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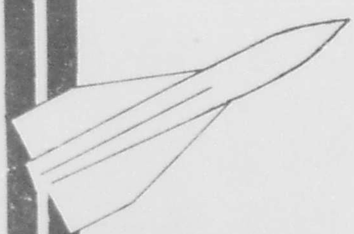

The Missile and Munitions Center Team

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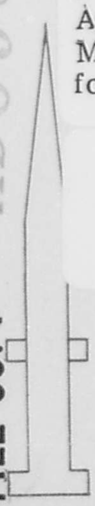

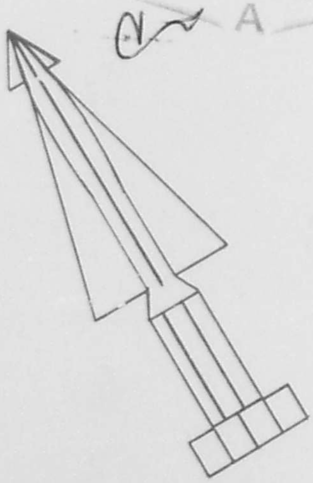

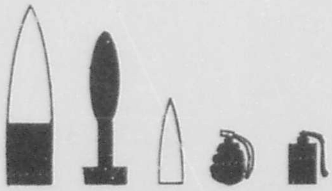

MISSILE AND MUNITIONS EVALUATION (MAME-71)

FINAL REPORT

Second Printing - December 1971

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Redstone Arsenal, Alabama
35809

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407 320

DEPARTMENT OF THE ARMY
UNITED STATES ARMY MISSILE AND MUNITIONS CENTER AND SCHOOL
REDSTONE ARSENAL, ALABAMA 35809

ATSMM-D (6)

SUBJECT: Missile and Munitions Evaluation (MAME-71). (9) Final Report. Apr-Sep 71.

(11) Dec 71

(12) 514p.

1. In late 1969, the Missile and Munitions Center Team at Redstone Arsenal approved a proposal to combine their joint-command resources and conduct a comprehensive field survey of missile and munitions support units worldwide. After securing the necessary concept approvals and theater clearances, the survey was conducted in CONUS, USAREUR, USARPAC and USARAL during the period April - September 1971. This final report compiles the resultant findings, conclusions and recommendations of the MAME-71 endeavor.

2. As director of the project and the one who performed advanced party liaisons in each theater, I would like to extend a sincere expression of appreciation and gratitude to all those who joined hands to make this project possible. Primarily, I wish to thank the hundreds of individuals in the field who graciously gave us of their valuable time and talents to identify logistics problems and specify recommended solutions. In a very real sense this is not our report, but an accumulation of the information we were told by field personnel.

3. This entire project was conceived, from the outset, to be a means of self-criticism. In other words, we in the Center Team needed to know precisely what we're doing wrong, or how we can better provide logistics doctrine, training and materiel to the field. Therefore, our intent is not to offend or incriminate any command, unit or individual. Our purpose is rather to stimulate thinking and motivate actions to improve the support and insure the readiness of our materiel. It is to this end that this MAME-71 final report is dedicated.

D. S. Hanline

D. S. HANLINE
COL, OrdC
MAME-71 Project Director

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MISSILE AND MUNITIONS EVALUATION (MAME-71)

FINAL REPORT

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MISSILE AND MUNITIONS EVALUATION (MAME-71)

FINAL REPORT

INTRODUCTION

GENERAL:

The MAME-71 Project was conceived, sponsored and conducted by the Missile and Munitions Center Team. The purpose of the endeavor was to gather pertinent logistical support data from the field in the areas of rockets, guided missiles, conventional ammunition and special ammunition. The resultant findings, conclusions and recommendations will provide a basis for concerted action, or in some cases further study, by the Center Team membership. The constituted membership of the Missile and Munitions Center Team is as follows -

contin p. iv

US Army Missile and Munitions Center and School (USAMMCS)
US Army Combat Developments Command, Maintenance Agency (USACDCMA)
US Army Combat Developments Command, Supply Agency (USACDCSA)
US Army Missile Command (USAMICOM)
US Army Munitions Command (USAMUCOM)
US Army Safeguard Logistics Command (USASAFLOG)
*Field Command, Defense Nuclear Agency (FC, DNA)

*Associate member only.

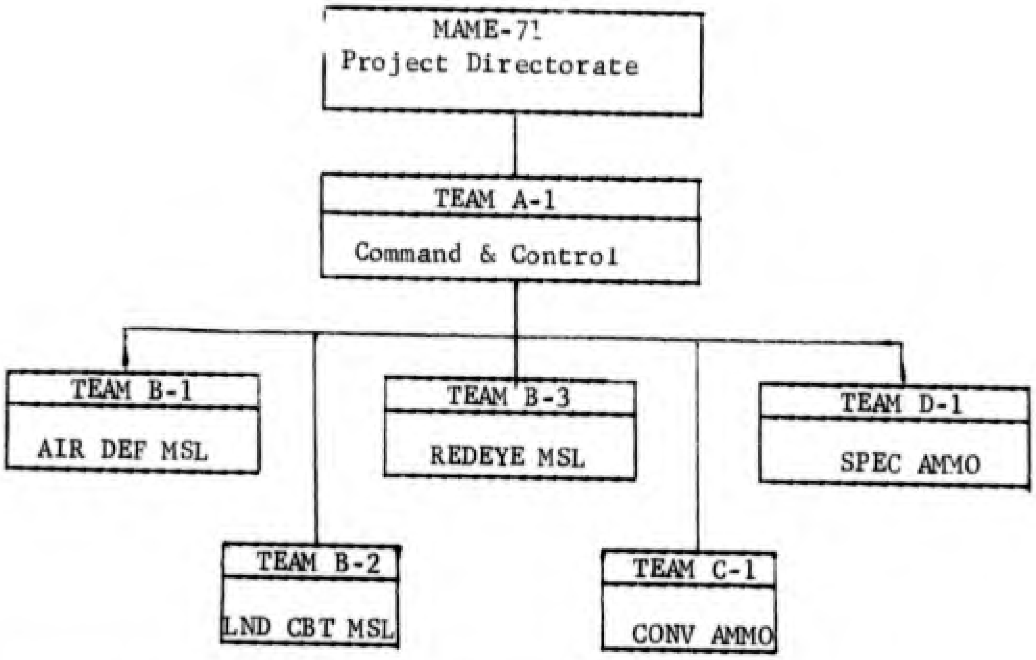
In addition to the participating and/or sponsoring organizations cited above, the following organizations have also assisted in the project -

DA, Deputy Chief of Staff for Logistics
DA, DCSPER, Enlisted Evaluation Center
US Continental Army Command
US Army Air Defense School
US Army Field Artillery School
US Army Ordnance Center and School
US Army Combat Developments Command, Air Defense Agency
US Army Combat Developments Command, Artillery Agency
US Army Combat Developments Command, Nuclear Agency
US Army Metrology and Calibration Center
US Army Weapons Command
All CONUS and Overseas Commands and Armies

This protective marking is canceled on 1 November 1974.

PROJECT ORGANIZATION:

The MAME-71 Project was conducted under the auspices of the Missile and Munitions Center Team. The Center Team concept was employed to facilitate project development and implementation actions, and the project directorate reported directly to the Center Team chairman. The internal organization of the MAME-71 project is shown below:



PROJECT DATA COLLECTION AND ANALYSIS PERSONNEL:

One of the objectives in conducting this project on a combined-command basis was the conservation of resources. It was observed that most of the Center Team commands had specific requirements for conducting field evaluations to gather information in their respective proponency areas. MAME-71 attempted to fulfill all participating commands data requirements without impacting on any one element disproportionately. Therefore, the personnel, workloads, and resultant costs were distributed over each of the commands. The following table summarizes those who participated in the MAME-71 endeavor, their organizations, and degree of involvement in the data collection effort:

TEAM	NAME	GRADE	ORGANIZATION	CONUS	USAREUR	USASETAF	USARPAC	EIGHTH USA	USARYIS	USARV	USARAL
A-1	*Donald S. Hanline	COL	USAMMCS	X	X		X	X	X		
B-1	Freddy L. Harris	CPT	USACDCMA	X	X				X		X
B-1	Jack L. Matthews	GS-12	USAMMCS	X	X			X	X		
B-2	Lawrence B. Residori	MAJ	USACDCMA	X	X			X			
B-2	Michael P. Howard	CPT	USAMMCS	X	X						
B-3	James C. Hooper	GS-12	USAMICOM	X	X						
B-3	Edwin L. Grady	GS-12	USAMICOM	X							X
C-1	James D. Rowan	MAJ	USAMMCS	X	X			X		X	
C-1	Francis W. Frankenburg	GS-12	USAMUCOM	X	X				X		X
C-1	Robert N. Brewer	GS-12	USACDCSA		X						
D-1	**William L. Strickland	MAJ	FC, DNA	X	X	X					
D-1	Donald W. Blaisdell	CWO	FC, DNA	X	X	X					
D-1	Jerry D. Brakhage	GS-12	USAMUCOM	X	X	X		X			
D-1	Asa A. Hord	GS-12	USACDCSA		X						

*Project Director
**Retired

CHRONOLOGY OF SIGNIFICANT EVENTS:

The MAME-71 Project was conducted in three phases: Phase I - Planning and Development; Phase II - Field Visits and Data Collection; and Phase III - Data Collation and Analysis, and Final Report Development. The significant milestones are as follows:

PHASE	ACTION	DATE
I	Concept Proposed to Center Team	5 Nov 69
I	CONARC Approval	19 Mar 70
I	CDC Approval	28 Sep 70
I	AMC Approval	3 Nov 70
I	DA, DCSLOG Approval	1 Feb 71
I	Evaluator Training Session	22 - 26 Mar 71
I	Theater Clearances Obtained	Apr - May 71
II	CONUS Survey	31 Mar - 21 Apr 71
II	USAREUR Survey	5 May - 31 Jun 71
II	USASETAF Survey	23 Jun - 1 Jul 71
II	USARPAC Survey	13 - 16 Jul 71
II	EIGHTH USA Survey	14 Jul - 20 Aug 71
II	USARYIS Survey	1 - 16 Aug 71
II	USARV Survey	13 - 29 Aug 71
II	USARAL Survey	16 - 29 Aug 71
III	Data Collation and Analysis	1 Sep - 1 Oct 71
III	Briefing at Chief of Staff's Forum for Center Commanders	23 Sep 71
III	Availability of Final Report	Nov 71

(cont to p.)

ORGANIZATION OF REPORT: (of this report)

In order to facilitate the utilization of this final report, the discussion portion is ~~sub~~divided in accordance with the five basic areas that were surveyed: Air Defense Missile Systems; Land Combat Missile System; Conventional Ammunition; Special Ammunition; and Redeye Missile System. An expandable decimal numbering system for problem discussions and paragraphs is employed in order to simplify the referencing of data in accordance with the applicable commodity area (Air Defense Missiles, Land Combat Missiles, etc.), and with functional categories of evaluation (doctrine, training, materiel). Likewise, the pages are numbered with an analogous numbering scheme.

These divisions are subdivided according to

To quickly reference the more specific problem areas discussed, the reader should consult the "INDEX" at the beginning of each commodity area discussion. It will be seen that the specific problem discussions are arranged in a logical sequence in which related problems are grouped together.

The terminal conclusions and recommendations for <u>all</u> areas are consolidated at the end of the report (paragraph 6.-series and 7.-series). This is done to enable the reader to go to <u>one</u> location for all project conclusions and recommendations. Further, some of these items are applicable to more than one area (e.g., an Air Defense-developed issue and course of action may also apply to Land Combat), and the grouping of conclusions and recommendations facilitates the interface of actions proposed.

AVAILABILITY OF FURTHER INFORMATION OR INPUTS:

The information portrayed in this report represents only the more significant and well defined problem areas that were obtained during MAME-71. The conclusions and recommendations presented are based upon considerable data collected from many sources, and the observations of the individual evaluators. It should be pointed out that the detailed information, upon which this report is based, is available for further analysis at the Project Directorate. Included in this repository are the completed questionnaire booklets, data collation summaries, statistical recaps, SOP's, MTOE's, reports, organizational charts, etc.

It would also be appreciated if readers of this report would apprise the Project Directorate of any technical errors, new logistical procedures, or additional data that may have a bearing on the actions that are recommended in this report.

The point of contact for such inquiries or inputs is as follows:

Commandant
US Army Missile and Munitions Center and School
ATTN: ATSMM-D (Project MAME-71)
Redstone Arsenal, Alabama 35809

1. AIR DEFENSE MISSILE SYSTEMS

INDEX FOR AIR DEFENSE MISSILE SYSTEMS REPORT

1.1. GENERAL INFORMATION AND DEFINITIONS.

In this portion of the MAME-71 Final Report, Air Defense Missile Systems are identified to be those AD systems that are usually defined as "high cost, low density." Specifically, the NIKE HERCULES and HAWK AIR DEFENSE GUIDED MISSILE SYSTEMS are portrayed. The "medium cost, high density" air defense systems, such as Redeye and Chaparral/Vulcan, are presented in Functional Area numbers 2. and 5. in this report. The data to follow was collected, collated, and analyzed by the MAME-71 evaluators on the Air Defense Missile Team (B-1) and the conclusions and recommendations are based upon a survey of U. S. Army Air Defense units in CONUS, Europe, Korea, Okinawa, and Alaska. This data gathering endeavor encompassed the period: April 1971 through August 1971.

1.2. COMMAND AND CONTROL

The current command and control structure for Air Defense units in overseas locations, to include the supporting logistics activities, is protrayed in Inclosures 6-1, 6-2, 6-4, and 6-5. The ARADCOM/CONARC structure employed in CONUS is not portrayed due to the small sampling of these type units that was made during MAME-71.

1.3. AREA DESCRIPTIONS

In order to better comprehend the current problems or situations in the field, it is necessary to understand the basic structure employed for support of Air Defense Systems. The following is a brief portrayal of the support system employed in each area visited.

1.3.1. CONUS

The tactical Air Defense missile battalions are organized under regional Artillery Brigades. The specific location of all units to include the associated command, control, and logistical support structures can be found in ARADCOM Pam 10-2, Organization Chart and Station List. The DS/GS support elements are organized as a part of the garrison (post, camp, and station) support. At Homestead AFB, the support of the HAWK and NIKE HERCULES missile systems is provided by a Third US Army Logistical Support Group (TUSALOG). Operational control of these support activities is exercised by the applicable CONUS Army, DCSLOG, which is responsive to direction from HQ, CONARC. The tactical Air Defense battalions are organized under TOE, modified to accommodate the ARADCOM mission. The support organizations are structured by TDA and are composed predominantly of DAC employees and equipment that is not in a tactical configuration (i.e., mounted in vans, tactical vehicles for unit mobility, etc.).

1.3.2. USAREUR.

Air Defense is organized under the 32nd Air Defense Command (32nd ADCOM), which has three Artillery Groups as intermediate commands. (See inclosure 6-5) All direct support elements are organized as "Direct Support Platoons" of the supported Air Defense Artillery Battalion. These elements are organized under a modified version of TOE 44-536D (NIKE HERC) and TOE 44-.36D (HAWK). In some cases the MTOE varied considerably from the DA approved TOE due to theater ceilings, changes in mission, MOS changes etc. General support maintenance is provided by a single GMGS company (i.e., 4th Ord GMGS) which is organized under a modified version of TOE 9-227E. The merger of a HAWK-NIKE HERC Supply Depot into this company for the theater-wide provisioning of missile system peculiar repair parts was scheduled for implementation in July 1971. Class V maintenance support services for the Air Defense missiles are provided by a Guided Missile Large Rocket (GMLR) element of the 9th Ord Ammo Co. Unserviceable electronic components of missiles are repaired by the GMGS Company on a repair-and-return basis or by DX. The General Support Company is under the command and operational control of the Advanced Weapons Support Command, which also commands all USAREUR Special Weapons (Depot) activities.

1.3.3. EIGHT US ARMY

The tactical Air Defense Missile battalions are organized under the 38th Artillery Brigade, with no intermediate groups or headquarters (See inclosure 6-4). Direct support is provided by organic DS elements in each battalion. A recent MTOE modification has redesignated these elements, (formerly DS Platoons of the Headquarters Battery) as DS Detachments and assigned them to the Battalion Headquarters for operational control. In reality, these "detachments" are essentially the same as the former platoons except for deviations that will be described in this report. The TOE employed are modified versions of TOE 44-536G (NIKE HERC) and TOE 44-236G (HAWK). All battalions are standard four-firing battery size, except for one Nike Hercules Battalion (4/44th Arty) which consists of six firing batteries. The direct support personnel and equipment authorizations are proportionally larger in this battalion. General support maintenance is provided by a single GMGS company (30th Ord GMGS), which is organized under a modified version of TOE 9-227E. This GMGS Company supports the Nike Hercules and Hawk as well as the Sergeant missile systems. The Nike Hercules Platoon of the 30th Ord GMGS Company is physically separated from the company area (3 hours one-way by tactical vehicle). The company recently activated a Central Maintenance Facility (CMF) for the DS and GS support of the electronics portion of the HAWK Missile. The GS company is organized under the command of two non-missile type headquarters (an automotive maintenance battalion and a general support group). The preponderance of mission-type operational control is exercised by the AC of S for Ammunition, KORSCOM. Repair parts supply is provided to all units from an ASCOM Depot; however, HAWK system-peculiar repair parts are handled separately by a Missile Supply Element (MSE), a system-dedicated activity at ASCOM, and controlled by the 30th Ord Co. Plans are to establish a similar dedicated activity to provide supply support for the Nike Hercules system sometime in the future.

1.3.4. USARYIS

Air defense in Okinawa is provided by one Nike Hercules battalion and one Hawk battalion. These battalions are commanded by an Air Defense Brigade, which also commands the 44th Ordnance Support Company (See inclosure 6-2). This company provides direct and general support to the missile battalions. Depot supply and backup maintenance support for Engineer, Signal, and Automotive items is provided by a consolidated theater support activity, the 2nd Logistics Command. The DS/GS company is organized under a highly modified version of TOE 9-247G. The personnel, equipment, supplies, and float items are consolidated both geographically as well as functionally. Thus, the concept of "one stop service support" for Air Defense is fully manifested in this unit. Command and operational control of the company is coordinated by a Brigade Ordnance Officer, who is physically positioned in the shop area. The company handles all its own administrative functions (e.g., personnel services, messing, unit supply, etc.), and has a separate Company Administration element, divorced from the shop, to perform these services. Except for liaison with the 2nd Log Command for supply and backup support, the GM-GS/DS company is fully autonomous and solely commanded by the Air Defense Brigade.

1.3.5. USARAL

The Air Defense structure in Alaska is limited to one Nike Hercules battalion consisting of three firing batteries. This battalion is commanded by a reduced Artillery Group, and the battalion commands and exercises operational control over an Ordnance Missile DS/GS Company which provides the battalion direct support and general support services, to include special weapons support of Class V missile items (See inclosure 6-1). Reductions in tactical units, and hence support requirements, has necessitated a reorganization of the logistics support structure, a move that was consumated shortly before the MAME-71 survey. The GM-GS/DS company is organized under highly modified version of TOE 9-247G, a new version of which was pending at the time of the survey. The perponderance of support to Air Defense units is provided by this company with all backup or special support functions provided by the US Army Garrison at Fort Richardson. Repair parts and principal item supply is coordinated by the Supply Control Center at Fort Richardson.

1.4. UNITS CONTACTED DURING SURVEY

The following is a list of specific Air Defense headquarters and units that were directly contacted during the MAME-71 evaluation -

1.4.1. CONUS (USA)

31st Artillery Brigade (NIKE HERC/HAWK)
Third US Army Logistical Support Facility (Homestead AFB,FL)
35th Artillery Brigade (NIKE HERC)
HQ, First US Army, DCSLOG (Fort Meade, MD)
Directorate of Industrial Operations, Missile Support Section (Fort Meade, MD)

1.4.2. USAREUR (Germany)

HQ, USAREUR, DCSLOG & Liaison Assistance Office
HQ, Theater Army Support Command (TASCOM)
Advanced Weapons Support Command (AWSCOM)
Materiel Command (MATCOM)
32nd Air Defense Command (32nd ADCOM)
94th Arty Gp (NIKE HERC)
69th Arty Gp (HAWK)
10th Arty Gp (HAWK)
6th Bn, 562nd Arty (HAWK)
6th Bn, 517th Arty (HAWK)
6th Bn, 52nd Arty (HAWK)
3rd Bn, 7th Arty (HAWK)
6th Bn, 59th Arty (HAWK)
6th Bn, 62nd Arty (HAWK)
2nd Bn, 56th Arty (NIKE HERC)
3rd Bn, 71st Arty (NIKE HERC)
5th Bn, 1st Arty (NIKE HERC)
4th Ord GMGS Co (HAWK/NIKE HERC)
9th Ord Co (Ammo) (Guid Msl Large Rkt Spt Elem)

1.4.3. EIGHT US ARMY (Korea)

HQ, Eight US Army, G-4 and Liaison Assistance Office
Korean Support Command (KORSCOM), ACofS, Ammo
38th Arty Bde (AD)
2nd Bn 71st Arty (HAWK)
6th Bn 44th Arty (HAWK)
7th Bn 2nd Arty (HAWK)
4th Bn 44th Arty (NIKE HERC)
30th Ord GMGS Co (HAWK/NIKE HERC/SGT)
ASCOM Missile Support Element (Supply Depot)

1.4.4. USARYIS (Okinawa)

HQ, USARYIS, Liaison Assistance Office (MICOM)
30th Arty Bde (AD)
44th Ord GMGS/DS Co (HAWK/NIKE HERC)
8TH Bn 3rd Arty (HAWK)
3rd Bn 81st Arty (NIKE HERC)

1.4.5. USARAL (Alaska)

HQ, USARAL, G-4
87th Arty Bde (AD)
4th Bn 43rd Arty (NIKE HERC)
524th Ord GMGS/DS Co (NIKE HERC)

In each Air Defense Battalion shown above, the MAME-71 team concentrated their efforts primarily in the Ordnance direct support element. In addition, the Battalion Commander and one or more Firing Batteries (i.e., Artillery users) were also contacted in order to verify, amplify, or modify data regarding the logistics support of the system. The Ordnance GS or DS/GS units were surveyed in depth, to include associated supply depots and Class V support elements. Those logistics elements of major or intermediate headquarters that provide command, staff supervision and/or control of Air Defense support were contacted to corroborate data, secure information or coordinate visits to subordinate units. Approximately 310 individuals (all grades and skill levels) were directly contacted during the course of the Air Defense survey on a world wide scale. Every facet of logistics support of Air Defense missile systems was addressed and examined in each unit surveyed.

1.5. SUPPORT UNITS ORGANIZATIONAL STRUCTURES

Much of the discussion to follow will refer to certain features of organization currently implemented in the field by Ordnance support units. As stated in the Area Descriptions for each theater (1.3), there is a wide variance in the command and control, TOE/MTOE employment, and support service provisioning between the areas surveyed. Likewise, the internal organizations of these support units varied especially with respect to DA doctrine (viz., TOE, maintenance support plans, FM, etc.). Therefore, a diagram depicting the internal organization of each missile support unit has been included in this report. These diagrams are provided as inclosures 1-1 through 1-20. Each diagram is marked with the unit being depicted, and is arranged in theater/area sequence (i.e., CONUS, USAREUR, Eight US Army, USARYIS, USARAL).

1.6. REPORT ORGANIZATION

The data to follow is a resume of the problem areas that the evaluators identify as being significant and fully supported by the data that was collected, collated, and analyzed. The problems cited pertain to both the HAWK and the NIKE HERCULES missile systems unless specified otherwise. Likewise, the problems are treated on a worldwide basis unless identified as being applicable only to a specific area/theater.

The discussion portion of the report is subdivided into four functional areas: Doctrine, Organization, Training, and Materiel; however, an item may overlap into several areas (e.g., doctrine and training). In such circumstances the problem description is arranged under the most appropriate functional area with reference made to other areas affected. This portion of the report is intended to provide backup information, discussion, and analysis of selected problem areas. The terminal conclusions and specific recommendations are cited in functional areas 6.1 and 7.1 of this report.

1.7. AIR DEFENSE MISSILE SYSTEMS PROBLEM AREAS - DOCTRINE

1.7.1. Direct Support/General Support Operations.

1.7.1.1. Background.

Current doctrine portrays direct support of high cost, low density missile systems as being provided by the battalion support maintenance platoons which are organic to air defense missile battalions, and general support being provided by guided missile general support maintenance companies on an area basis. The direct support platoons render supply and maintenance support services to the battalion, chiefly to the firing batteries. The platoon will consist of supply and maintenance personnel who provide direct support services both on-site and in the shop area. The General support companies provide general support maintenance for all components of supported missile systems and associated ground guidance, launching, handling, and test equipment. The company is also tasked to provide backup direct support and overflow support to supported units.

1.7.1.2. Analysis.

Three theaters (CONUS, Okinawa, Alaska) are currently supporting high cost, low density missile systems with combined direct support and general support facilities. These facilities are functioning exceptionally well and are providing outstanding support to the firing batteries. In one theater (CONUS) the firing batteries are widely dispersed while in two theaters (Okinawa, Alaska) the firing batteries are located relatively close to the support facility. In the absence of doctrine, guidance and organizational structures for combined DS/GS operations, each of the facilities had its own distinct organizational structure and method of operation. The CONUS facilities were operating under the CONUS installation maintenance concept. Okinawa was organized along direct support lines (DX, shop stock, tech supply, etc.,) but was in reality, doing both DS and GS level work. The command and control was the standout feature of the Okinawa missile support company. The combined direct support and general support company was organized under the artillery brigade instead of the artillery battalion. This concept worked exceptionally well because it provided dedicated support to artillery units while insuring that legitimate maintenance and supply procedures are adhered to. Units organized directly under the artillery battalion often sacrificed, due to command pressures, the ability to enforce good maintenance and supply practices. Alaska was organized primarily along general support lines and, using the MSSL, was handling all chassis on a repair-and-return-to-stocks basis. No DX was available and using units turned in unserviceables to tech supply and were issued a serviceable item as a supply action. The shop was using projected stocks instead of shop stock and production control was controlling shop operations.

The survey reveals that current doctrine does not adequately provide for combined direct support and general support operations. Certain areas can realize a significant dollar saving in personnel, equipment and facilities by using this approach. These facilities provide good support and exhibit a well defined potential for future doctrine. The general support approach being employed in Alaska and the command and control system in Okinawa are unique and display advantages that should be explored.

1.7.1.3. Summary.

Combined direct support and general support units are currently in operation and displaying a capability for providing excellent support. Combined direct support and general support units are fielded in sufficient quantities to justify the development of doctrine, organization and guidance. The general support approach employed in Alaska and the command and control procedures utilized in Okinawa have demonstrated potentials that merit further study and consideration in developing combined direct support and general support concepts for missile systems. The data collected by the field survey can be of significant value for further analysis in evolving doctrinal coverage of a combined direct support and general support organization.

1.7.2. Consolidated Support For Missile Guidance Packages.

1.7.2.1. Background.

Current doctrine for the maintenance of missile guidance packages (i.e., non-explosive portion of the missile) states that either the guided missile direct support or general support unit is capable of providing this service. This support is envisioned as being performed by the Ground Handling Support Section of TOE 9-59, 44-236, 44-256, and 44-536. This support is provided in conjunction with other support services (contact team calls, launcher support, etc.).

Historically, the support of this materiel has been critical since guidance equipment tends to be very sensitive, and the standards and criteria for flight items are of a close tolerance. The concept of performing these critical repairs in a forward location (with an uncontrolled environment, relatively loose quality control, little specialized soldering equipment, and test and measuring equipment that may be of dubious condition) raises significant questions as to the effectiveness and reliability of such an approach.

1.7.2.2. Analysis.

During the course of the field survey it was noted that overseas theaters are employing different systems in different areas for the support of the non-explosive portions of the missiles. It was observed that the "classic" doctrinal system is not adequate in all situations, especially whenever there is some question as to condition of stocks or quality of support. Some theaters have experimented with new approaches for the support of missile guidance packages. This suggests that current doctrine may either be deficient or not broad enough to cover all field requirements.

In USAREUR a special Guided Missile, Large Rocket support element was organized under the Special Ammunition General Support Company for the support of the Class V portion of the low density, high cost missiles. (NOTE: See item No. 1.7.3. in this report for a detailed description of this system.) The non-explosive components of the missile that are determined to be unserviceable are evacuated to a Guided Missile General Support Company for DX or repair-and-return. In most cases, these items are components of the guidance package (i.e., chassis, platters, and repair parts) and not the entire package. Similarily, the support of the artillery battalion stock of missiles is provided on a component repair basis by the organic missile direct support element. A system, similar to that used in USAREUR, is also employed in USARYIS and USARAL except that the density of stocks is smaller and DS and GS support elements are consolidated.

In Eighth US Army, a novel and entirely new approach for the HAWK missile was being implemented at the time of the survey. This concept envisions a single location at which all missile guidance packages can be processed for repair. This activity is called the Central Maintenance Facility (CMF) and is operationally controlled by the Guided Missile General Support Unit. Support functions performed include repair of the guidance packages, flight cables, actuators, and gyros. Highly reliable support is achieved through using a controlled environment, specialized repair facilities, selected highly proficient repairmen, use of precision test, measuring and repair equipment, and an elaborate quality control scheme. The CMF is collocated with the GMGS Co., but a dedicated system is used for production control, quality control, DX, shop stock, and other shop-management functions.

What is truly unique about this support concept is that all missile electronic repairs are done at one location, both for the support of the theater depot stocks and for the unserviceable battalion stocks. An element of the CMF, located at the Class V stockage point with appropriate personnel and equipment, determines the serviceability of depot stocks. Air-lift transportion is used to convey the complete guidance packages to and from these points. Under the current system, the CMF accepts guidance packages on a DX basis from either the Air Defense Brigade units or the Special Ammunition Depots. It is anticipated that eventually this system should evolve into a more simplified operation in which the user will turn-in unserviceable rounds to the depots and be issued a serviceable round in return; the depot will then job order unserviceables to the CMF. This process will require only one point of missile breakdown instead of two. Additionally, this system will also suffice for the requirement to rotate stocks and conduct annual serviceability checks of missiles.

The "beauty" of this system is that it appears to work, and based upon MAME-71 comparative data it works admirably well. It also appears that this concept (or a variation thereof) will exist for quite some time to come in Eighth Army, and may have potential application in other theaters. Further, there are indications that the trend toward "wooden round" missiles will necessitate a revision to present doctrine. It would appear, therefore, that the concept briefly portrayed herein, may have merit for inclusion in doctrine, consideration for application in maintenance support concepts for new missiles, and possible implementation worldwide for certain missile systems.

This discussion has been brief, however, the detailed data accumulated during the field survey can be used as a basis for action and/or further study. This includes: personnel requirements, equipment requirements, standard operating procedures, quality control criteria, standard forms and reports, production control, and control procedures. This information can be made available from the MAME-71 project.

1.7.2.3. Summary.

The inherent sensitivity and recurring problems associated with the maintenance support of missile guidance packages would suggest that the current system (i.e., doctrine, organization, maintenance concept, and provisioning) for the support of these items may be inadequate or inefficient. The Central Maintenance Facility (CMF) employed in one of the overseas theaters is one method of overcoming certain problems. The organization and methodology used can serve as a basis for revising doctrine, developing maintenance support plans for new systems, and implementing the system on a larger scale. The data collected during the field survey is available for further analysis in refining and standarizing operations, and improving doctrine for logistics support of the non-explosive portions of guided missiles and large rockets.

1.7.3. Doctrine for Class V Missile Maintenance of High Cost, Low Density Systems.

1.7.3.1. Background.

Current doctrine calls for missiles to be stocked by the special ammunition direct and general support companies and issued to the firing units in a ready-for-issue condition. The special weapons direct support companies have no capability, other than visual inspection, to determine condition. Therefore, in-storage maintenance on Class V components of a missile must be accomplished by the special ammunition general support company. Maintenance on the Class VII and IX components, whether the missiles are in the special ammunition general support company or direct support company, will be performed by the missile direct or general support companies. Class VII and IX maintenance support will be requested by the special ammunition company when it is required. The firing unit will have the skills and equipment required to perform preflight checkout of missiles and effects most of the necessary repairs. The supporting missile unit will have contact teams available to assist with on-site repair, when required. Missile complete rounds, which cannot be repaired with organizational test equipment, will be evacuated to the supporting special ammunition company, and unserviceable missile components will be evacuated to the missile unit.

1.7.3.2. Analysis.

Current doctrine portrays a system requiring a high degree of coordination between special weapons units and missile support units which is difficult to establish when a concerted effort is put forth by all concerned and virtually impossible to accomplish otherwise. Under current doctrine the special weapons company cannot verify the serviceability of missiles received and stored in theater without personnel and equipment being provided by missile support units. Total Class V missile maintenance requires services that are performed jointly by personnel from both the special weapons company and the missile support company using facilities and equipment of both units. Listed below are critical areas of missile maintenance, that must be performed, which will normally require the assistance of a missile support unit:

(1) HAWK

a. Inspection, disassembly, and test of complete rounds.

b. Removal, inspection, tests, and installation of the explosive release device, EPU igniter, EPU fuel stick, rocket motor igniter, rocket motor initiator, safe and arming device and warhead.

c. Inspect and repair storage container.

(2) Nike Hercules

a. Removal and disassembly, if defective or unserviceable, of the explosive harness assembly, thermal battery, and motor mount anchor nut assembly.

b. Inspect and electrically test rocket ignitor and safety and arming device.

c. Inspect and test guidance set squib battery; and inspect and repair the storage container.

(3) Sergeant

a. Inspection of rocket motor for liner-to-case and liner-to-propellant separations; propellant grain for cracks, breaks and voids; and storage container.

b. Remove, disassemble, assemble, and install the initiator assembly and locking mechanism, bracket lock assembly, forward launching hook, skin, aft body assembly, dessicant container and cable assembly set.

(4) Pershing

Inspection and testing of guidance section, motor ignitor initiator, battery assembly, explosive connector switch, squib, propulsion section, motor propellant and nozzle, thrust termination system, safe and arming device, explosive bolt cartridge, and shape charge retainer assembly.

Currently the determination of specific responsibilities and requirements must be achieved by active and frequent liaison between units involved - which is generally not being done.

USAREUR has established a guided missile and large rocket operation (GMLR) (see inclosure 1-13) for the receipt, storage, stock accounting, maintenance (Class V) and issue of theater stocks. This operation is organized under the special ammunition general supply company (9th Ordnance Co). This operation has developed complete check procedures for receipt, in-storage and issue of missiles for the theater. A missile Class V maintenance shop has been established with adequate mixes of personnel (both special ammunition and missile repairmen) and equipment (OMTS, etc.) to perform all necessary checks on complete rounds (if appropriate) and explosive components. This operation assures, for the first time, that asset receipts are in fact serviceable, in-storage assets are properly coded, and that serviceable assets are issued to firing units. In short, this unit performs all functions normally associated with the special ammunition company plus those requiring assistance from the missile support unit (listed above).

The Korean theater has accomplished basically the same concept in HAWK support by attaching a team, complete with equipment, to the special weapons company. The team personnel and equipment provisioning are provided by the GMGS company.

Current doctrine is difficult to administer and appears to work only when the GMGS platoon is collocated with the special weapons company, as it is for Nike Hercules in Korea. The survey reveals many benefits in an organization similar to the one established in Germany or the related one for HAWK support in Korea. This organizational concept provides the special ammunition company with the means of issuing missiles in a <u>verified</u> ready-for-issue condition. It assures the special ammunition company that its assets are properly accounted for and in their proper condition code. This organization insures that missiles are verified upon receipt and proper disposition made.

1.7.3.3. Summary.

Current doctrine is inadequate in the area of Class V missile maintenance and should be expanded in its coverage. The information collected by the MAME effort depicts the need for an organization, either as an integral part of the special ammunition company or a separate detachment, capable of performing total Class V maintenance. This organization should be provisioned with personnel and equipment necessary to perform Class V maintenance, to verify assets in storage, and to perform preflight checkouts of missiles to be issued to firing units. The data collected during the survey could be utilized in the development of personnel and equipment authorizations.

1.7.4. Theater Missile Supply Support.

1.7.4.1. Background.

Current doctrine depicts the DS units as providing retail supply support to the using units. The DS units transmit supply requisitions direct to the Inventory Control Center (ICC) of the TASCOM Supply and Maintenance Command (SMCOM). Missile general support units are portrayed as normally being collocated with the ammunition supply units in an ammunition depot complex and would also transmit its requisitions to the SMCOM ICC. The ICC directs release of the items from the appropriate Missile and Aircraft Repair Parts Company having responsibility for the stock control, receipt and issue of the desired items.

1.7.4.2. Analysis.

The field survey revealed that the system of theater missile supply support portrayed in doctrine (FM 9-6 & 9-59) is not being utilized. Both Okinawa and Alaska are organized with a DS/GS unit providing total support for both supply and maintenance with replenishment requisitions going through a theater supply control center directly to CONUS. In Germany the DS and GS units were requisitioning through MATCOM who directed a material release from one of their five (5) conventional Army depots, in the absence of the Missile and Aircraft Repair Parts Company depicted in doctrine. Germany was preparing to change this system into one where the DS units would requisition directly from missile peculiar depots located at and under the operational control of the GM GS company for a particular missile system. The 4th Ordnance GM GS Company would have the total HAWK and NIKE supply support mission for the theater. Replenishment requisitions would go through MATCOM, for financial management, directly to CONUS.

The net outcome would be a theater missile peculiar supply system for Nike Hercules and HAWK with asset receipt, storage, issue and stock accounting at the GMGS maintenance company.

Nike Hercules and HAWK units in Korea were operating under two distinctively different supply support systems and the collated data portrays a distinct and significant difference in responsiveness. The Nike DS units transmit replenishment requisitions to the 8th US Army Korean Support Command (KORSCOM) Inventory Management Center (IMC). The IMC forwards a MRO to the ASCOM Army Depot. No Missile and Aircraft Repair Parts Companies are being utilized. The KORSCOM IMC is responsible for requisitioning replenishment stocks from CONUS. The HAWK DS units requisition from the Missile Support Element (MSE) of the 30th Ordnance GMGS Co. The MSE is responsible for requisitioning HAWK missile repair parts for the theater. The MSE is responsible for stock accounting, receipt, storage and issue, to DS units, of all theater HAWK peculiar repair parts. The net result is a HAWK peculiar theater supply system.

Analysis of the collected data indicates that the HAWK peculiar system is far more responsive. Repair parts are reaching the user in a significantly shorter time span. The average 02 priority response time with the MSE dedicated system is 9.5 days compared to an average of 24 days for NIKE using the conventional system. The current trend is toward a dedicated theater supply system for missile support.

1.7.4.3. Summary.

The units in the theaters appear to be reorganizing under system peculiar missile supply support concepts that are generally under the operational control of the GMGS companies or GM DS/GS companies. This reorganization tends to increase the effectiveness and responsiveness of missile supply support in the theater of operations. Current doctrine has never been fully implemented and the trend is not in that direction. Current doctrine should be reassessed using the data collected during the course of the MAME-71 endeavor. The data collected points out numerous advantages in having supply support on a dedicated basis, and that a separate theater missile supply system would be feasible and desirable.

1.7.5. Reduction in Mobility of DS and GS Units.

1.7.5.1. Background.

Current doctrine for the mobility of Air Defense missile support units envisions that it will be "100% mobile with organic vehicles". An exception to this is the TOE for Basic HAWK (44-236) which provides for three levels of mobility -- fixed, semi-mobile, and mobile. The AD General Support Unit (TOE 9-59) provides for 60% mobility for the purpose of tactical movement in organic vehicles, and a 100% mobility in two lifts for administrative movement.

The field survey did not address the mobility requirements and problems of tactical units (e.g., AD Battalions and Firing Batteries), but restricted itself to the DS and GS support units. The following analysis, therefore, is limited to support units.

1.7.5.2. Analysis.

Investigation into the actual mobility-capability of support units worldwide reveals that such units consider themselves to be anywhere from 0% to 90% mobile. The average figures obtained were: Nike Hercules DS PLTS - 47%; HAWK DS PLTS - 45%; Air Defense DS/GS CO's - 0%; Air Defense GS CO's - 30%. The reasons for these relatively low mobility figures include such factors as: test equipment dismounted from shop equipment vans; non-availability of large tactical vehicles due to deadlines or shortages; excess supply inventory; provision of operational readiness float equipment without vehicles to move the float; lack of vehicles to move the NCR-500 computers; and lack of fork lifts to move large, bulk storage items. All units contacted were uniform in expressing the need for downgrading the mobility criteria for support units in DA doctrine. In one theater, the brigade had issued a new policy, articulated in new MTOE documents, to revise the mobility requirements to a "semi-mobile" condition, which approximates 25% mobility.

Retention of the high mobility requirement in DA-approved TOE not only conflicts with the preponderance of present field capabilities, but also creates other problems. For example, the attainment of a full 100% mobility necessitates TOE authorization of large quantities of heavy-duty tactical equipment (e.g., 2 1/2 T, 5T cargo trucks, or tractors). Under ordinary circumstances, these vehicles are not required, and indeed, present a major problem in keeping them maintained, road-worthy, and stored. The retention and utilization of such heavy tactical vehicles also results in significant problems in accident rates, personal morale, and restricting unit productivity.

On the other hand, the actual mobility requirements that are needed in the field were clearly identified by the units contacted. In summary, these are as follows:

a. DS units must have a 100% mobility for administrative movement.

b. DS units must have a 100% mobility for contact teams and technical assistance teams.

c. DS and/or GS units must have a limited mobility in the form of prime movers of certain operational readiness float items (e.g., generators, battery major items, etc.).

d. GS units must have a 100% mobility for administrative movement only.

In most cases, the above criteria could be achieved by the TOE authorization of a moderate number of light tactical or commercial vehicles (i.e., 1¼ T, 3/4 T or carryall vans) and a small number of heavy duty prime movers of the tactical type (i.e., 2½ T, 5 T). The exact quantities required must be determined by further analysis based upon the type unit and mission assignment. The additional mobility that would be required in the event of a tactical or geographical move could be provided by a transportation activity which would be tasked with furnishing this movement support. The infrequency with which such an event occurs in currently deployed Air Defense systems makes this proposal worthwhile, and it is believed that significant monetary savings could be achieved.

1.7.5.3. Summary.

The mobility requirements currently imposed by doctrine on Air Defense missile support units are unrealistic in view of actual needs and maximum efficiency. Fielded support systems are, in practice, in a semi-mobile configuration for DS units, and a semi-mobile or fixed configuration for GS or DS/GS units. In addition, the high mobility requirement imposed by current TOE gives the support units an unrealistic qualitative and quantitative authorization of tactical vehicles that are seldom used and inherently problematic. The provision in all DA-approved TOE of Air Defense support units for a semi-mobile and fixed configuration (and a corresponding reduction in the quantity and types of vehicles authorized) would alleviate many problems associated with automotive support and effect monetary savings. Correspondingly, the additional mobility requirements necessitated by a total move should be tasked to an appropriate supporting transportation activity.

1.7.6. Technical Assistance Service.

1.7.6.1. Background.

Technical assistance is currently intended as the service of providing instruction and technical guidance to supported units to enable them to perform their missions in a more efficient manner. When rendered in an effective manner, the provision of technical assistance should yield: (1) Enhanced relationship between supported and supporting unit; (2) Improved operational readiness of equipment; (3) Decreased maintenance demands of the supporting unit, (4) Reduced demands for repair parts. In missile support, the provision of technical assistance is considered particularly important due to the relative complexity of the equipment, the frequency of equipment modifications, advances in state-of-the-art, and the stringent requirements for maintaining a high state of readiness.

1.7.6.2. Analysis.

Review of field statistics points out that 95% of the DSP visited were not internally organized to provide technical assistance services. 90% indicated they made up a team when called upon to do so by the supported unit. The average time expended per month by HAWK and NIKE DSP on a worldwide basis was merely 45.7 manhours. 90% of the DSP indicated they did not receive technical assistance from anyone. Two units employed technical assistance techniques and one aggressively dispatched technical assistance teams. These units provided data and demonstrated by experience that for every manhour devoted to effective technical assistance service many manhours of repair would be saved at a later date. Supported units consistently discussed problems that would have been solved easily by technical assistance (canceled requisitions, procedural changes, SOP revisions, DX lists, etc.). All units visited expressed the desire to receive technical assistance and felt it would enhance cooperation and operational readiness. There was a general absence of knowledge regarding technical assistance and the lack of motivation toward it was apparent. Many felt that technical assistance was to be performed by the MICOM MMT and thus relieved them of the function. There is generally an absence of command emphasis and staff participation. Neither the supporting or supported units understand what their relationship with each other should be or what the technical assistance interface is.

Collected data reveals that technical assistance, as envisioned by doctrine, is not being performed in the field. Supporting unit and headquarters staff personnel are not familiar with the intent of technical assistance and do not realize the dividends to be realized from such a service. The personnel reflect an absence of TA training and attitude that should be instilled at CONARC training facilities. There is a void in technical assistance guidance for missile staff officers, resulting from the absence of a fielded staff officers field manual.

1.7.6.3. Summary.

Technical assistance is not being performed in the field, primarily due to lack of doctrine, training and motivation. The problem is further complicated by the absence of staff officer guidance. It would be desirable for the Missile and Munitions Center and School and the Air Defense Artillery School to put forth a concerted effort to instill knowledge and attitude in its students regarding technical assistance. The proponent agency (CDC) for FM 29-20 should provide staff officers with necessary guidance on the subject of staff level technical assistance.

1.7.7. Maintenance Allocation Charts (MAC).

1.7.7.1. Background.

The allocation of maintenance responsibilities for most missile systems is documented in technical manuals (TM) in a chart format called "Maintenance Allocation Charts (MAC)." These references attempt to define the alignment of specific tasks with the identifiable levels of maintenance (e.g., Organizational, DS, GS, and Depot). A code system is used to define the level at which specific tasks are supposed to be performed. In most cases, these MAC are prepared during the early phases of system development, called Preliminary Maintenance Allocation Charts (PMAC's), and they are refined periodically when equipment is added or deleted.

Studies have been conducted, by the CDC Air Defense Agency, regarding the real utility of these MAC, and the feasibility of retaining them in future publications or revisions to existing publications.

1.7.7.2. Analysis.

The field survey of Air Defense missile units asked three basic questions regarding the Maintenance Allocation Charts. First, it was asked to what extent the MAC were actually used. All Air Defense support units except three (all at GS level) stated that they never or seldom referred to MAC. Likewise, the Air Defense user units (i.e., firing batteries) concurred in this matter; namely, 12 out of 14 units stated that MAC have little or no use. The primary reasons for this response were that the MAC were inaccurate, and that the unit capability, not a TM, governs what work is done. Some units, which felt that the MAC should be retained, referred only to the engineer equipment allocations. Also, it may be significant that many of the personnel at the working level were not even aware of the existance of the MAC.

The second question inquired into the accuracy of current MAC. The vast preponderance of responses received indicated that the MAC are either "unrealistic and invalid" or contain a significant number of inaccuracies. In a few cases, units used these charts so seldom that they were not able to give a legitimate appraisal of their accuracy. By far, most units rely almost exclusively upon "P" manual parts authorizations and/or local policy to establish who does what.

The third question pertained to the impact incurred on field units by deletion of MAC. Of the support units contacted, only the three general support units claimed a real impact. Two user units out of fourteen claimed such an impact. The main impact cited was that the MAC's were sometimes used to settle arguments on maintenance responsibilities, and it was felt that the elimination of these charts might portend a loss of authority to requisition certain repair parts.

In analyzing these responses, it would appear that in Air Defense units there is a limited application for Maintenance Allocation Charts in their present form. The solution appears evident in the observation of one warrant officer: "Either make them accurate or eliminate them." It was noted, for example, that the repair parts authorizations for the HPI radar (HAWK) do not coincide with the MAC allocation of duties. In some cases, these inconsistencies may be due to equipment modifications or state-of-the-art changes.

It should be pointed out, in retrospect, that the designation of separate levels of maintenance responsibilities is not adhered to in the field. In doctrine, there is a clear segregation of duties at the User, DS, GS, and Depot levels, but Air Defense units tend to follow a pragmatic approach of doing whatever they are capable of doing. The only restraining factors are available skills, equipment, repair parts, and time. For example, a HAWK DS unit may frequently perform work that is identified to be organizational, DS, GS, or even depot level as a matter of routine operations. The net result of this phenomenon is that the planning of logistics support in the future must take into account the fact that necessity rather than a support concept, tends to dictate the "modus operandi." And this factor must be reevaluated periodically to either change policy or reorient resource provisioning.

1.7.7.3. Summary.

A critical evaluation was made at field support and user units of the Maintenance Allocation Charts (MAC) as they are currently provided in Air Defense systems technical manuals. The preponderance of opinion is that in their present form, they are seldom consulted or used, they are somewhat inaccurate, and little impact would be incurred in the field by their elimination. If retained, the MAC should undergo a thorough reevaluation in view of current equipment design and "P" manual authorizations. The field survey did not obviously address the utility or application of MAC to CONUS-based activities such as service schools, commodity commands, CDC activities, etc.

1.7.8. Doctrinal Guidance On Theater Maintenance Float Management.

1.7.8.1. Background.

Current doctrine envisions the major Army commanders as being responsible for: (1) Implementing policies and procedures for the utilization and management of float assets within their commands in accordance with the policies and requirements of AR 750-19 and related publications; (2) Insuring that command inventory levels of operational readiness float assets are within authorized allowances and that the distribution of the assets will improve command materiel readiness in accordance with operational priorities; (3) Insuring that operational readiness float asset data is maintained and reported on a timely basis in accordance with pertinent AR's and TM 38-750.

It is envisioned that the commanders of units authorized an operational readiness float will: (1) Be responsible for initial requisitioning of the authorized float and submit recommendations with complete justification, for increases and decreases in stockage levels; (2) Maintain prescribed maintenance records and equipment logs in accordance with TM 38-750; (3) Insure that ORF assets are maintained in serviceable, ready-for-issue condition and that these assets are included in the authorized stockage list; (4) Report ORF assets in accordance with AR 710-12, AR 711-5 and TM 38-750.

1.7.8.2. Analysis.

The field survey revealed that the objectives of AR 750-19 are not being realized and that the fulfillment of responsibilities described for various command levels is lacking. Policies and procedures for the utilization of the float are almost non-existant and, as a result, so is control and management. The reporting is inadequate, and the accounting procedures are weak and certainly not in accordance with doctrine. Review and adjustment of asset levels is virtually non-existant. Analysis of the data points out that intermediate command levels (between major Army commander and the unit commander possessing the assets) are not adequately developing or enforcing policies and procedures for ORF assets. Doctrinal publications are generally lacking and no real guidance is being given the field commanders through publication channels. The various staff officers having responsibility for the conduct of the assets have very little to assist them in setting up a good ORF management system.

1.7.8.3. Summary.

Current doctrinal guidance for intermediate field commanders and staff officers is limited. The ORF system found in the field today is not acceptable. There must be a concerted effort to provide field commanders, at all levels, with the guidance necessary to improve ORF conditions of field commands. FM 9-59 coverage should be expanded and FM 29-20 should provide detailed guidance for staff officers. Overseas commands should be encouraged to develop and implement policies and procedures for the utilization and management of float assets.

1.7.9. <u>Production Control Reconciliation</u>.

1.7.9.1. Background.

A production control element should be responsible for directing and controlling the work in a maintenance shop in a manner that will result in a maximum output of quality work while providing management with a means of evaluating production progress and reportable data. This is normally accomplished with various tools for control, such as the production control board, tub file, job order register (2405) and a document register (normally with the shop supply element). The objective of production control is to make maximum utilization of men, materiel and facilities. It is envisioned that the status of jobs reflected by the control board should always coincide with the status of records in the tub file, that items reflected as waiting parts would have a valid requisition (with status) in the document register and follow-up action taken when appropriate. Each of these tools should be used as a check on the other to assure that all are up to date.

1.7.9.2. Analysis.

The field survey revealed that only one unit had established a "formal" production control reconciliation system. Most units rarely checked total validity of the data portrayed by its production control tools. Most had no real assurance that all items awaiting parts did in fact have a valid requisition; that is, one that had current status. Shop supply actions were rarely reconciliated with production control and often not with tech supply. All units realized the importance of assuring true portrayal by production control but were at loss in developing a sound method that could be performed in the time they had available. Many units had spot check methods or supervisory sampling but reconciliation, as such, was less than desirable.

1.7.9.3. Summary.

Current publications are not definitive in correlating the need for reconciliating a production control system. Field units find it difficult to develop a reconciliation system due to personnel shortages, time limitations and qualified personnel. The field survey revealed that a reconciliation system should be developed and portrayed in all FM's pertinent to shop operations (FM 9-59). The system should also be included in staff level manual (FM 29-20) in order to assist staff officers in understanding the production control operation and in assuring that the support shops are accurately portraying production status.

1.7.10. <u>Consolidation of MOS 23Q and MOS 23S</u>.

1.7.10.1. Background.

When the HAWK Missile System was initially fielded (1959) the MOS structure for support maintenance consisted of the following:

255.1 HAWK Pulse Acquisition Radar and BCC Repairman.

256.1 HAWK CW Radar Repairman (to include Test Equipment repair).

257.1 HAWK Internal Guidance - Launcher Electronics Repairman.

435.1 HAWK System Mechanical/Hydraulic Repairman.

System evolution and proliferation of equipment maintenance responsibilities have necessitated MOS changes over the years; and the current MOS structure is as follows:

23S20 HAWK Pulse Radar Repairman (to include Test Equipment repair).

23Q20 HAWK Fire Control Repairman.

23T20 HAWK CW Radar Repairman.

22K20 HAWK Missile and Launcher Repairman.

23V50 HAWK Maintenance Chief (Capper MOS for grades E-7 and E-8).

The MAME-71 survey evaluated the adequacy of this MOS structure in view of field requirements and contemporary practices.

1.7.10.2. Analysis.

Six out of nine (or 70%) of the commanders of HAWK direct and general support units contacted spontaneously recommended that MOS 23Q and 23S be combined. An even higher ratio of personnel at the Section Chief and Repairman level at all units corroborated the need to combine these two MOS. The reasons for these recommendations are virtually the same in all units.

Primarily, it was pointed out that the duties of personnel in these two MOS are similar; and, in practice, the men must work in pairs, particularly during contact-team jobs on-site. For example, the troubleshooting of the BCC or Engagement Simulator (TPQ-21) requires a fundamental knowledge of the PAR and ROR. It is significant that the Artillery counterpart to the MOS 23Q and 23S Ordnance repairmen is a single MOS (viz., 24F HAWK Fire Control Mechanic) with responsibility for all pulse radars, BCC, TPQ-21, AFCC.

Secondly, there is a relatively small amount of work in a DS or GS unit for MOS 23Q. The BCC, AFCC, and Engagement Simulator are not as problematic as the other major battery equipment items. This fact has caused many field units to convert (by OJT or cross-training) many 23Q personnel to MOS 23S or 23T.

Thirdly, the responsibility designated in AR 611-201 for MOS 23S to repair all support maintenance test equipment (except OMTS and AMTS) is implemented in only one HAWK support unit worldwide. Conversely, current field practice is for the MOS which uses the shop or item to repair that item (e.g., 23T repair Shop 3). Thus, there is a diminished responsibility in the field for MOS 23S personnel.

Finally, the current system of fragmenting MOS 23Q and 23S tends to compromise the grade structure and unit personnel authorization of each MOS. For example, there are not enough 23Q's authorized in a typical support unit to warrant sufficient higher grades (i.e., SSG or SP6) toward which junior personnel can progress.

The facts obtained would tend to support the feasibility of combining MOS 23S and 23Q, and subsequently effecting corresponding changes in the resident training programs. Further, the test equipment maintenance responsibilities now assigned to MOS 23S should be redistributed to MOS 23T and 22K, and training modified accordingly.

1.7.10.3. Summary.

The current alignment of certain HAWK MOS in AR 611-201 is unsatisfactory in the light of field requirements and present policies of personnel utilization. There is considerable evidence to support the consolidation of MOS 23S and 23Q into a single MOS. This premise is based upon the compatibility of field duties, the proportionally small amount of work for MOS 23Q, the system used for test equipment support, and considerations regarding TOE grade structures. Such a combination would further align the Ordnance MOS structure with the current Artillery structure, and improve site repair coordination. Resident training programs would also be affected directly by this proposal.

1.8. AIR DEFENSE MISSILE SYSTEMS PROBLEM AREAS - ORGANIZATION

1.8.1. Uniform Implementation of "G" Series TOE.

1.8.1.1. Background.

The Combat Developments Command has proponency for developing and maintaining the Army inventory of TOE's. In Air Defense missile systems the current DA-approved TOE's are as follows:

Basic HAWK Direct Support - TOE 44-236G dtd 31 Oct 66*.

Self Propelled HAWK Direct Support - TOE 44-256H dtd 22 Dec 70.

Nike Hercules Direct Support - TOE 44-536G dtd 7 Sep 67*.

Air Defense Systems General Support - TOE 9-59 dtd 12 Mar 69*.

*Each of these TOE has one or more changes in 1970 or 1971 which implement minor modifications to the mission, structure, or personnel and equipment authorizations.

The TOE's cited above are those against which all reviews and changes are applied, and resource planning made. At the present time, CDC is engaged in the development and finalization of the "H" series TOE's, which are intended eventually to replace the "G" series.

1.8.1.2. Analysis.

MAME-71 attempted to define what TOE the field is using, and record the specific deficiencies in each. It was significant that the preponderance of Air Defense missile support units were organized under a modified version of an obsolete or very old version of the TOE. Here is a worldwide synopsis of the findings, which depicts the type of unit and what TOE has been modified to accomodate their current authorizations:

Basic HAWK DSP:

3 Units (Korea) - TOE 44-236G (MTOE modified).

3 Units (Germany) - TOE 44-236D (MTOE modified).

Self Propelled HAWK DSP:

3 Units (Germany) - TOE 44-256T (MTOE modified).

Nike Hercules DSP:

3 Units (Germany) - TOE 44-536D (MTOE modified)

1 Unit (Korea) - TOE 44-536G (MTOE modified)

HAWK/Nike Hercules DS/GS Co:

2 Units - TOE 9-247G (?) (MTOE modified)

HAWK/Nike Hercules GS Co:

2 Units - TOE 9-227E (MTOE modified)

The above summary shows two things: (1) All units have found it necessary to modify the DA-TOE to meet their specific requirements, sometimes this change was very extensive; (2) Most units have modified an "old or obsolete" TOE rather than a more current version.

An analysis of the specific changes that were implemented in each unit in every theater reveals that such modifications were either adjustments in assets to meet current theater limitations, restrictions, and special requirements, or correction of personnel and equipment authorizations to conform to doctrinal or regulatory directives. Examples of changes in this latter category include: Elimination of the apprentice MOS 22A and 46A; addition of capper MOS 23W and 23V; change of MOS 4802 to MOS 4516; and realignment of quantitative authorizations to compensate for the addition of new equipment, such as the Nike Hercules HIPAR or the HAWK Target Simulator. Similar modifications were made to add, delete, or adjust equipment authorizations in view of system changes or support concepts.

The significant point here is that the scope and magnitude of field MTOE action could be significantly reduced if the latest DA-approved TOE (the "G" series in most cases) were uniformly implemented. These TOE (to include subsequent and approved changes) implement many of the factors that the field has had to modify by MTOE action.

An added benefit to be gleaned from the uniform field application of the current, approved TOE is the effect it would have on the TOE development and revision process. Use of the "G" series in missile units would enable a closer interface between the needs of the TOE user and the corrective actions by the TOE developer (CDC).

The revision process would be simplified when feedback data from the field on TOE references the current version. And from this interface there should evolve a greater compatibility between DA doctrine and field application of doctrine.

It is recognized that the uniform adoption of the current series of TOE is not a panacea to cure every theater or unit operational requirement. The MTOE process is intended to be exercised to fulfill these isolated voids or variations. But, the results of the MAME-71 survey would support the premise that both the overseas commands and CONUS developers would benefit from implementation of the current series TOE. The personnel and equipment changes that MAME-71 recommends to improve current TOE (addressed elsewhere in this report) should go far in making the DA-approved TOE more adaptable to field requirements than they now are.

1.8.1.3. Summary.

The MAME-71 endeavor demonstrated that there is a widespread deviation between the TOE used by the field and those that are currently maintained by CONUS developers. Analysis reveals that a considerable degree of field MTOE actions are the result of changing authorizations to accomodate recent doctrinal equipment or policy changes, items which are routinely implemented in the current DA-approved TOE and <u>not</u> in the obsolete TOE. Uniform implementation of the present "G" series TOE would not eliminate the field requirement for MTOE actions, but it would significantly reduce the magnitude and scope of such actions. And this practice would also greatly facilitate the TOE revision process by CONUS TOE developers, thus evolving a greater compatibility between doctrine and field application, and effecting a greater degree of uniformity between units in different areas.

1.8.2. <u>Positioning of the Direct Support Element</u>.

1.8.2.1. Background.

The Headquarters and Headquarters Battery, of the Air Defense Artillery Battalion, is organized to perform the normal command, administrative and supply functions for the battalion. In addition, the Headquarters and Headquarters Battery contains the Direct Support Platoon which provides direct support maintenance and repair parts supply to the battalion. Maintenance is predicated on the concept of service to the user to assist him in keeping his equipment in serviceable condition and to repair and return unserviceable equipment to the user as soon as practicable. This is accomplished by providing supported units with technical assistance and contact team support, by repairing equipment for the prompt return to supported units, and by using Direct Exchange (DX) and Operational Readiness Float (ORF) procedures. The DSP is also responsible for receipt, storage and issue of repair parts supply.

1.8.2.2. Analysis.

The field survey revealed that any mention of organic direct support brought on spontaneous responses that invariably became emotional. This subject produced more comments by field personnel than any other subject addressed. The artillery personnel felt they must have the direct support unit under their direct control if they were to get the responsive support that missile systems deserve. They were adamant in this belief and were convinced that with this command control concept, they could insure the degree of support response that is commensurate with the mission.

The direct support platoon personnel were infinitely displeased with the organic direct support concept. The officers and senior NCO personnel felt there was very definitely a conflict of interest, and that no system of "checks and balances" existed. Listed below are common complaints by the direct support platoon personnel:

(1) The promotion and career development system is controlled by Artillery-oriented boards and DSP personnel do not routinely receive equal treatment. Many artillery personnel are promoted using DSP slots (e.g., Bn clerk as 22K, Bn driver as 22L, etc.). Warrant officer appointments are selected by artillery personnel and firing battery NCO often receive first consideration (the preponderance of DSP warrants in the field have artillery backgrounds). Personnel assignments are generally in favor of the firing batteries. The firing battery personnel slots tend to get filled first and the DSP may have to take what is left. This is a natural phenomena due to the tactical mission of the firing battery.

(2) The DSP leaders and NCO feel they do not have adequate control of their personnel or their mission function. They have very little influence on such matters as extra duty selection, promotions, pay, work requirements (for the batteries) or logistical practices.

(3) The DSP (due to its size) performs a disproportionately large amount of extra duties for the Headquarters and Headquarters Battery with inadequate consideration given to mission requirements

in the selection of personnel. The DSP often receives support (supply, motor pool, administration, etc.) on a low priority basis.

(4) The DSP is frequently unable to influence maintenance practices regarding contact team support and organizational maintenance.

(5) Good maintenance and supply practices are often violated. The command structure excludes "checks and balances" that prevent cannibalization (especially of the float), insure that maintenance catagories depicted in maintenance allocation charts (MAC) are adhered to, assure that the operational readiness float transactions are in accordance with the criteria and procedures established by AR, and specify that damaged chassis (other than fair wear and tear) require a report of survey. The DSP is also unable to influence the legitimate use of priorities in maintenance and supply transactions.

The field survey verified that there is a clear need for a system that is responsive to the user while providing for an inherit "check and balance" system which will insure the conduct of acceptable logistical practices. The current system is apparently lacking in the latter. All personnel generally agree that the direct support maintenance unit must be characterized by its capacity to provide responsive support on a repair and return-to-user basis, including the performance of on-site repair, and the stockage and issue of operational readiness float (ORF) items and repair parts to enhance and sustain the operational readiness of supported units. The field survey noted that where the support units were organized under the Artillery Brigade rather than directly under the using Artillery Battalion, both responsive support and good maintenance practices were being realized. The Artillery and Ordnance personnel were satisfied with this type organization; and indeed, they expressed a preference for this system.

The data collected indicates that the Direct Support Units were very definitely doing general support work on a routine basis. This aspect of field reality coupled with the successes experienced by combined DS/GS shops, might well warrant further investigation into the feasibility of deploying combined DS/GS units under the Artillery Brigade (or equivalent) with forward direct support elements in the Artillery Battalions. It is generally felt that such a system would retain responsive direct support, increase general support responsiveness and realize a dollar saving in personnel and equipment.

1.8.2.3. Summary.

The organization for maintenance operations must take into consideration the wide variety of complex equipment and the broad range of operational situations under which units must be prepared to function. In consideration of these factors and the effective use of maintenance resources, the organization for maintenance must of necessity vary in order to be responsive to requirements for maintenance support. Maintenance must be performed in accordance with published maintenance doctrine at the lowest category and consistent with facilities, skills, time, repair parts, tools, and test equipment available.

The field survey reveals that the organic direct support concept now in practice is not totally successful. It inherently prevents the "check and balance" system for insuring acceptable logistical practices, although it may provide responsive support to the user. The MAME-71 evaluators feel that a concerted effort should be made to improve this support system. The evaluators agree that removal of support units from the direct control of the battalion alone is not necessarily the optimum solution, unless an adequate command and control structure is provided (preferably under the Artillery Brigade or equivalent). The data collected by the MAME-71 endeavor should be used as a basis for an indepth study which would further explore the feasibility of developing new and alternate support concepts and organizational structures.

1.8.3. <u>Personnel Provisioning for a Support Unit Shop Office</u>.

1.8.3.1. Background.

Current TOE for Air Defense support units (i.e., TOE 44-236, 44-256, 44-536, 9-59) envision the "Shop Office" as an integral part of the unit headquarters, with the exception of TOE 9-59 which does have a separate Maintenance Control Section. The personnel authorized by these TOE are minimal; are apparently based upon a single shift operation; and in consideration of only standarized shop functions such as routine clerk duties and typing. For example, the SP HAWK DSP (TOE 44-256H) and the Basic HAWK DSP (TOE 44-236G, W/C-7) currently authorized only one each Clerk Typist, MOS 71B30, grade E-4.

1.8.3.2. Analysis.

One of the most revealing aspects of the MAME-71 survey was the malassignment of personnel, particularly the utilization of expensively trained, highly skilled Ordnance journeyman in administrative or lesser-technical positions within the unit.

This situation is caused by the well defined need in a shop for performing such functions as production control, direct exchange, shop stock, calibration records, equipment records -- all of which are not provided for in the TOE. These functions are conducted, in most cases, by the "Shop Office" or "Shop Operations" portion of the support unit. (NOTE: See the organizational charts for each unit visited in inclosures 1-1 through 1-20.)

Virtually every Air Defense support unit contacted during the field survey stated that this TOE deficiency was adversely impacting their operations. And it was a major "bone of contention" among malassigned personnel who felt that their career or proficiency was being unnecessarily compromised. The specific recommendations obtained for correcting these conditions were obviously diversified, however, the majority of units stated that, as a minimum, the TOE should authorize three additional shop administrative duty positions. It must be pointed out that this proposed quantity increase envisions a personnel structure that covers essential function on one shift only. Therefore, it is in no way a "padded" requirement or optimistic projection.

The clerk-typist position currently authorized is engaged fully in non-technical administrative jobs at the unit headquarters level. Additional personnel authorization are required based upon the following criteria:

a. Production Control Clerk - one each per support unit with duties to maintain the production-control board, TUB file, maintenance register, and associated reports, records, and indicators for the entire support unit.

b. DX/Shop Stock Clerk - one each per support unit with duties to run the Direct Exchange (DX) function to include associated records, reports, issue and receipt transactions for approximately 200 line items; and to run the shop stock function to included associated records, reports, issue and receipt transactions for approximately 180 line items.

c. Equipment and Calibration Records Clerk - one each per support unit with duties to maintain records on support unit organic equipment, and the status of A and C level calibration on text and measuring equipment that is calibrated and/or scheduled by the support unit.

These personnel would suffice for meeting the initial "hard-core" requirements of a support unit on a single shift operation. It is recognized that personnel would be required for these functions on other work shifts, however, the reduced scale of operations prevalent on these shifts would enable the use of other personnel on a detailed basis or by employing "split shift" techniques.

Since each support unit identified the "Shop Office" as a separate entity from the Platoon Headquarters, and indeed they operate this way; it would appear advisable to depict these personnel in a separate paragraph in the TOE. In practice, the support units will usually choose to designate one of their Ordnance warrant officers to act as Shop Officer or Maintenance Officer. Although of lesser significance than providing the adequate personnel to do the job, as described in earlier paragraphs, the provision of a separate paragraph for the Shop Office would conform closer to actual practice and give this vital function greater "visibility."

1.8.3.3. Summary.

A principal cause of personnel malassignment in the field in Air Defense support units is the lack of TOE authorization of adequate duty positions for certain shop administrative functions. Critical requirements exist for the provisioning of personnel to handle the functions of production control, direct exchange, shop stock, and equipment and calibration records. A minimum of three (3) duty positions in each support unit, authorized at the appropriate grade and MOS, would alleviate many of the present conditions of malassignment and enable the support shop to effectively conduct these essential technical/administrative tasks. The designation of a separate TOE paragraph (to include adequate personnel and equipment authorizations) would enhance the proper utilization of these personnel and conform to current organizations used by all field units.

1.8.4. TOE Designation of a Quality Control Element.

1.8.4.1. Background.

A cursory review of the internal organization employed in the field (inclosures 1-1 through 1-20) will demonstrate that virtually every Air Defense support unit has instituted a formal organization and system for the conduct of Quality Assurance/Quality Control (QA/QC). This has been partially due to recognized need for such a program in field maintenance units, and also the fact that rigorous command emphasis has been given this program by higher headquarters. In general, the QA/QC program is working satisfactorily. The need for certain equipment requirements, such as Ultrasonic Cleaner and Advanced Electronic Repair Equipment, is addressed elsewhere in this report. Current DA-approved TOE for support of Air Defense Systems (i.e., TOE 44-236, 44-256, 44-536, 9-59) provide inspectors, however, they are "buried" down in the repair sections. Further, the designations are not uniform in grade or skill level, and there is no provision for an inspector of Engineer items.

1.8.4.2. Analysis.

The comments provided by supervisors, inspectors, and repairmen in the field, as well as an analysis of the organizational composition and shop location of the QA/QC elements, provide us with information that can be of significant value in forming an appropriate TOE element for this function.

In the preponderance of units visited the QA/QC (or Inspection) element was identified separately; that is, separate from any other shop administrative, maintenance or supply function. In most cases, these inspectors reported directly to the support unit commander (i.e., PTN LDR or CO CMDR). The separate identity is needed to insure an independence of the inspection function from the production line functions. This reporting system direct to the commander insures that management is aware of an unbiased appraisal of the shop work. In a TOE, these factors could be accommodated by specifically designating the inspector duty positions in a separate paragraph, and annotating that command and operational control is provided direct to the support unit commander.

The grades of the inspectors in field units varied between SP5 and E-7, and MOS used were the -20, -30, or -40 repairman series, or the -50 maintenance chief series. Provisionings were largely based upon assets on hand and higher command directives specifying grade and MOS. Although some units felt that the E-7 grade and -50 skill level would be desirable, most recommended the following:

a. Authorization of <u>one</u> inspector for <u>each</u> Ordnance specialty at DS and GS levels.

b. Authorization of <u>one</u> Engineer equipment inspector at the DS level.

c. Designating the skill level as -20 (journeyman level) for the Ordnance inspectors, and 52D20 (journeyman level) for the Engineer inspector.

d. Designating the grade level of SP6 for the Ordnance inspectors, and SP5 for the Engineer inspector.

e. Classify one of the above mentioned inspector positions as "Chief Inspector" and authorize as grade SSG (i.e., E6 NCO) at the -40 skill level (advanced journeyman).

Past exploratory studies on QA/QC have tended to ignore the requirement for an Engineer Inspector in the DS unit. The evaluation revealed that a significant amount of shop production and manpower was being expended in support of the missile peculiar power generation, air conditioning and compressor equipment at the direct support level. Inspection of shop work as well as the condition of battery Engineer equipment is a definite requirement for insuring quality and status. Since the missile general support units do not generally perform Engineer repair, except organizational maintenance on organic equipment, there is no need to provide Engineer inspectors at this level. It is vital to designate one of the inspectors in the QA/QC element as a "Chief Inspector," and authorizing him at grade SSG (E6) and skill level -40. Support units in the field employing inspectors usually found it necessary to establish one as a leader or chief. This practice simplifies reporting responsibilities and provides better management of the QC function. The requisites for this type supervisory/technical job and the job descriptions contained in AR 611-201 support the contention that this position warrants a man at the E6 NCO grade and skill level -40.

1.8.4.3. Summary.

Current DA approved TOE are deficient in providing an adequate organizational structure and personnel authorizations for the conduct of quality assurance/quality control in Air Defense Support Units. The inspection function will have greater "visibility" and effectiveness if identified in a separate paragraph, and made responsible to the support unit commander. Quality control authorizations should include one inspector from each Ordnance MOS area at the grade of SP6 and skill level -20 (except for one individual who is designated "Chief Inspector" and authorized at grade SSG (E6 NCO) and skill level -40); and one Engineer inspector authorized at grade SP5 and skill level -20 at the DS level only.

1.8.5. Personnel Provisioning for Units with Operational Readiness Float Mission.

1.8.5.1. Background.

Current doctrine does not address the matter of personnel provisioning to support an organic operational readiness float in missile DS, GS, or DS/GS units. The basic TOE for Air Defense Missile Support (i.e., TOE 9-59, 44-236, 44-256, 44-536) do not specify where the support of the float will be accomplished, nor do they provide personnel authorizations for the conduct of such support. Likewise, FM 9-59 does not contain this information, although it does recognize that maintenance of the float stock is a tangible requirement and such support is usually rendered by a separate organizational element (para 6-34, p. 6-16). However, although not specifically addressed in doctrine, it has been generally assumed that the preponderance of the theater float has been positioned at the GS level, since the float is usually owned and controlled by the theater.

1.8.5.2. Analysis.

The field survey revealed that, in recent years, action has been taken in both Germany and Korea to preposition the majority of the float stock forward in the direct support units of Nike Hercules and HAWK battalions. Specific quantities of major items on-hand in each unit vary, but most DSP have the equivalent of one complete firing battery set plus a quantity of generators, air conditioners, air compressors, and system-peculiar test equipment. On the other hand, the general support units in these theaters, formerly had all or most of the float stock, now possess only a skeleton amount, or none at all. Personnel authorizations at GS that used to maintain a sizable float, are now diverted to other tasks, such as operating field maintenance test equipment.

The situation described above has resulted in significant imbalances in personnel authorizations with respect to the magnitude of mission. DS units, which now have a sizable float, are not augmented with additional personnel for the servicing, handling, accountability, and transportation of the items. GS units, conversely, require fewer repairmen who are skilled on the maintenance of battery equipment because they no longer service a sizable quantity of float stock.

When asked what percent of manpower their unit expended in support of their operational readiness float, DS units responded with figures that range from 5% through 40%, although the average mean response of most units was 10-15%. Support units, that now have a sizable float stock, unanimously felt that an augmentation of personnel was a necessary prerequisite to the acceptance of a float and the corresponding support mission.

Detailed backup data is available in the MAME-71 findings on a unit-by-unit basis, however, there is a correlation between the quantity of the float on hand and the personnel required to support it. Generally, one complete battery set of float equipment, or equivalent, will require one Ordnance repairman for each equipment MOS area, to include Engineer equipment repairmen. The TOE provisioning of personnel in support of a float mission authorized to any type of unit should position the proper personnel at the precise location where they are required, and delete such personnel authorizations when such a mission is eliminated.

1.8.5.3. Summary.

Current doctrine (TOE and FM) is not definitive in correlating the personnel authorizations with actual requirements to support the operational readiness float. Specific personnel authorizations clearly defined in doctrine (TOE augmentation paragraphs or cellular detachments for float support) would enable field units to have a valid basis for increasing or decreasing their assets in proportion to the assigned mission. This would establish a uniform basis for the field in equating mission requirements with personnel assignments. A minimum personnel authorization of one Ordnance MOS and Engineer MOS repairman for each equipment-equivalent of a battery set (designated as a float stock) appears to be an acceptable ratio at any support unit level. This action would also be in consonance with the provisions and responsibilities cited by AR 750-19, Maintenance Float Support of Army Materiel (p. 1-4, Table 1-1, Item Nr. 3).

1.8.6. <u>Requirement for an Organic Signal Support Capability</u>.

1.8.6.1. Background.

Current doctrine for support of Air Defense missile systems provides for a limited signal support capability within the Air Defense battalion. Specifically, a "Fire Distribution Support Section" consisting of 5-8 personnel is authorized in each direct support platoon to support the battalion Fire Distribution equipment to include the Operations Center and Coder-Decoder Group. These personnel have no designated responsibilities for the support of other signal equipment (viz., test equipment or communication gear). The general support company, TOE 9-59, does not provide for signal equipment repair capability. Current doctrine anticipates that all these units will be provided such support by a signal repair activity in the vicinity of the support unit or battalion.

1.8.6.2. Analysis.

For the purpose of this analysis, the signal support of the Fire Distribution System (FDS) can be excluded from consideration because this element, in most instances, is physically separated from the DSP, being located at the Battalion Operations Center. Often it is not directly associated with the DSP either functionally or command-wise. Further, this element has no mission or capability for performing services on other than FDS equipment.

A universal complaint, expressed by headquarters commanders, battalion commanders, battery personnel, and support unit personnel in Air Defense units, was the inadequate support of their signal equipment, chiefly the large quantities of common test equipment at the firing batteries and support units. The present practice of seeking repair or "C" level calibration services from a signal activity is unacceptable because of the distance (and therefore time) to these units; limited capability of such units in supporting certain "missile-peculiar" test gear; and the lack of responsiveness provided to high-priority work. The preponderance of respondents contacted during the MAME-71 survey felt that Signal-equipment repair was just as critical to the Air Defense mission as was Engineer-equipment repair, for which an organic capability exists at the DS level.

This problem was so acute that several battalions had taken MTOE action to create a "Signal Support Section" or "Instrument Repair Section" as an integral part of their DSP. Other units, lacking TOE provisioning of resources, assigned a Signal support responsibility to one of the Ordnance equipment repair sections, as an additional duty. Three out of four Air Defense general support companies had instituted a separately defined activity by MTOE specifically for the support of their organic Signal equipment. (NOTE: See inclosures 1-1 through 1-20 for a comparative portrayal of the Signal support in each support unit visited.)

The quantitative requirements involved in augmenting the present missile support units is comparatively slight. The majority of units contacted indicated that two or three Signal repairmen could perform the necessary services, which include support maintenance, "C" level calibration, and "A/C" level calibration of approximately 250 Signal test equipment items per battalion. It is the opinion of the MAME-71 that two repairmen would be adequate in view of the workload data accumulated worldwide in this area. The specific duty position, MOS, and grades are recommended as follows:

Signal Support Section		
1 ea Senior Test Equipment Repairman	MOS 35B40	E6
Signal Support Section		
1 ea Test Equipment Repairman	MOS 35B20	E5

The personnel authorization cited above is recommended for a conventional size Nike Hercules or Hawk Battalion, and is intended to be an augmentation to the direct support platoon of TOE 44-236, 44-256, 44-536. The personnel authorization at the GS unit, TOE 9-59, would depend on the magnitude of the support mission and the size of the unit. In general, a GS Company with a Nike Hercules and Hawk support platoon would require a double augmentation of Signal repair personnel compared to that cited above.

The items of test and repair equipment needed by this section are available in the MAME-71 project group for analysis. They are excluded here for purposes of brevity.

It is envisioned that the Signal activity recommended above would only support the battalion test, measuring, and diagnostic equipment (such as the TS-352, TS-505, USM-89, USM-32, USM-207, etc.). The present system for repair of communications equipment is considered to be less acute than that for the other Signal equipment items. Therefore, no change to the present system for communications equipment support or to the FDS equipment support is contemplated.

1.8.6.3. Summary.

The lack of provisioning in current missile support unit TOE of personnel, equipment, and the mission for the support of test and measuring equipment is degrading the Air Defense mission. All units contacted during the field survey considered this a significant problem, and the majority of units had taken action to provide this vital service organically. The modification of the mission for both the DS and GS Air Defense support units to include a test equipment repair responsibility, and the authorization of at least two Signal repairman per unit, would substantially correct these present conditions. This recommended action in no way affects the current structure for the support of Fire Distribution System equipment, currently authorized in the support platoon of Air Defense battalions, or the system for the support of unit communications gear.

1.8.7. Requirement for an Organic Loader Transporter Support Capability.

1.8.7.1. Background.

Current doctrine for support of the HAWK Missile System does not provide for a loader transporter support capability within the Air Defense Battalion. It is anticipated in doctrine that all these units will be provided such support by a conventional maintenance repair activity in the vicinity of the support unit or battalion. This service is normally provided by the maintenance company providing support for other non-missile equipment.

1.8.7.2. Analysis.

A universal complaint, expressed by Battalion Commanders, firing battery personnel, and support unit personnel of Air Defense units was the inadequacy of support to their loader transporter. The majority of the respondents stated that the maintenance units currently providing support were not knowledgeable in the repair of the item and often did not have pertinent manuals or an adequate stockage of repair parts. The loader transporter would routinely be non-available because the item normally had to be loaded and transported for excessive distances to the support unit, left for a period of time and later transported back to the battery. Even the routine load testing service would commonly place the item out of use for 3-4 days, primarily due to lack of knowledge by support personnel.

It was generally felt that the majority of the problems could be solved if the DSP had the capability to provide total direct support and load testing for the superstructure and limited support for the automotive portion.

1.8.7.3. Summary.

The preponderance of the HAWK units contacted during the field survey commented that maintenance and load testing support for the loader transporter was a significant problem. The vast majority of respondents indicated the necessity and desirability of having this item supported by the organic ordnance direct support element. It would be appropriate, and advantageous, to provide the DSP with a limited mission and capability for the support of the HAWK loader transporter.

1.8.8. <u>Grade Level of the DS Platoon Sergeant</u>.

1.8.8.1. Background.

Current, approved TOE are inconsistent in the grade levels that are authorized for the senior NCO in the direct support unit. This duty position is usually designated as "Platoon Sergeant" or "Maintenance Chief". The authorized grade of this position is E-8 in the Self Propelled HAWK (TOE 44-256H), PERSHING (TOE 6-619G) DS units, and in the Air Defense GS Company (TOE 9-59G). On the other hand, the Basic HAWK DSP (TOE 44-236G) and the Nike Hercules DSP (TOE 44-536G) currently authorize grade E-7. In AR 611-201, the MOS for either grade E-7 or E-8 is identical for both of the Air Defense Missile Systems (HAWK MOS 23V50; Nike Hercules MOS 23W50).

1.8.8.2. Analysis.

Every direct support element contacted by the MAME-71 Air Defense team spontaneously stated that the current grade authorization of the Platoon Sergeant duty position was unrealistic. (NOTE: SP HAWK and GS units excepted since their authorized grade is now E-8). Some units had justified upgrading this position to E-8, and had received approved MTOE which reflected this grade level. All units contacted felt that this change should be inserted in doctrine.

Realizing the natural tendency to elevate grade structures, the MAME survey attempted to uncover the facts and the basis, if any, for such a change. Our findings demonstrate that this senior NCO position is one of great responsibility, embodying a large amount of decision-making in personnel management, maintenance support, supply support, and many "orderly room" functions. In other words, the position is characterized by administrative management, with an in-depth technical competence requirement. The personnel strength of a DSP (average of 70 personnel), the value of the equipment and supplies managed (millions of dollars), and the sensitivity of the unit mission (Air Defense with a 24 hour readiness posture), would suggest that the grade of E-8 is justifiable. Indeed, the qualitative mission and quantitative authorizations of Air Defense DSP tend to approach a battery or company size operation.

An additional factor to be considered is the enlisted grade structure in the remainder of the unit. The maintenance section chiefs are authorized at grade E-7, justified by the number of personnel supervised and the high technical proficiency requirements of that position. Thus, the current practice of having three or more E-7 NCO in the unit tends to create a turbulance when a new man with a greater time-in-grade arrives. The resultant personnel shift can temporarily impair unit effectiveness and may deteriorate morale. Additionally, it would appear logical that the grade of the senior NCO at the unit headquarters should be higher than the level authorized at the subordinate elements.

The above facts demonstrate that there is no valid basis for supporting a differing grade level for the senior NCO in similar-type support units. The magnitude of the job, which is supported by the detailed MAME-71 data, further justifies that the grade of E-8 is most appropriate in Air Defense direct support units.

1.8.8.3. Summary.

Current doctrine (i.e., TOE authorizations) is inconsistent in providing a grade level for the senior ranking NCO in support units. The findings of the field survey demonstrate that these duty positions, usually titled "Platoon Sergeants," are justified at the E-8 grade in all Air Defense TOE. The basis for this assertion includes: the responsibilities and proficiencies inherent in the job, the relative grade levels used in subordinate elements, and the number of personnel supervised. Uniformity of authorizations at the E-8 grade level would also make a greater correspondence between DA doctrine and field requirements and, in some cases, MTOE authorizations.

1.8.9. <u>Grade Level of Tech Supply Personnel</u>.

1.8.9.1. Background.

Current, approved TOE are inconsistent in the grade levels that are authorized for the senior NCO in the direct support technical supply section of Air Defense direct support platoons. The grade of E-6 NCO is authorized in the Self Propelled HAWK (TOE 44-256H) and Basic HAWK (TOE 44-236G). On the other hand, the Nike Hercules DSP (TOE 44-536G) is currently authorized a top grade of E-5.

Current TOE do not authorize a commissioned officer or warrant officer in any of the above Air Defense direct support platoons.

1.8.9.2. Analysis.

The preponderance of Nike Hercules direct support elements contacted by the Air Defense team stated that the E-6 grade authorization of the technical supply Senior NCO position was necessary. (NOTE: HAWK units are currently authorized grade E6 in this position.) All units contacted felt that this change should be inserted in doctrine.

Virtually all technical supply activities (DS, GS, DS/GS) visited were organized with a warrant officer and/or officer in charge of the operation. Listed below are the supply activities visited (by theater and type support unit) and the grade level of each Tech Supply Section Chief:

Theater	Type Support Unit	Number Units Visited	Tech Supply Supervised By
USAREUR	DS Platoon	8	Warrant Officer
USAREUR	DS Platoon	1	NCO (E-6)
USAREUR	GS Company	1	Officer and Warrant Officer
Eighth US Army	DS Platoon (Det)	1	Officer
Eighth US Army	DS Platoon (Det)	2	Warrant Officer
Eighth US Army	DS Platoon (Det)	1	NCO (E-6)
USARYIS	DS/GS Company	1	Officer and Warrant Officer
USARAL	DS/GS Company	1	Officer

Many units had justified a warrant officer as the technical supply supervisor, and had received approved MTOE which reflected this grade level. All units felt this change should be reflected in current doctrine. Realizing the natural tendency to evolve grade structures upward, the field survey attempted to uncover the facts and basis for such a change. The findings demonstrate that the technical supply section chief is a position of considerable responsibility, embodying a great deal of decision-making in matters such as personnel management, logistical planning and forecasting, logistical support, and maintenance management (DX and ORF). In other words, the position is characterized by administrative management and in-depth technical competence.

The data collected also demonstrates that there is no valid basis supporting a different grade level for the senior NCO in similar support units. The magnitude of the job further justifies a warrant officer as the most appropriate grade for the technical supply section chief.

1.8.9.3. Summary.

Current doctrine (i.e., TOE authorizations) is inconsistent in providing a grade level for the senior ranking NCO in the DSP tech supply. The findings of the field survey demonstrate that these duty positions are justified at the E6 NCO grade level in Nike Hercules units as is currently authorized in HAWK units.

The survey also revealed that units in the field are utilizing warrant officers as tech supply section chiefs whenever possible. This action is deemed necessary, and widespread action has been taken to authorize this grade by MTOE. The basis for this action includes the responsibilities and duties inherent to the job and the degree of administrative management required. The data would support the requirement for school-trained supply warrant officers for these positions.

1.8.10. Conversion of Power Generation Equipment Operators to Repairmen.

1.8.10.1. Background.

Current Air Defense direct support unit TOE (TOE 44-236, 44-256, 44-536) authorize one Power Generator Operator/Mechanic (MOS 52B30) for each electronic repair section. This man is placed in the section for the purpose of energizing and performing first and second echelon maintenance on engineer equipment assigned to that section (i.e., generators). AR 611-201 defines the duties of this MOS as being restricted to operation and limited preventive maintenance (PM) services on this equipment.

Each platoon also has a support maintenance responsibility for power generation and air conditioning equipment. Assets to support this function are provided in a separate TOE paragraph within the platoon, and Power Generator Equipment Repairmen (MOS 52D20) are authorized. Support is provided to all system-peculiar engineer equipment in the AD Battalion, to include that which is organic to the DS platoon.

1.8.10.2. Analysis.

The field survey noted that the Power Generator Operators that are assigned to the repair sections of DSP were not utilized at this location in any Air Defense unit visited. And there were good reasons for this. First, there is an Engineer Section (formally dubbed "Power Generation and Air Conditioning Equipment Support Section") in every DSP, and this element handles all matters pertaining to such equipment to include operation and PM of same. Therefore, the units quite logically combine their personnel assets into a single organization.

Secondly, there is not usually sufficient work involved in turning on and off generators to employ two men full time. On the other hand, the support maintenance workload in the Engineer Section is extraordinarily high. This is caused by such things as: old and deficient engineer equipment in the field, improper operation and preventive maintenance services by firing batteries, and acute difficulties in securing adequate repair parts. Without touching upon the causal factors in this portion of the report, it will suffice to conclude that the Engineer Section was short personnel, and they quite properly utilized the "operators" in the section like "repairmen."

A review of AR 611-201 will demonstrate that the repairman MOS (55D20) can assume the operator duties in addition to his maintenance functions (due to training and proficiency); whereas the operator MOS (52B30) is not capable of functioning in a dual capacity.

Four direct support units contacted strongly recommended that this TOE conversion be made (i.e., 52B30 to 52D20), and that their personnel be removed from the repair section where they are now authorized and assigned to the Engineer Section. As stated earlier, all other units concurred in this point by implication, since this was the manner in which they used their engineer personnel assets. This change would not modify the manning levels, or necessarily change the grade structures; however, it would improve the unit capability in this most critical area.

1.8.10.3. Summary.

Current Air Defense TOE authorize two or more Power Generator Mechanics (MOS 52B30) in each Direct Support Platoon at the Repair Section level. The field survey findings demonstrate that these men can be more productively utilized as Power Generation Equipment Repairman (MOS 52D20) in the Engineer Section of the DSP. Conversion of the MOS authorized and a realignment of their TOE positioning will conform to universal field practice and result in the most effective utilization of resources.

1.8.11. Proportion of Test Equipment Operators at General Support.

1.8.11.1. Background.

By definition, the primary role of general support is to provide backup support to the direct support units, repair the unserviceable stocks in supply channels or from a DX system, provide services to the non-explosive portions of the Class V supply point, and service the organic operational readiness float, if such is authorized. With the possible exception of maintaining a float, most GS work is characterized by a large scale production line, controlled environment, and use of special and general purpose test equipment. A GS unit, as opposed to a DS unit, does not perform large scale repair or service on battery equipment, particularly on-site.

1.8.11.2. Analysis.

The field survey verified that the general support system is mainly used to support the supply system and provide limited backup support to DS for selected maintenance tasks. This backup support is usually handled by a DX system between the GSU and the DSP. The control and maintenance of float equipment is conspicuously lacking at the GS level, since these items have largely been prepositioned at forward locations (i.e., DSP). The proportion of manpower that the GS units expend in maintaining the float averaged only 14%, and, in many units, it was considered nil. Thus, there was relatively little work which requires the services of battery equipment repairmen at the GS level. Conversely, there is a magnified requirement for test equipment (i.e., shops, consoles, and vans) operators and repairmen.

This factor accounts for many of the MTOE actions taken by overseas units to adjust their personnel authorizations to provide more test equipment repairmen. (NOTE: In the Nike Hercules System the test equipment operators/repairmen are MOS 22L, and in the HAWK system they are MOS 23T and 22K.) It also helps explain why many GS units have had to initiate cross-training programs to qualify battery equipment personnel as test equipment operators/ repairmen (Example: in the Nike Hercules System the Track Radar Repairman, MOS 23N is often converted to a Test Equipment Repairman, MOS 22L).

A review of the current TOE for Air Defense units (i.e., TOE 9-59G) indicates that approximately the same <u>mix</u> of Ordnance MOS are authorized in this GS TOE as is used in the DS TOE. The findings of the MAME-71 survey demonstrate the inappropriateness of this proportioning.

1.8.11.3. Summary.

The current practice of authorizing the same approximate proportion of all Ordnance enlisted MOS to both DS and GS units is not supported by the field survey. Various indicators have demonstrated that a greater proportion of test equipment personnel (i.e., MOS 22L for Nike Hercules and MOS 23T and 22K for HAWK) are required in

GS units due to the more limited support provided to battery-type equipment. The personnel authorizations of Air Defense general support units (i.e., TOE 9-59) should be reevaluated in view of the survey findings, and personnel authorizations adjusted accordingly.

1.8.12. Material Handling Equipment Requirements.

1.8.12.1. Background.

The TOE equipment allowance tables for air defense artillery direct support platoons (TOE 44-236G Basic Hawk, 44-256G SP Hawk, 44-536G Nike Hercules, 9-59 General Support) were developed to provide the minimum essential quantities and types of equipment necessary to accomplish the mission of the unit. Additional special tools and equipment contained in supplemental publications may be authorized by local commanders, provided the items requested are determined to be essential for the successful performance of the assigned supply and maintenance mission. Requests for additional personnel and/or equipment must be submitted in accordance with AR 310-49.

The field survey revealed numerous problem areas regarding proper quantities, types, designs and authorizations of TOE equipment. The preponderance of these equipment problems are discussed in item number 1.10.4. The discussion here is limited to materiel handling equipment (MHE) only.

1.8.12.2. Analysis.

MAME-71 attempted to define what Materiel Handling Equipment (MHE) the field was using, and record existing deficiencies. It is significant that the preponderance of the air defense missile support units (Nike Hercules and Hawk) were equipped with two pieces of MHE that are not provided for in current TOE. Virtually all of the units were using "A" frames as a routine shop lifting device. All units visited, except Korea, were using forklifts in supply and maintenance operations. It was generally felt that both pieces of equipment were necessary. Shop personnel indicated that two "A" frames were needed. One is required for the missile and ground guidance section for lifting and emplacing heavy items (e.g., launcher rails, radar pedestals, power units, etc.). The second "A" frame is required in the air conditioning section for changing generator motors, loading equipment and mounting air conditioners. Unit supervisory personnel stated that forklifts had become necessary in view of current supply practices and are extremely useful in shop operations. Missile support units are receiving many large bulky items and palletized shipments through supply, which make manual handling extremely dangerous, time consuming and impractical. They indicate a very high density utilization of current assets of forklifts and that they would be severely hampered without them. Their use for movement of heavy material in shop operations alone saves many manhours and would justify their existance.

Nike Hercules units were constantly needing a 5 ton wrecker which was not readily available. This was not a problem in HAWK because both Basic and SP HAWK direct support platoons have 5 ton wreckers authorized. The Nike DSP must rely on the transportation section of the Headquarters and Headquarters Battery (TOE 44-536G). Two common problems exist with this arrangement; (1) The DSP is not always collocated with the Headquarters and Headquarters Battery; (2) This single wrecker is commonly (always in USAREUR) designated as the TPI standby wrecker and can't be taken from the motor pool area.

1.8.12.3. Summary.

The data collected during the field survey reveals that virtually all Nike Hercules and HAWK direct and general support units are utilizing "A" frames and forklifts. The data portrays a very definite need for both items, and indicates that their utilization would greatly enhance maintenance and supply operations. Units operating without them are clearly expending more manhours than necessary and supply and maintenance operations are hampered. Both items should be placed in the direct support platoon portion of current TOE (HAWK Basic 44-236G, SP HAWK 44-256H, Nike 44-536G), and in the Air Defense General Support Company (TOE 9-59).

Nike Hercules direct support units also have a definite and well identified need for an organic 5 ton wrecker. A truck wrecker, 5 ton 6x6 w/wench should be included in the support platoon headquarters portion of TOE 44-536G.

1.9. AIR DEFENSE MISSILE SYSTEMS PROBLEM AREAS-TRAINING.

1.9.1. Missile Maintenance Officer Training (MOS 4515, 4516).

1.9.1.1 Background.

There are two military occupational specialties for Ordnance commissioned officers that are authorized in missile maintenance support units and command and staff level posiitons. These are -

Missile and Munitions Officer - MOS Code 4515

Missile Maintenance Officer - MOS Code 4516

In general, the MOS 4516 is a Company Grade officer and MOS 4515 is a Field Grade officer. The principal difference between training in these MOS is that 4515 is an advanced program fed by 4516 personnel (and other MOS), and the 4515 MOS encompasses total ammunition service support (ie., missiles and munitions), whereas the 4516 MOS pertains to missile systems support only. (NOTE: See AR 611-101 for detailed information.)

Resident training for these MOS is conducted at the U. S. Army Missile and Munitions Center and School (USAMMCS), Redstone Arsenal. The specific courses are -

Missile and Munitions Officer Course - 4F-4515 (19 weeks, 4 days)

Missile Maintenance Officer Course - 4F- 4516 (14 weeks, 4 days)

It should be pointed out that a major revision of the 4516 course was recently made, partially based upon the preliminary findings of the MAME-71 project which were provided to course developers. As a result of this revision (CONARC approved on 14 Oct 71) the course was decreased from 21 weeks to 14 weeks, 4 days, and certain modifications were made which are cited in this report as areas requiring corrective action. It is believed that further actions are still needed in the light of the following analysis.

(NOTE: This discussion relates to both Air Defense and Land Combat missile officers contacted by teams B-1, B-2, and B-3 during the field survey. The analysis made is based upon comments received from 4515 and 4516 officers in all type units.)

1.9.1.2 Analysis.

During the field survey, approximately 124 Ordnance commissioned officers were contacted by the Air Defense, Land Combat and Redeye Missile Teams. Of these, 36 officers completed detailed questionnaire booklets that inquired into the specific deficiencies of the resident training programs. The information and recommendations portrayed in this discussion are based upon this data and upon observations made by the project evaluators.

Since the preponderance of officers contacted were MOS 4516, or referenced their comments to the 4516 course, the data to follow is specifically referenced toward the 4F-4516 course unless otherwise specified. It should be recognized however, that many of the areas requiring change is the 4F-4516 course apply equally to the 4F-4515 course. Therefore, a careful scrutiny of the information portrayed should be made by course developers and instructors to determine the applicability to both courses.

1.9.1.2.1. General Adequacy of Training.

Respondents were almost evenly divided on the overall adequacy of their resident training at USAMMCS. Approximately 50% of those who completed questionnaire booklets stated that present training was satisfactory. The remainder felt that there are significant deficiencies in courses, particularly in the way that the training they had received prepared them for field assignments. Few of the comments received recommended any change in course length, only a restructuring or reemphasis of the level or content of existing courses.

The individuals contacted were in a variety of duty positions. The majority of them were Platoon Leaders, Detachment Commanders, Company Commanders and Shop Officers in Missile Support Units. However, there were several in jobs like Ordnance Staff Officers, Supply Officers, Executive Officers, Operations Officers, and Facility Directors. A significant number of officers contacted in the field were in Ordnance TOE duty positions, but they were Quartermaster, Artillery, Infantry or Intelligence personnel with obviously no training received at USAMMCS. In such cases, responses regarding adequacy of training were not considered. It is felt, however, that a wide cross section of Ordnance missile officers were contacted on a worldwide basis, which provides a valid basis for an evaluation of training adequacy.

1.9.1.2.2 On-the Job-Training (OJT) Program.

Officers stated that they required approximately 12 weeks (a statistical average based on all estimates obtained) to cross train or OJT into the job they are expected to perform. Although this is not an excessive amount of time, it can be significant because there is usually <u>no overlap in time</u> between the arrival of a new officer and the departure of the incumbent officer. Thus, there is little opportunity for officers to OJT before they must accept full command

and mission responsibility. This fact must be considered in developing or revising training programs. All essential skills must be acquired during CONUS training, since any time available for OJT is fully consumed in familiarization with local or command policies and orientation within the assigned unit.

1.9.1.2.3. Academic Instruction on Management.

The biggest single complaint of officers in the field was the disproportion between technical training and management training in resident courses. The vast majority of respondents felt that there is entirely too much training on hardware in comparison to the amount of instruction on logistics management. In what was perhaps an exaggeration, two officers stated that the Ordnance officer courses should be 90% logistics management and 10% equipment. It was verified, however, that the actual job requirements of a typical Ordnance officer involves a high degree of personnel management, maintenance management, supply management and property accountability. Conversely, the detail with which he must know the hardware, particularly the battery equipment, is relatively small. In most cases, the support unit or staff element he commands has warrant officers and/or enlisted personnel authorized who can provide the necessary technical expertise.

The preponderance of officers felt that the instruction they had received on functional block diagrams of equipment, practical exercises on hardware maintenance checks, and, in some cases, even circuit training was of little or no value to them in view of their current jobs. The did feel that it was important to have an overview of an integrated battery operation and a familiarity with Ordnance shop test equipment, but in no cases was it necessary to delve into the chassis or circuit levels. (NOTE: See other items in this analysis for specific examples of technical training required.)

On the other hand, management of resources is their primary job and constitutes the majority of problems with which they must cope. The most salient logistics management area is the handling of personnel, such as manpower management, cross training, personnel utilization, career development, MTOE assets justification, promotions, disciplinary actions, and morale-building. Allied with this is a significant rise in personnel problems in the areas of drug abuse and racial tension (e.g., detection, legal aspects, remedial actions, etc) for which training is required. All personnel stated that their instruction on this vital aspect of logistics (VIZ, personnel management) was deficient.

The second most prevalent deficiency is maintenance management. Missile support units are principally involved in maintaining equipment and providing various repair support services. Efficiency of operations and mission effectiveness are dictated, to a large degree, by the controls, records, reports, and inspections of these maintenance operations. Officers and warrant officers play a key role in making sure that these operations work smoothly and effectively. The tools used to do this include: production control, quality control, reports control, publications control, shift supervision, shop inspections, safety and security checks, shop layouts, internal and external SOP's, and a variety of management indicators. Since these matters occupy a significant portion of an officer's time, it is essential that resident training correspondingly emphasize the accepted and most productive manner of achieving maintenance management. Admittedly, this instruction is now given in the courses of instruction; however the quantitative content is inadequate and the qualitative emphasis is not sufficiently "vitalized" with real field cases and problem-solving exercises. Further, most officers felt that they need to be exposed to maintenance management training in an environment which closely simulates a typical DS or GS support unit in the field. This "environment" includes not only physical considerations (ie. shop set up, production control boards, files, etc), but also it encompasses typical situations encountered in the field such as: priority job order processing, excessive workloads in one shop section, deadlined float equipment, technical assistance to Artillery units, conducting spot inspections, performing deferred maintenance evaluations, justifying equipment authorizations, presenting command briefings, approving quality control rejection criteria, and a host of other "real life" situations. Thus, it is felt that training should be modified to enhance instruction on maintenance management, emphasizing the case-solution techniques which parallel job requirements in the field.

Finally, officers stated that they needed additional training on materiel management, or to be more specific, the methodology involved in supply operations, property accountability, and equipment status. Although Ordnance officers are not normally assigned as supply officers, it is imperative that a support unit commander know the pertinent regulations and applicable procedures for supply. Units have technical supply activities, and in some cases unit supply and/or depot supply operations. In addition, most units have shop stock and bench stock operations. Since supply is generally problematic and so much of the unit mission effectiveness and responsiveness is dependent on repair parts availability, it is imperative that an Ordnance missile officer be thoroughly indoctrinated with all supply operations and the typical problems inherent to each. As was cited for maintenance management, supply management training must go beyond the content of supply regulations (ie., AR 711-16, 711-25, 725-50, and 735-series) and into the practical application of these policies to actual field problems.

Associated with supply management is the matter of equipment accountability and control. Ordnance officers are often responsible for many items of equipment, directly or indirectly. Examples are: vehicles, organic operational readiness float, test equipment shop vans, power generation equipment, installed property, and a variety of other Ordnance, Engineer, Signal, and Automotive equipment. Officers may have pecuniary liability for such items and are often confronted with decisions regarding control, issue criteria, and support. These peripheral tasks collectively consume a significant portion of an officer's time. They are largely overlooked or minimized in training programs, to the detriment of a newly assigned officers ability to meet these challenges in the field.

1.9.1.4. Officer Equipment Training.

In earlier portion of this discussion it was stated that there should be proportionally greater emphasis in Ordnance officer training program on logistics management, and correspondingly less on equipment. This does not imply a deletion of equipment training, but rather a reduction and reorientation of emphasis. The desire of most respondents was for less training on the theory of equipment operations and check procedures, and a greater emphasis on those equipment tasks that are normally an integral part of their job.

For example, it appears that the preponderance of equipment instruction is on the battery equipment of missile systems with a deemphasis on the shop equipment. The latter, however, is what the Ordnance officer directly controls, owns, and must rely on. Greater coverage should be given on this equipment to include design factors, limitations, common maintenance problems, calibration requirements, environmental restrictions, and skills needed to properly utilize items.

Related to this, is the training given on Preventive Maintenance Indicators (PMI). Most contemporary instruction elaborates on PMI for battery-type (ie. on site) major items, but apparently tends to neglect those PMI that pertain to shop equipment. Shop equipment is defined as including such items as test shop sets, generators, compressors, air conditioners, and vehicles. It was further recommended by officers in the field that all PMI instructions should be given in the course concurrent with technical training on the major item(s), instead of consolidating all PMI training in one lesson. PMI instruction itself could be improved if less repetitive emphasis were placed upon rust, paint, dirt, etc, and a greater concentration on the electronic/mechanic/hydraulic indicators that are provided commonly on missile hardware (e.g., meters, dials, gear wear, loose fittings, humidity indicators, log books, lapsed time indicators, etc).

Most shops now have a significant size operational readiness float (ORF) which they must maintain and control. Officers need detailed instruction on the regulations governing floats, and information on how to cope with field problems associated with these items.

1.9.1.5. Technical Assistance Service Instruction.

One of the weakest areas identified during the field survey was the provisioning of technical assistance services by support unit commanders to using units, and by staff officers to subordinate units. In many cases, the individuals were not impressed with the real value or necessity of having a formal technical assistance program. And in almost all cases no real defined program existed. In some units the feeling was that the assigned Missile Maintenance Technician (MMT) was the "beginning and ending" of the unit tech assistance program. On the other hand, some support units had an effective program in operation with scheduled visits, good records, ideal relationships, and outstanding results! It appears that resident training is a primary source of instilling the mechanics of establishing and maintaining an effective technical assistance program.

1.9.1.6. Training on Field Implementation of Doctrine.

It is axiomatic that formal training programs must closely correspond to approved, published Army doctrine. This is documented in such sources as FM 9-6, FM 9-59, and various AR's, TM's, and other publications. But this doctrine is not necessarily that which is implemented in the field, as is continually verified by this evaluation report. As a result, many officers compained that the instruction they received was, in many cases, useless for the application in the field.

Accordingly, it was proposed that a "capper" series of lessons should be presented at the end of existing officer training programs which would present pertinent information on the different theater logistical systems or practices. Examples of such training are as follows:

a. Current theater command and control structure.

b. MTOE organizations used in field support units.

c. Theater supply system for issue and evacuation.

d. Ongoing rebuild or major equipment modification programs.

e. Command policies on floats, QA/QC, priorities, and maintenance allocation criteria.

f. Environmental and geographical constraints on support operations.

g. Typical and recurring support and management problems.

h. Manpower situation (ie., shortages, assignment and classification methodology, promotions, OJT, regulations, etc).

i. Personnel problem areas (ie., drug abuse, racial incidents, extra duties, etc).

j. Class V support structure.

k. Communications and transportation systems.

l. Mobility requirements.

m. Use of NCR-500 computer.

n. Recurring and specialized reports.

o. Safety and security special considerations.

p. Theater inspection systems.

It would be highly productive if such instruction would be presented to include a provision for questions and answers at the end of both the 4515 and 4516 courses. The relative importance of this subject matter would justify formal inclusion in the POI, and a significant amount of time allocated to these areas. The findings and accumulated data from the MAME-71 survey will provide one source of reference upon which such training can be based.

1.9.1.3. Summary

The field survey amply demonstrated that officer personnel in the field did not receive all the instruction that was required to effectively perform their job. Contemporary situations are such that

OJT is an unreliable and inadequate means of qualifying officers on essential skills. Deficiencies were identified in the area of logistics management, chiefly the management of personnel, maintenance, materiel, and supply operations. There is proportionally less training required on the detailed technology of tactical-type equipment. Equipment training requiring emphasis includes: the shop equipment, preventive maintenance indicators on shop equipment, and the operational readiness float. Additional instruction is also required on the provisioning of technical assistance services and the theater-implemented versions of logistics doctrine. Although recent officer course revisions have already implemented part of these recommendations based upon preliminary MAME-71 reports, it is felt that a detailed reappraisal is needed in the light of these terminal findings and proposals.

1.9.2. Air Defense Warrant Officer Training.

1.9.2.1. Background.

There are two MOS for Air Defense Ordnance warrant officers, one for HAWK and one for Nike Hercules. These are:

Air Defense Missile System Repair Technician (NIKE) - 251B

Air Defense Missile System Repair Technician (HAWK) - 251C

Job description and classification criteria are contained in AR 611-112, Manual of Warrant Officer Military Occupational Specialities.

Training for these MOS is provided by two courses given at the US Army Missile and Munitions Center and School, Redstone Arsenal. These courses, as described in DA Pam 350-10, US Army Formal Schools Catalog, are as follows:

Air Defense Missile Maintenance Technician (NIKE) 4F-451B

Air Defense Missile Maintenance Technician (HAWK) 4F-251C

Although these courses are offered by the CONUS school, current US programmed inputs for these training programs in recent years have been insignificant. The majority of recent student inputs has been provided to meet training committments to foreign countries.

A recent development in warrant officer training is the "Warrant Officer Career Education Program", as described in DA Pam 600-11, Career Planning for Army Warrant Officers. Essentially this program visualizes three phases of training for warrant officer candidates/appointees: a "Warrant Officer Orientation Course" to qualify Artillery battery-level technicians (Phase I); a "Surface-to-Air Missile Systems Maintenance Intermediate Course," to qualify Artillery battery-level technicians into support unit technicians (Phase II); and a "Surface-to-Air Missile Systems Maintenance Advanced Course" to provide technological update information, research and development data, and advanced logistics instruction (Phase III). Although Programs of Instruction (POI) for these courses have been approved, resident training has not yet commenced.

1.9.2.2. Analysis.

A large number of Ordnance warrant officers (MOS 251B and 251C) were contacted worldwide during MAME-71. The one thing that stood out regarding the training of these personnel was that, in most cases, they had none or very little. The personnel who are holding these MOS in the field are generally in one of four categories (in descending order of prevalence)--

a. Artillery personnel (enlisted or warrant officer) who converted into an Ordnance warrant officer MOS without resident training in that MOS.

b. Ordnance personnel (enlisted) who were awarded an Ordnance warrant officer MOS without resident training in that MOS.

c. Ordnance warrant officers who had received resident training in their MOS, but such training was received a long time ago (often 10 years or more).

d. Ordnance warrant officers whose training was in one missile system, but who have been reclassified into another system (Nike Hercules warrant officers into HAWK), without corresponding training.

As a result of these field condidtions, the discussion to follow will not address the deficiencies in the pertinent warrant officer courses, per se, but it will rather relate to the impact caused by a lack of trained personnel currently in the field.

Personnel in field support units are, in most cases, working hard and conscientiously. Thus, without reflecting on individuals involved, it is observed that many warrant officers are handicapped by having no formal resident, or recent, traininining in CONUS schools. This handicap appears in at least three categories: system perspective, logistics management, and personnel supervision.

Many (if not the vast majority) warrant officers contacted lacked a technical expertise "across the board." Not having had a course which would give them a total system perspective of all major items of equipment, these men are still primarily highly specialized technicians in their narrow technical field, such as CW Radar Repair, or Nike Test Equipment Repair. Their job, on the other hand, requires them to apply a system wide knowledge and experience to troubleshooting equipment, supervise repairmen, or conduct technical assistance. In the case of appointees from Artillery MOS, some of these individuals have had no instruction or experience on the support maintenance test equipment.

A primary function of resident training for warrant officers is to instill a knowledge of Ordnance shop operations and logistics man management. In many cases these functions are significantly different from jobs assigned to enlisted personnel, and invariably the Ordnance services are dissimilar to the Artillery functions of a Firing Battery. Because of the lack of training on shop operations and logistics management, there is a wide variation between field units in the manner in which such functions are executed. Specific examples of this include: the use and control of the organic operational readiness float; the program for rendering technical assistance to users; the management indicators maintained on shop production; the set-up of the shop quality control function. Although it is necessary and desirable that these functions be tempered by field experience, the basic principles by which shop management is accomplished must be acquired by formal resident training programs.

It is a "fact of life" that authorized field warrant officers spend a great deal of time in the supervision of subordinates. And, to a large degree, these individuals also have considerable involvement and contact with their peers or superiors (e.g., technical assistance to users, liaison with command and staff personnel, briefings to battalion commanders, etc). These tasks require a large degree of expertise in the areas of manpower management, presentation of briefings, maintenance of personnel records and reports, etc. There was a great deal of variance in the manner in which these personnel management functions were executed.

In analyzing the data accumulated, there appears to a direct correlation between the proficiency that an individual displays and the amount of formal training he has received. This is reflected not only in his technical proficiency, but also in the attitude, self confidence, and resourcefulness that the individual exhibits. The lack of warrant officer training is apparently a significant cause of many deficiencies enumerated above.

Although the "Warrant Officer Career Education Program" purports to eventually remedy a postion of this problem, it does not suffice for the current situation now in the field. As a supplement to this program, there is a need to qualify each warrant officer currently holding a 251B or 251C MOS who has not had formal, resident training in these MOS. It would appear that the Surface-to-Air Missile Systems Intermediate Course (defined in DA Pam 600-11) could be used to accommodate this necessary training. Obviously, formal programming of selected inputs and the type of courses each would required (based on time remaining in service and past training received) on a case-by-case basis would be necessary. Ideally, this programming should begin on a immediate and priority basis.

In order to preclude a repetition of this situation in the future (viz., indescriminate field award of MOS without training) appropriate revisions to AR 611-112 are required to insure that appropriate resident training is a prerequisite for award or appointment of a warrant officer MOS. Precedent for this "mandatory training prequisite" has been established already for enlisted MOS for missile support (NOTE: See "Special Requirements" paragraph in AR 611-201 for certain MOS of 21, 22, and 23-series).

1.9.2.3. Summary.

The field evaluation demonstrated that there are significant variances in the technical and managerial capabilities among Air Defense Ordnance warrant officers currently in the field. This situation is directly traceable to recent policies which restrict the provision of resident training uniformly to all warrant officers. Resident and formal training is necessary to: update training to include new or modified equipment; provide a missile system-wide technical perspective; instill the Ordnance techniques of logistics management; and provide the accepted principles and methodology of supervision and liaison. Current provisions of the "Warrant Officer Career Education Program" partially suffice for future requirements but not for present conditions. Personnel who have either a 251B or 251C MOS, and who have not successfully completed the corresponding resident training program, should be methodically programmed to attend one of the approved Surface-to-Air Missile Systems Maintenance Intermediate Courses. Appropriate restrictions should be placed in AR 611-112 to make successful completion of approved service shcool training a prerequisite for award of MOS, with certain waiver provisions delegated to the Commandant, USAMMCS. (NOTE: These proposals were envisioned and approved for implementation by DA in conjunction with the HAWK Equipment Logisitics Program (Project HELP); however, the more recent "Warrant Officer Career Education Program" appears to have inadvertently deleted these provision.)

1.9.3. Requirement for Resident Training of "Capper MOS".

1.9.3.1. Background.

Several years ago, the enlisted MOS structure for Air Defense missile system support was revised to provide a separate MOS for enlisted men who progress to the E-7 level or higher. This is commonly referred to as a "capper" MOS, and the designations used are: Nike Maintenance Chief - 23W50; and HAWK Maintenance Chief - 23V50. According to the job descriptions in AR 611-201, these personnel are intended to fill duty positions of maintenance supervisor, maintenance chief, or first sergeant. The duties, skills and knowledges encompass a wide spectrum of management/ supervisory specialties and a working knowledge of all items of equipment (i.e., battery major items and test equipment) for the whole missile system.

In the past, there has been no resident or non-resident training program for qualifying these personnel before or after the award of the MOS. Attainment of the MOS has been essentially concurrent with promotion to the grade of E-7. The current NCOES program does provide such a resident course at USAMMCS (Redstone Arsenal) for "selected candidates" at the grade of E-6. This program does not envision training for personnel now holding a capper MOS, nor is the course a prerequisite for award of the MOS.

1.9.3.2. Analysis.

The MAME-71 field evaluation collected considerable data on training, but there was no more univeral comment made than that pertaining to the training (or lack of training) of capper MOS. And this trend runs equally throughout the data tabulated for Nike Hercules and Hawk at the DS, DS/GS levels. The comments were so uniform that no differentiation is made in this analysis between MOS 23V50 and 23W50.

In general, the personnel holding a capper MOS were satisfied that a separate MOS was necessary, one which provided for supervisory specialities and embraced a system-wide technical capability. Personnel with this MOS were usually in such positions as First Sergeant, Platoon Sergeant, Shop Operations NCO, Section Chief, and, in a few cases, Quality Control Inspectors. The only adverse comments on the doctrine for this MOS pertained to the excessive emphasis in AR 611-201 to the detailed technical requirements of the job (e.g., in depth knowledge of equipment, maintenance check, etc.). A greater emphasis in the AR on the managerial aspects of the job would make the write-up more descriptive of actual field assignments.

By far, the most common complaint was the total absence of any formal training for personnel holding these MOS or for candidates aspiring to this level. Under the present set-up, personnel are awarded the capper MOS by virtue of their being promoted to grade E-7. The vast majority of the personnel in the field expressed that no "miracle" occurs which endows a man, who formerly was a repairman in a narrow technical speciality such as Pulse Radar Repairman, with broad competence in supervision and total missile system technology at the point of promotion to E-7. In contemplating this problem, CONUS based planners may speculate that the man should qualify himself through OJT, correspondence courses, and other means of self-initiative. But the survey shows that such practice is most difficult for field personnel to attain due to the demands of the job on the individuals time and capacity. Further, the skills he must pick up are not readily obtainable in the field. For example, the battery major items upon which he must become skilled are not available for training purposes in an Air Defense unit with a 24 hour, full time mission. Operational requirements and conditions of personnel shortages in support units preclude him from being assigned developmental supervisory/administrative assignments. In other words, if he is to formally acquire the job requirements of the capper MOS on a standardized and adequate basis, he <u>must</u> be trained at a CONUS school.

The personnel contacted were pessimistic regarding the current system of having such a course, as it is envisioned under the NCOES program. This concept envisions a course that would only be open to "selected candidates" at the grade of E-6. This would only solve part of the problem. There are currently scores of E-7's and E-8's now in the field who have considerable time left in the Army, and, in many cases, desperately need to be trained. The NCOES program does not make provision for them, nor does it assure a uniform system for training of capper MOS candidates <u>on a mandatory basis</u>.

An additional factor bearing upon this problem was also highlighted by several field respondents. This is the MOS Evaluation Test that is administered to capper MOS personnel. NCO's complained that the current test contained many questions which were not related to their actual jobs (orderly room functions, rations and messing, etc.). It should be emphasized that most of these men were not complaining about the MOS, or necessarily the MOS tests, but the fact that they had <u>not</u> been trained on these items.

Specific recommendations for coverage in a "capper course" include the following, which is a summary of the most frequently mentioned areas by field personnel:

a. Battalion/Company/Platoon administrative operations.

b. Personnel management and resources utilization.

c. Shop operations to include supply and maintenance management.

d. Time keeping procedures and manpower accounting.

e. Quality Assurance/Quality Control management and procedures.

f. General battery-wide equipment operation, troubleshooting, and inspection.

g. Recent equipment modifications and major item additions.

1.9.3.3. Summary.

Analysis of data from all support units contacted during the field survey demonstrates that the current use of "capper" MOS in the Ordnance career structure for Air Defense is generally supported. There are three basic problems, however, associated with this program which adversely impact unit operations, personnel proficiency, and individual morale. These are: (1) there is no mandatory requirement for formal resident training of candidates for the -50 skill level or for the large number now in the field who hold such MOS; (2) the MOS Evaluation Test encompasses areas for which the men are not trained or have no available source of self-qualification; (3) the current regulatory guidance (i.e., AR 611-201) is somewhat inaccurate in defining the exact responsibilities of the duties in the field. The survey obtained considerable data upon which course development and AR revision can be based in conjunction with contemporary efforts on the NCOES program, and the findings strongly support the requirement for making successful completion of such a course a mandatory prerequisite for the award of the -50 level MOS. Further, programming of student inputs should have a well-defined provisioning system for the training of E-7's who now hold a capper MOS and have sufficient time remaining in the Army. (NOTE: These proposals, in substance, were envisioned and approved for implementation by DA in conjunction with the HAWK Equipment Logistics Program (Project HELP); however, the current NCOES program appears to have deleted these provisions.)

1.9.4. Training Improvements - NIKE HERCULES Ordnance Enlisted MOS Courses.

1.9.4.1. Background.

Ordnance training for the Nike Hercules enlisted MOS is conducted at the US Army Missile and Munitions Center and School (USAMMCS) at Redstone Arsenal. DA Pam 350-10, US Army Formal Schools Catalog, is the appropriate document for the courses referenced in this section of the report. The findings and recommendations contained herein pertain to the following resident courses:

MOS	COURSE TITLE	COURSE NO.
22G20	NIKE Launcher Control Repair	121-22G20
22L20	NIKE Test Equipment Repair	121-22L20
22M20	NIKE Missile Repair	121-22M20
23N20	NIKE Radar and Computer Repair	104-23N20
23U20	NIKE High Power Acquisition Radar and Radar Simulation Repair	104-23U20

Data was also obtained concerning the training of the "capper" MOS for the Nike Hercules Missile System (MOS 23W50), the identified need for a specialized course, and programming of student inputs. This information is presented in item number 1.9.3.; and it is therefore not included in this portion of the report.

1.9.4.2. Analysis.

The information presented herein is a condensation of a large quantity of data gathered from supervisors and maintenance men in Air Defense support units worldwide. To be more specific, this summary includes data gathered in 8 Nike Hercules support units and approximately 130 individuals. Many of these respondents completed written questionnaires which asked a series of questions on their specific MOS training in the perspective of their current duty assignment. The MAME-71 project personnel have statistically and analytically collated the data from these varied sources, and this data has been arranged by the specific MOS for which training is provided. Some of the responses received were pertinent to all or many of the Nike Hercules MOS courses. These items are presented in a separate section at the beginning of this report, and this portion should be consulted along with the specific MOS course recommendations in order to secure a total perspective.

1.9.4.2.1 ALL NIKE HERCULES ENLISTED COURSES (GENERAL).

1.9.4.2.1.1 Inadequacy of OJT as Means of Training.

A discussion of the problems associated with qualifying school graduates in the field by using on-th-job-training (OJT) is covered for the HAWK Missile System in item number 1.9.5.2.1.1 of this report. In essence, the same problems cited for HAWK are equally applicable in Nike Hercules; therefore, this write-up should be consulted.

1.9.4.2.1.2 Contact Team Support Training.

The most prevalent complaint among field personnel about the training of Nike Hercules Ordnance enlisted training was the inability of graduates to understand the major items as they function in an integrated tactical battery configuration. Although the repairmen have a general understanding of how each individual piece of equipment functions, they do not understand the items as they tie-together and operate as a unified set of ground equipment. This is especially prevalent in the MOS that are predominently utilized to render on-site support services (22M, 22G, 23N and 23U). It was almost unanimously stated by all personnel contacted that the courses for these MOS should provide improved training techniques which would enable the students to: (1) have practical exercises in an integrated battery environment; (2) perform major item troubleshooting where more than one MOS is used; (3) receive more realistic equipment malfunctions of the type that are encountered on-site (when "bugging" the equipment for troubleshooting training); and (4) receive additional major item diagnostic troubleshooting using common portable test equipment or specialized organizational maintenance test equipment.

1.9.4.2.1.3 Shop Administrative Procedures.

It was indicated that many recent graduates are lacking in their understanding of common shop administrative functions. This problem appears to relate to all Nike Hercules enlisted courses. Specific examples cited include the operation of a production control activity, a quality control function, and the operation of a support unit shop office. It would appear that a greater emphasis on the shop operation portion of resident training programs is necessary to acquaint personnel with the operation of a typical Nike Hercules DA and GS shop. FM 9-59, Missile Support Unit Operations, is the primary reference source for their information.

1.9.4.2.1.4 Use of Technical Publications.

Numerous comments were made on the inability of Nike Hercules graduates to efficiently use technical publications: This deficiency pertains to two areas: (1) the proficient use of schematics, procedures manuals, and wiring diagrams; and (2) the ability to research "P" supply parts manuals in getting item requisitioning data.

Much time is wasted in the inefficient use of these manuals, and mistakes due to improper usage are not uncommon. In conjunction with this problem, there is another that was defined and is related! preparation of maintenance forms, records, and reports. The student should have greater training on the accurate preparation of various maintenance forms and log books. Improved instruction and practical application is therefore required on the use of TM, SM, and related publications to include associated TAMM records and forms as defined in TM 38-750 and FM 9-59.

1.9.4.2.1.5. Realism of Training Malfunctions in Troubleshooting.

Nike Hercules support units in Germany, Korea, Okinawa and Alaska expressed the conviction that the "bugs" used to exemplify equipment malfunctions in resident training were unrealistic. It was stated that clipped wires, missing resistors, broken pins in tubes, etc. are not really representative of actual field problems normally encountered. It may be significant that the types of faulty conditions that these units recommended as typical are due to environmental problems prevalent in these areas. For example, most often cited were: corrosion of components, chassis, bearings, etc.; deterioration of mounts, o-rings, etc.; internal breakdown of electrolytic capacitors, transistors, etc.; damage due to excessive humidity, cold weather, etc.; loss of calibration due to physical jarring or environmental conditions; bad soldering connections due to vibration or rough treatment. Obviously, all such conditions cannot be duplicated in training, but it would appear that a greater degree of realistic component malfunction simulation would significantly enhance troubleshooting training.

1.9.4.2.2. NIKE LAUNCHER CONTROL REPAIR (MOS 22G) and NIKE MISSILE REPAIR (MOS 22M).

NOTE: (Comments for training improvement for MOS 22G and 22M were closely related in the preponderance of field comments; therefore, the discussion of these MOS training programs is portrayed simultaneously.)

1.9.4.2.2.1 Use and Maintenance of the Function Tester.

Several personnel stated that the training on the Function Tester (frequently referred to as the "Luckly Louie") was inadequate. There were indications that some graduates did not receive any instruction on this item, and the feeling of the majority of respondents was that there were sufficient field problems with this equipment to warrant course coverage. Not only is instruction on the use of the Function Tester required, but also the procedures for maintenance of the item, chiefly the stepping switches/relays and associated circuitry.

1.9.4.2.2.2 Use of the Cable Megger.

A minority of personnel contacted indicated that increased instruction was required on the use of the Cable Megger, which is used to perform resistance breakdown and continuity checks on system cables.

1.9.4.2.2.3 Calibration of RF Test Set.

Personnel in the field (primarily MOS 22M) have to calibrate ("C" level) the RF Test Set. Part of this operation is performed by the 22M repairman and part of the check is done with the assistance of the 22L repairman on the Ord 6 test equipment. The calibration checks and associated maintenance operations are relatively complex operations which recur in the field, and the CONUS school provide greater emphasis in both MOS areas.

1.9.4.2.2.4 Hydraulics, Pneumatics and Mechanical Training.

Personnel with MOS 22M and 22G in the field almost unanimously felt that the instruction they received on the hydraulic, pneumatic, and mechanical operations associated with the Nike Hercules system was inadequate. Specific tasks involved were not cited; however, it would appear that the density of work in this area would justify a general expansion of training coverage. It was obvious that the age and condition of some field equipment (to include operational readiness float stock) was such that these type of support operations were proliferating.

1.9.4.2.2.5 Launcher Rebuild Training.

The field is undergoing a comprehensive program of launcher rebuild, and this is being accomplished largely at the Nike Hercules direct support unit level. Such work encompasses a high percentage of the work of MOS 22G, and all appearances are that this condition will persist for some time to come. Support functions being performed on the launcher include detection of faulty bearing surfaces, checkout and replacement of launcher struts and beams, and the disassembly, checkout, and reassembly of the complete launcher. Supervisors and repairmen cited that they needed greater emphasis on these support procedures in resident training courses.

1.9.4.2.2.6 Training on Use of Special Tools.

Some respondents stated that they needed a greater degree of coverage on the proper use and identification of special tools that are used in typical missile/launcher support services. The items most commonly cited were---

Kelox screw thread insert tools

Tap and Die Set

Torque Test Device

Helicoil screw thread insert tools (replacement and repair services)

Impact Wrenches

Training should be amplified on the correct use of these items, to include proper identification of selected components by nomenclature, size, and application to particular jobs.

1.9.4.2.3 NIKE TEST EQUIPMENT REPAIR (MOS 22L)

1.9.4.2.3.1 Repair of Shop 3 Card Reader.

The most prevalent comment regarding the training of Nike Hercules test equipment repairmen was the inability of course graduates to use and repair the Shop 3 Card Reader. Questions were raised regarding the basic design adequacy of this item since it is perpetually deadlined or marginally operational. Design considerations aside, the personnel in the field have to use this item, and it was recommended that 22L personnel be given a much greater degree of quantitative and qualitative instruction than at present. Particular emphasis should be given to the adjustments of this item, and the servicing of corroded or faulty relay contacts.

1.9.4.2.3.2 Proportion of Practical Exercises to Theory.

A significant number of the 22L repairmen contacted stated that the training they received at USAMMCS could have been improved if the ratio of practical exercises to theory instruction were greater. They felt that job requirements were such that less theory of test equipment operation and greater practical training on the use of the shops would be desirable. In general, these men are able to perform satisfactorily on Shops 1 and 2, but not on Shop 3. They require a better understanding of the digital and low voltage characteristics of Shop 3, with emphasis upon the application of this theory to the types of checks and adjustments that are made using this equipment.

1.9.4.2.3.3 Calibration of RF Test Set.

A portion of the calibration ("C" level) of the RF test set is performed on the Ord 6 test equipment by test equipment repairmen (MOS 22L). This is a critical checkout procedure for which training needs improvement in the 22L and 22M courses.

1.9.4.2.4 NIKE RADAR AND COMPUTER REPAIR (MOS 23N)

1.9.4.2.4.1 Operation and Site Support of Radars.

The 23N repairman is the backbone of the contact team support provided by the Nike Hercules support unit. There appears to be a proliferating requirement for this service which increasingly involves the performance of daily, weekly, and monthly equipment checks. Current practices involve heavy reliance on Artillery operators or mechanics to assist with on-site troubleshooting. This situation is undersirable due to alleged decreasing proficiency of battery personnel, personnel shortages, and increasing on-site workloads. It is required, therefore, that training for MOS 23N be expanded in contact team support tasks, and this training should be conducted on an integrated firing battery configuration in order to duplicate or simulate actual field conditions.

1.9.4.2.4.2 SAMCAP Modification.

Although it was more of an anticipated than a real problem, several field personnel felt that the forthcoming SAMCAP modification to the Nike Hercules system will significantly increase support responsibilities, chiefly to the Radar and Computer Repairman, MOS 23N. It was therefore recommended that training programs be carefully analyzed and modified in order to provide the instruction of on-site operations, troubleshooting, and repair of SAMCAP-modified Nike Hercules ground equipment.

1.9.4.2.5 NIKE HIGH POWER ACQUISITION RADAR AND RADAR SIMULATOR REPAIR (MOS 23U).

1.9.4.2.5.1 Simulator (T-1) Repair Procedures.

Few comments were received in the field regarding the adequacy or inadequacy of training for MOS 23U. In general, the training for the HIPAR appeared to be adequate as presently given; however, some improvement was required in the T-1 simulator training. Personnel need to have a better understanding of how this simulator ties into the firing battery on an integrated basis so that he can better troubleshoot the end item when it becomes unserviceable.

1.9.4.3. Summary.

The field evaluation identified general and specific areas in which resident training for Nike Hercules enlisted MOS is deficient. In system engineering, it is sometimes assumed that certain tasks are able to be acquired by on-the-job-training (OJT). This is, generally speaking, an unreliable, non-standardized, and often inadequate process for qualifying enlisted personnel. In particular, the performance of most contact team support operations (i.e., on-site troubleshooting and repairs) are difficult to administer in the field by OJT. These operations and procedures therefore require expanded emphasis and coverage in applicable Nike Hercules training programs. Expanded and/or improved instruction on shop administrative procedures, use of technical publications, and equipment troubleshooting (with realistic malfunctions) is needed in all enlisted courses. In addition, selected improvements in specific courses, as identified inpreceeding paragraphs, are also required to better qualify graduates for field work. It is recognized that appropriate instructors and curricula specialists will have to make a comparative analysis of these findings and recommendations in relation to existing training programs and academic restraints, since this has not been accomplished in-depth by MAME-71 project personnel.

1.9.5. Training Improvements - HAWK Ordnance Enlisted MOS Courses.

1.9.5.1. Background.

Ordnance training for the HAWK enlisted MOS is taught at the U. S. Army Missile and Munitions Center and School (USAMMCS) at Redstone Arsenal. DA Pam 350-10, US Army Formal Schools Catalog, is the appropriate document for the courses referenced in this section of the report. The findings and recommendations contained herein pertain to the following resident courses:

MOS	COURSE TITLE	COURSE NO.
22K20	HAWK Missile and Launcher Repair	121-22K20
23Q20	HAWK Fire Control Maintenance	121-23Q20
23S20	HAWK Pulse Radar Repair	104-23S20
23T20	HAWK Continuous Wave (CW) Radar Repair	104-23T20

Date was also obtained concerning the training of the "capper" MOS for the HAWK Missile System (MOS 23V50), the identified need for a specialized course, and programming of student inputs. This information is presented in item number 1.9.3.; and it is therefore not included in this portion of the report.

1.9.5.2. Analysis.

The information presented herein is a condensation of a large quantity of data gathered from supervisors and maintenance men in Air Defense support units worldwide. To be more specific, this summary includes data gathered in 14 HAWK support units and from approximately 160 individuals. Many of these respondents completed written questionnaires which asked a series of questions on their specific MOS training in the perspective of their current duty assignments.

The MAME-71 project personnel have statistically and analytically collated the data from these varied sources, and this data has been arranged by the specific MOS which training is provided. Some of the responses received were pertinent to all or many of the HAWK MOS courses. These items are presented in a separate section at the beginning of this report, and this protion should be consulted along with the specific MOS course recommendations in order to secure a total perspective.

1.9.5.2.1 ALL HAWK ENLISTED COURSES (GENERAL).

1.9.5.2.1.1. Inadequacy of OJT as Means of Training.

Almost universally, personnel in field units commented that on-the-job-training (OJT) was a substandard form of training. Their criticism was not that OJT is unnecessary but rather that prevailing field conditions (e.g., short tours, personnel shortages, malassignments, high workloads, etc.) often preclude the effective discharge of an OJT program. Upon examining the OJT system used, MAME-71 evaluators found that, in most units, no formal program exists, no records are maintained of individual progress, and no uniform criteria exists against which progress is measured. Most OJT that is accomplished is really "cross-training," that is, preparing a man for a special purpose skill (e.g., cross-coupling check, speedgate repair, etc.) or into another specialty area (e.g., MOS 23Q to 23S) to compensate for personnel shortages or disproportionate distribution of workload.

Most of the OJT or cross-training being given in the field was the assignment of a new school graduate to someone who had been in the unit awhile, and the section chief personally evaluated his progress. On occassion, the Missile Maintenance Technician (MMT) assigned to the unit would conduct informal training on equipment modifications or problematic maintenance checks and troubleshooting procedures.

Most field commanders were reluctant to endorse any formalization of OJT either in doctrine or the mechanics of conducting such a program. This was due to the constraints of mission demands and available manpower vis-a-vis workload considerations that prevailed in their units. They felt, therefore, that the CONUS schools should not become overly dependent upon OJT as a reliable means of qualifying personnel for total proficiency in developing resident training program content. All critical skills, knowledge, and techniques for a particular skill level of an MOS must be covered in sufficient depth in resident training courses to enable graduates to have an initial working capability when he arrives at the field unit. OJT, as presently conducted, can only "polish" this capability and make the man more efficient.

1.9.5.2.1.2. Basic Electronics and Mechanical Training.

A significant number of comments were obtained on the subject of training on fundamental principles of electronics, mechanics, and hydraulics. Comments were not highly definitive in referencing specific deficiencies on course content, but certain general areas do stand out.

Former students commented that the basic electronics instruction should be oriented more to the actual hardware that they would eventually be repairing. For example, it was felt that "training breadboards" do not convery the actual job requirements for soldering components. Seventy-five percent of all graduates surveyed felt that more practice soldering on HAWK hardware is needed.

A significant number of respondents felt that they needed more instruction on the troubleshooting procedures used on solid state circuits, chiefly diodes and transistors. The theory given on these areas should be less theoretical and more-oriented toward missile application and troubleshooting concepts.

Most individuals felt that a greater emphasis should be placed early in the course on use of missile repairman's basic hand tools, common test instruments, and soldering gear. And many of these comments referred to the instruction given on mechanical/hydraulic jobs. Since the deletion of the HAWK Mechanical Repairman (MOS 46F) some years ago, the "electronics repairman" is expected to perform equipment mechanical type repairs. Thus, a basic knowledge of the principles of mechanics and the use of corresponding tools and test equipment are needed for all HAWK MOS.

1.9.5.2.1.3 Quality Assurance/Quality Control Instruction.

In fielded Air Defense support units QA/QC is a reality. Generally speaking, the commands are emphasizing the program and final inspections of shop and site work is more critical than before. All this places a greater burden on the Ordnance repairman with respect to the quality of his workmanship.

USAMMCS training has obviously instilled a "quality awareness" among graduates. The most deficient area appeared to be the exposure of students to the quality techniques that should be performed in a shop and the standards used in judging workmanship. This is not limited to soldering standards and techniques (although this is important) but to "total maintenance" which includes such things as chassis cleanup, torqueing bolts, replacing dented waveguide sections, painting, installing fasteners, etc.

1.9.5.2.1.4 Contact Team Support Training.

By far, the most common complaint of field personnel (Artillery and Ordnance) was the caliber of the MMCS graduates in performing on-site repair of battery major items of equipment. In the field this service is called contact team support, which is that service rendered on-site, upon request, of an integrated ground equipment system in a fully tactical configuration.

Most supervisors and repairmen felt that they had had "more than enough" resident training on shop-type test equipment operation (Shops 2, 3, 4, 6 & 7); but they felt that the training on contact team service was virtually non-existant. It is not that the students are not exposed to the major equipment. Rather it is evident that this exposure is proportionally not enough, and, very importantly, is not presented in an integrated battery configuration.

It may be argued that this type of training can be (or should be) accomplished by OJT in the field. This is totally impractical since the battery equipment is seldom available for training purposes. Air Defense systems operate on a 24 hour a day basis, seven days a week. (NOTE: See also item no. 1.9.5.2.1.1. of this report for an expansion of OJT limitations.)

Thus, a major portion of each HAWK course should devote concentrated training to realistic troubleshooting of major items of equipment in a tactical battery configuration (or realistic simulation). Such training must include as a minimum: boresighting procedures; daily, weekly, and monthly checks; on-site tech assistance service provisioning; inter-system power and signal data cabling; and realistic troubleshooting where more than one item of equipment is involved (e.g., PAR and BCC interface on video display problems).

1.9.5.2.1.5. Power Distribution Equipment Training.

Some responses received stated that a limited but greater-than-present emphasis should be given in resident training to the operation of, and preventive maintenance on, power generation equipment, and the repair techniques associated with power and signal distribution. This area includes the resistance-checking and soldering that is performed on large cables, and the troubleshooting and use of TM schematics for fault isolation within a major item or chassis. One example cited was the ability to troubleshoot an electrical relay complex using test points or signal distribution boards.

1.9.5.2.1.6. HAWK Test Equipment Repair Responsibilities.

AR 611-201 prescribed that the HAWK electronic field maintenance test equipment will be supported by MOS 23S, Pulse Radar Repairman. The field survey does not bear this out. In practice, the operator of a given shop repairs the equipment in that shop. For example, the 23T CW Radar Repairman repairs his Shop 3 in its entirety.

Thus, current regulations and training conflict with field practice and, indeed, a logical delineation of support responsibilities. In only one Hawk support unit worldwide was the 23S repairman used as the unit test equipment repairman as doctrine and training prescribes.

This obvious deficiency merits a reevaluation of the job descriptions in AR 611-201, and a subsequent realignment of training in order to conform more closely with the actual field job requirements.

1.9.5.2.1.7 Training on Administrative and Operational Procedures.

Based on a comparative analysis of present shop practices with previous feedback endeavors, it is apparent that today's school graduate is more aware of shop administrative and operational procedures than his predecessors. One reason for this may be that such functions as quality control and production control are now more formalized and standardized than before. It was pointed out that HAWK graduates are still weak in certain administrative/operational areas, and training should be improved.

Repairmen are weak on the procedures for accurately completing forms, reports, and records such as the TAMMS items in TM 38-750.

Additional practice should be given on the preparation of DA Form 2407, DA Form 2404, and DA Form 2408-series. So much time is expended in some support units in reviewing and correcting maintenance forms that a man is charged with doing this. Correspondingly, the repairman should have a familiarization of shop operations and shop procedures so that he can understand his role in the overall system.

1.9.5.2.1.8 <u>Operation and Use of Common Test Equipment</u>.

It was recommended that the school give the students a greater exposure to, and usage of, common items of TOE authorized test and measuring equipment. This includes the use of such items as VTVM, differential voltmeters, calibration standards, oscilloscopes, signal generators, frequency counters, power meters, etc. In the field, such items must be selected by the repairman and effectively employed in conducting on-site troubleshooting. It was suggested that a review of TOE test instrument authorizations be made, and detailed training on the operation and use of the more commonly used items be given.

1.9.5.2.2 HAWK Missile-Launcher Repair Training (MOS 22K).

1.9.5.2.2.1 <u>Repair of Launcher Hydraulic Valves</u>.

Training of the 22K20 repairmen is inadequate in the procedures for the removal and replacement of the hydraulic valve of the launcher. The problem was most prevalent in USAREUR HAWK units.

1.9.5.2.2.2. <u>Boresighting Procedure for Launcher</u>.

It was stated that there is a need to teach the <u>complete</u> boresighting procedure for the HAWK Launcher. Emphasis should be made on the intricate sector adjustment and the use of auxiliary equipment.

1.9.5.2.2.3 <u>Missile Receiver Alignment</u>.

School graduates need additional training on the missile receiver alignment with particular emphasis on the checkout and troubleshooting of the Target and Fuse Doppler Amplifier.

1.9.5.2.2.4 <u>Missile Speedgate Training</u>.

The preponderance of 22K personnel in the field indicated that training on the Missile Speedgate is still inadequate to qualify graduates in performing support maintenance services on this item. Some repairmen stated that <u>additional</u> instruction on the Speedgate schematics in TM 9-1400-500-30 and test procedures in TM 9-1400-500-34/2 would be helpful in better understanding checks and adjustments.

1.9.5.2.2.5 Repair of Helicoil Screw Thread Inserts.

Support services are frequently required on the launcher helicoils. Missile-Launcher Repairmen need additional training on servicing these items, particularly the replacement procedures.

1.9.5.2.2.6 Shop 6 Equipment Utilization.

There is insufficient training given to 22K personnel on the use and operation of the special tools and equipment in Shop No. 6. An example of this is the use of the tachometer device.

1.9.5.2.3. HAWK Fire Control Repair Training (MOS 23Q).

1.9.5.2.3.1. Battery Control Central (BCC) Alignment.

Numerous 23Q personnel in the field stated that the training they received on the BCC alignment was inadequate. Particularly stressed was the need for more practical exercises on synchro alignment procedures.

1.9.5.2.3.2 Battery Control Central (BCC) Power Distribution System.

Some personnel stated that more instruction on the BCC Power Distribuiton System would have aided them in better performing their duties in field assignments.

1.9.5.2.3.3 Engagement Simulator (AN/TPQ-21).

Repairmen in the field stated that additional instruction is needed in three areas of the TPQ-21 Simulator: (1) window clutter circuits; (2) jamming circuits; (3) special effects circuits.

1.9.5.2.3.4. Battery Terminal Equipment (BTE).

A very significant problem in the majority of field units was the inability of any Ordnance MOS to maintain the BTE. This item of equipment, although not technically complicated, did require a disproportionate amount servicing which nobody in the unit is trained to perform. Current practice is to either use a MICOM Missile Maintenance Technician (MMT) or a specially cross-trained repairman to do BTE repairs. Several units recommended that the MOS 23Q be designated by AR 611-201 to repair the BTE, and also be trained in this piece of equipment. This recommendation is based upon the similarity of the BTE to other Fire Control Equipment, and due to the capability of this man to assume this additional equipment support responsibility. (NOTE: The consolidation of MOS 23Q and 23S is separately addressed in this report. See item number 1.7.10.)

1.9.5.2.4. HAWK PULSE RADAR REPAIR TRAINING (MOS 23S).

1.9.5.2.4.1. Pulse Acquisition Radar Stabilitron.

Currently, graduates cannot proficiently perform those functions that current policy, by at least one major overseas command, requires of the direct support element.

Other areas of the PAR transmitter training that were cited as needing more emphasis include: High Voltage Power Supply, AFC Amplifier, Stalo Power Supply, and Stalo Servo AMP Drive Assembly.

1.9.5.2.4.2. Pulse Acquisition Radar Coolant Pump.

Some personnel stated that additional training was required on the specialized procedures for removing and replacing the coolant pumps of the PAR.

1.9.5.2.4.3 Other Pulse Acquisition Radar Maintenance Areas.

Some personnel contacted stated that they felt training needed to be improved, particularly in the practical exercises involving troubleshooting, in the following areas: removal and replacement of line stretchers, AFC alignment procedures, and end-item troubleshooting in an integrated firing battery configuration.

1.9.5.2.4.4 Range Only Radar ROR.

Review of the comments of 23S repairmen indicates that they generally lacked training in the ROR transmitter, receiver, and antenna positioning systems. Specific areas of deficiency most often cited were the Parallax Computer, IF Pre-Amplifier, and Back-Bias Amplifier. It was also stated that more practical troubleshooting procedures instruction on the ROR indicating system was required. (NOTE: The consolidation of MOS 23Q and 23S is separately addressed in this report. See item number 1.7.10.)

1.9.5.2.5 HAWK CONTINUOUS WAVE (CW) RADAR REPAIR TRAINING (MOS 23T).

1.9.5.2.5.1 CW Radars Mechanical Repairs.

The magnitude of work in mechanical repairs of CW radars is increasing in the field, and this impacts on the skill requirements of 23T repairmen at chiefly the direct support level. Specific problem areas cited most frequency include: replacement of the torque tubes of the CWAR; CWAR antenna backlash adjustment; and diagnostic troubleshooting and repair of the CW radars gear trains. Significantly, it was stated by some respondents that school graduates arrive in the field with a "false sense of security" regarding mechanical-type repairs. That is, they have been exposed to training on certain theory and repair operations, but these do not parallel the actual jobs or equipment used by field units.

1.9.5.2.5.2 Built In Test Equipment (BITE).

A significant number of personnel contacted stated that they needed more training on the BITE modification to the high power illuminator radar. Emphasis was on use of BITE and tie-in of BITE to the radar circuits that it checks.

1.9.5.2.5.3 Test Equipment Repair Responsibilities.

CW Radar repairmen use Shop 3 for checkout and repair of CW-type components. Often these items are utilized on a three shift basis due to shortage of consoles and density of CW jobs. In practice, the 23T repairman must also repair the test equipment he uses. Training on the repair of the CW/Pulse Console, Microwave Console, and Auxiliary Microwave Console is not adequate to support field operational requirements. Numerous comments were also made on the comparable training given on the organizational maintenance test equipment repaired by the 23T, chiefly the Transmitter Test Set and Signal Generator Test Set. (NOTE: See also the item in this report on Test Equipment Training Responsibilities, item number 1.9.5.2.1.6.)

1.9.5.2.5.4 Other CW Radar Maintenance Areas.

Other CW radar equipment training areas that were cited most often as deficient include the following: Velocity Gate Scanner of CWAR; Transmitter of HPI; Radar Set Group of HPI; Power Circuits of HPI; Spectrum Analyzer of the Shop 3 Microwave Console; Modulator Oscillator of the CWAR (alignment of).

1.9.5.2.5.5 Use of Technical Publications.

The 23T MOS was singled out as having problems with the efficient use of technical publications (TM's). This was cited as a major problem with newly assigned CW radar repairmen. Weaknesses included the ability to use wiring diagrams, trace power and signal flow in schematics, and correlation of schematic representation to actual components of a chassis. A greater familiarity on the proficient use of TM's is needed in resident training.

1.9.5.2.5.6 Boresighting the CW Acquisition Radar.

CW Radar repairmen in the field said that additional training was desirable on the boresighting procedures used for the CW Acquisition Radar.

1.9.5.3. Summary.

The field evaluation identified general and specific areas in which current resident training for HAWK enlisted MOS is deficient. It is believed that the systems engineering process of course development relegates many of these skills or knowledges to being acquired by on-the-job-training (OJT). OJT is not a reliable means of insuring proficiency in most cases, and some of these essential tasks must be covered in CONUS resident courses if proficiency attainment is to be realized. In certain other areas, training is currently being given, but the qualitative or quantitative emphasis is insufficient or misdirected. In order to give course planning and development personnel guidance for training improvement, the final report presents numerous examples of general and specific deficiencies. Training instructors and curricula specialists will have to make a comparative analysis of these findings and recommendations in relation to existing training programs and academic restraints, since this has not been accomplished in-depth by MAME-71 project personnel.

1.9.6. Adequacy of Non-Resident Training Programs.

1.9.6.1. Background.

As an augumentation to the resident training programs, most service shools also have correspondence courses which are provided for the purpose of self-advancement in a particular skill or knowledge. In some cases these courses can fulfill some of the requirements for MOS award, promotion, and skill level progression. The specific courses offered by the US Army Missile and Munitions Center and School are listed in the "Catalog of Correspondence Courses" issued by that school.

The MAME-71 survey teams distributed approximately 300 copies of this catalog to missile and munitions support units and headquarters elements worldwide. This was one of several devices that the project groups used to give technical assistance to the units visited. Survey teams also inquired into the adequacy of the USAMMCS non-resident training program and its offerings.

1.9.6.2. Analysis.

In general, the degree of participation by field personnel in Air Defense units was rather low in comparison to the total number of potential candidates within the unit. The following chart shows the number of men in each unit that were enrolled in a USAMMCS sponsored correspondence course at the time of the survey:

TYPE UNIT	NUMBER ENROLLED	TYPE UNIT	NUMBER ENROLLED
Nike Herc DSP	3	Hawk DSP	Unknown
Nike Herc DSP	0	Hawk DSP	10
Nike Herc DSP	10	Hawk DSP	0
Nike Herc DSP	Unknown	Hawk DSP	10
Nike Herc DS/GS	6	Hawk DSP	5
Nike Herc DS/GS	5	Hawk DSP	Unknown
Nike Herc GS	0	Hawk DSP	2
Nike Herc GS	15	Hawk DSP	5
		Hawk DSP	4
		Hawk DS/GS	6
		Hawk GS	8
		Hawk GS	Unknown

The field level of participation would certainly have been higher if support operations would have allowed more "free time" or "formal command emphasis". It is believed that the catalogs provided to units and individuals during the survey may have given greater "visibility" to what is available, and may have a stimulating effect on a large number of persons. It would appear that any subsequent field surveys, like MAME-71, which are conducted in the future should repeat this technique of distributing the Catalogs of Correspondence Courses. One advantage of this method is that it precludes the possibility of misrounting or faulty addressing, and it places the publication directly in the hands of the potential users.

Most of the respondents contacted were generally satisfied with courses they had completed and few comments of significance were obtained in this area. There were numerous recommendations for the development of new courses; or in some cases, the restructuring of existing courses to provide a different or more timely emphasis. The following list catalogs the areas that were most frequently mentioned as requiring coverage or improvements:

a. Course for NCO's and WO's on "Principles and Techniques of Shop Management." (Examples: shop operation, production control, quality control, shop stock, personnel management, supply and maintenance management, logistics concepts.)

b. Course on "Manpower and Resource Management." (Examples: Determination of productivity, effective manpower utilization; manpower surveys, computation of manpower requirements, development of MTOE, manpower survey methodology.)

c. "Package" type courses for each technical MOS - This proposal envisions a series of courses that each individual holding an MOS should complete in order to enable him to advance through his career and prepare for his MOS Evaluation Tests.

d. Course on "Supply Procedures in a Missile Maintenance Shop". (Examples: Procedures for requisitioning repair parts, how to research missile-type supply publications, procedures in Tech Supply, Shop Stock and Bench Stock operations, priority systems, status reporting.)

e. Course on "The Army Maintenance Management System (TAMMS)". (Examples: Instructions on the use of TM 38-750 as applies to missile systems application, log books, maintenance requests, and associated typical records and reports.)

f. Course on "The NCR-500 Computer" - This would be a brief familiarization so shop supervisors and key personnel on the use, operation, capabilities, limitations, and support of the NCR-500 as applied to the computerization of stock accounting and other function in a missile support shop.

g. Course on "Troubleshooting Techniques on Transistor and Solid State Circuits." (Example: Use and maintenance of the transistor checker, specialized troubleshooting techniques, special precautions, precision soldering procedures, and the handling of miniaturized components.)

h. Course on "Theory of Digital Computer" - This would be a brief resume of the type of digital computers used in the Battery Terminal Equipment, and the SAM-D and Improved HAWK systems.

It is recognized that several existing courses or subcourses deal with some of the above subject areas. In such cases, an analysis should be made to determine the adequacy of present coverage (i.e., timeliness, orientation, accuracy) and the effectiveness of publicizing the existing courses to overseas support units.

1.9.6.3. Summary.

The field evaluation identified several areas in which new courses or improvements to existing courses may be required in order to better accomodate the needs of missile support units. These areas include: Principles and Techniques of Shop Management; MOS Developmental Courses; Supply Procedures in a Missile Maintenance Shop; Manpower and Resource Management; TAMMS; the NCR-500 Computer; Troubleshooting Techniques on Transistor and Solid State Circuits; Theory of Digital Computers. The technique of distributing the "Catalog of Correspondence Courses" during the course of the field survey is a most appropriate means of disseminating such publications directly to the potential users, and this practice should be continued.

1.9.7. Shop Safety Training.

1.9.7.1. Background.

A concerted emphasis on safety in the shop has been made in training programs and procedural data as documented in SOP, FM, and TM. This emphasis has been orientated to the safety of individuals as well as the preservation of equipment. Special emphasis has also been given on certain safety precautions that are peculiar to missile systems, such as RF radiation hazards, high voltage conditions, radioactive components, and antenna rotation dangers. The field evaluation attempted to determine the effectiveness of these training programs and procedural data and define areas for improvement.

1.9.7.2. Analysis.

MAME-71 verified that CONARC training on shop safety is generally adequate, and all indications were that units are employing reasonably safe practices in their everyday operations. Most of the respondents contacted commented favorably on the safety training at USAMMCS. However, there were certain recommendations for training improvement and safety equipment provisioning.

In augumentation of the current training on safety, it was recommended by several support units that additional emphasis should be given on the following:

a. Safety around power generation equipment in the shop and on-site, to include electrical hazards, equipment grounding requirements and fuel storage.

b. Safety when working with or around heavy equipment, such as wreckers, crances, fork lifts, A-frames, vehicles, and MHE devices.

c. Safety precautions to be observed in using high pressure air and hydraulics; particularly Nike Hercules MOS 22G and 22M.

Probably the most significant problem that was identified by most units visited was the non-availability in the field, through normal requisitioning channels, of electrical safety shoes. These shoes are specially constructed to minimize the danger of electrical shock to workers around high voltage or potentially hazardous power sources. Documentation in some missile maintenance TM and FM, and regulations in some overseas commands require the use of these safety shoes.

The current policy for USAMMCS is to requisition or locally procure and issure one pair of safety shoes to each student in certain MOS courses. Graduates are permitted to retain the shoes for use at their next assignment. It appears therefore that the problem in the field is one of replacement (or, in some cases, initial provisioning) of electrical type safety shoes through normal quartermaster supply channels. It has been the experience of the missile school that these items are difficult to secure through supply channels, and local requisitioning has been mandatory to fulfill requirements. (NOTE: The identifying data for one type of these shoes is: Shoes, Safety, Electrical Hazard; FSN: 8430-904-4712). Therefore, the problem may be one of procurement in sufficient quantity to meet field requirements. In any case, as long as the safety hazard is present and the regulations specify the wearing of safety shoes, action should be taken to enable provisioning of these items in sufficient quantity in all areas.

1.9.7.3. Summary.

In general, the units visited were quite safety-conscious and resident training is generally adequate on shop safety. Certain training areas require additional emphasis in affected courses, such as power generation equipment safety, materiel handling equipment (MHE) safety, and safe utilization of high pressure air/hydraulics. The non-availability of electrical type safety shoes through normal requisitioning channels in overseas locations was a significant problem. Current policy and regulations requires the use of these safety shoes for personnel protection; therefore, action is certainly in order to stock these items in sufficient quantities at supply units which support missile maintenance units.

1.10. AIR DEFENSE MISSILE SYSTEMS PROBLEM AREAS

MATERIEL

1.10.1. Retention and Revision of the Missile System Stockage List (MSSL).

1.10.1.1. Background.

The objective of the Missile System Stockage List (MSSL) is to provide a means for improving the materiel readiness of deployed missile systems and reducing major item downtime. The MSSL Technical Manual (TM), for a particular missile system, will contain those missile repair parts that will be stocked or on valid requisition by all technical batteries (ORG), support units (DS and GS), and overseas depots. The quantities listed are minimum quantities of repair parts to be stocked at each level of support; however, quantities may be increased based on demand experience.

The MSSL in no way relieves applicable organizations from the responsibility of stocking other missile-system repair parts that are demand supported.

The MSSL will be prepared and updated by the NMP/NICP in coordination with major field commanders. Initial draft lists will be prepared by the NMP/NICP and forwarded to appropriate field commands for review, comment and/or concurrence. DA, DCSLOG, will approve weapon systems for which an MSSL may be developed and will also be the approving authority for the MSSL (AR 700-18).

1.10.1.2. Analysis.

The field survey revealed that an MSSL is necessary if excessive firing battery "red time" is to be precluded. Repair parts identified in the MSSL are those considered essential to the operation of the applicable missile system, because failure of these parts could cause a deadline or operational malfunction of the subassembly, component, or major item in which the part is installed. Nondemand supported item failure is common, and many short supply and long lead-time items may be placed on backorder for extended periods of time. The MSSL in USAREUR had been suspended prior to the MAME-71 Evaluation, and all units felt there was a resultant materiel readiness deteriation. The units were temporarily surviving by cross-leveling, but respondents felt that this provided only a short-term relief. All units indicated that a MSSL should remain in effect, but felt that current MSSL lists were unrealistic. Most units stated that current lists were quantitatively excessive and should be purged by knowledgeable personnel . It was felt that theater personnel should participate in a general revision of MSSL.

10.1.3. Summary.

All field units voiced the need for the MSSL. Units also indicated the need to be more selective in developing this listing. The majority of the personnel surveyed indicated the need for field participation in developing and revising MSSL. Current problems with MSSL composition could be eliminated, or significantly minimized, if, after the NMP/NICP develops the proposed MSSL, the final review were accomplished by a worldwide review board (or equivalent) consisting of qualified field representatives from each using overseas command. This board should be empowered to recommend adjustment of assets based on experience and accumulated demand data. Subsequently, command approvals and final approval from DA, DCSLOG would proceed as normal.

1.10.2 <u>The Equipment Improvement Program - Equipment Improvement Recommendations (EIR)</u>.

1.10.2.1. Background.

It is considered incumbent upon all authorized users of Army equipment to submit Equipment Improvement Recommendations (EIR) upon detection of equipment failures or defective new materiel received; or to propose improvements in materiel. The requisite conditions for submitting an EIR for missile materiel include: (1) conditions that are hazardous to personnel, damaging to equipment, or impair mission accomplishment; (2) conditions that inhibit maintenance accomplishment or significantly reduce item durability; (3) substandard quality or workmanship during manufacture, rebuild, etc.; (4) equipment deterioration due to effects of climatic or environmental conditions. Items are submitted on DA Form 2407 in accordance with TM 38-750 direct to the appropriate National Maintenance Point.

The accumulated EIR submitted are consolidated into a Technical Bulletin which is published quarterly and disseminated to field units. The publications applicable to Air Defense Missile Systems are:

TB 750-921 Equipment Improvement Recommendation Digest (Nike Hercules).

TB 750-924 Equipment Improvement Recommendation Digest (Hawk).

TB 750-929 Equipment Improvement Recommendation Digest (Battery Terminal Equipment).

During the field evaluation, the adequacy of the EIR program was investigated to include associated publications and feedback reports to the field units.

1.10.2.2. Analysis.

Discussions on the Equipment Improvement Recommendation (EIR) program with field personnel stimulated a much greater degree of response than for any other publications/technical assistance area. Comments were received from virtually every Air Defense unit Worldwide, both at the user and support levels. Responses received ranged from total dissatisfaction with the program (or some aspect of the program) to confusion regarding the authoritativeness of the program. The comments pertained largely to the MICOM EIR system, but conditions may also apply to other commodity areas (i.e., Engineer, Signal, Automotive).

Field personnel, in general, expressed a dissatisfaction with the quality and timeliness with which they were provided technical responses to EIR they had submitted. Although several instances were cited illustrating long time delays before receiving an EIR reply (i.e., 3-5 months), this was not the primary complaint. The preponderance of individuals contacted (supervisors and repairmen) believed that there was insufficient research and work accomplished in developing EIR replies, and that the responses implied a dismissal of their problems as irrelevant. For example, it was frequently cited that the responses actually received were often dismissed with such phrases as: "isolated case", "do additional research and resubmit", "funds limitations preclude corrective action", "case considered before and action not deemed necessary", and "see next issue of the EIR Digest". It is felt that the majority of EIR prepared by field personnel are submitted in all good conscience as a means of conveying a real-life problem that impacts their effectiveness or safety. In other words, they are "living" with some untenable problem or unsafe condition, and the EIR is intended as a means of effecting corrective action or at least receiving advice on how to cope with the situation. They feel, therefore, that the element to which they are corresponding is obligated to fully research the matter and provide them with either an indication of intended corrective measures or a means by which the problem can be locally resolved.

It is certainly recognized by the project evaluators that the conditions cited above are not <u>always</u> the case. Nor is it always true that all problems can be solved by remote control via the EIR program. But it is felt that the importance of this program and the significance attached to it by field personnel warrant a closer scrutiny in the researching and preparation of EIR replies. Every attempt should be made to avoid "canned" responses; and, whenever possible, the submitter should be provided with technical guidance which he can use in locally effecting a solution. Most field personnel think of the EIR program as a extension of the technical assistance program for equipment-related problems. Further, the relative sensitivity of Air Defense systems equipment tends to necessitate the requirement for quick-response solutions to be provided and authorized on seemingly insignificant problems. Thus, every attempt should be made to examine each case thoroughly, and rapidly provide the submitter with something he can use to correct or compensate for the dilemma which is very real to him.

There were also numerous comments regarding the quarterly publications which catelog the EIR submitted and resultant actions taken. Some units did not regularly receive each issue of the EIR Digest, for reasons that could not be clearly identified. This irregularity is very significant since there has been extensive use in recent issues of this TB for directing mandatory equipment changes. For example, a specific case may cite an undesirable equipment condition, for which the recommended remedial action is changing a wire or component. The action is then noted as being a "MANDATORY CHANGE FOR ALL EQUIPMENT IN THE FIELD." This practice has prevailed in both the Nike Hercules and Hawk systems, and it has been met with varying degrees of opposition or confusion in the field.

Initially, it is felt that _if_ such a "mandatory" system is employed, action should be taken to "tighten up" on distribution of the TB. This is required to insure that all units, to include those supporting the theater supply stocks, uniformly get directive data so that _all_ equipment is so modified.

Secondly, there was much confusion regarding the authoritativeness of the TB as a _valid_ basis for changing missile system equipment. Some units contacted had a policy of fully implementing everything directed by the EIR Digest. Conversely, many units felt that this document was _not_ sufficient authority, and directed maintenance personnel to await a "legitimate" Modification Work Order (MWO) before any changes were made on hardware. This diversity of interpretation results in inconsistency with which materiel is modified in the field, a potentially dangerous situation. There were divided responses as to the advisability of employing the EIR Digest to direct equipment changes, but the majority felt that the matter of the legality of using this system in lieu of or in supplement to the established MWO program should be clearly defined. This act of definitiveness should also include the provisions for officially recording the actions taken to modify the equipment.

Thirdly, the content of the recent issues of the EIR Digest was criticized. Field personnel generally stated that the present system of documenting cases is too abbreviated and sterotyped. There is apparently a lack of descriptiveness of the field problems, and chiefly those recommendations that have been adopted or for which corrective actions have been cited. As discussed earlier with respect to individual reply, the field personnel feel that if such a publication is continued, greater descriptiveness in problem discussions is warranted. It should be stated at this point that the EIR Digest is fully utilized by field units and was represented to be a valuable publication that is necessary to effectively discharge equipment support responsibilities.

Finally, some units expressed dissatisfaction (and showed cases -- in-point) with EIR replies that affirmed that corrective action would be taken and these would be subsequently documented in the EIR Digest or a pending MWO change. Careful checking over a reasonable time period, however, had indicated that no such corrective action had been apparently taken. It is realized that circumstances may have precluded implementation or human error could have been involved, but the practice of deferring a reply without a corresponding case follow-up is very discouraging to field personnel. It would seem appropriate to consider a case open until corrective action is taken or a reasonable rebuttal has been given to the submitter.

1.10.2.3. Summary.

There was a large scale dissatisfaction in the field with certain aspects of the Equipment Improvement Recommendation (EIR) program as pertains to Air Defense Missile Systems. Personnel contacted expressed concern over the quality of the responses being received on EIR submitted. Criticism was made of the (apparent) lack of researching performed on submissions; and the replies given were lacking in technical descriptiveness, completeness, and in their ability to convey realistic solutions for existing equipment problems. There were a significant number of support units which did not regularly receive the EIR Digest, and some individuals complained that the Digests received did not contain items that were supposed to have been documented. Much confusion existed regarding the use of the EIR Digest to direct mandatory equipment changes. The preponderance of respondents felt that either MWO - only should be used to modify equipment, or the authoritativeness of the TB should be better defined. Many individuals contacted felt that there had been a general degradation of information (quantitatively and qualitatively) in recent issues of the EIR Digest.

1.10. 3. Missile Maintenance Technician (MMT) Program.

1.10.3.1. Background.

The US Army Missile Command has a technical assistance program for the field that is performed largely by Missile Maintenance Technicians (hereafter called MMT) who are usually assigned on a basis of one each per Artillery Battalion or Support Unit. This program is intended to provide units with a resident technical source of information and MICOM representation at the field unit level for purpose of feedback and coordination of materiel matters. The MMT program is established and guided by two basic regulations: AR 700-4, Supply and Maintenance, Technical Assistance Program; AMCR 750-35, Maintenance of Supplies and Equipment, Maintenance Technical Assistance Program.

The MAME-71 Project Group was extended considerable assistance from the Army Materiel Command - Logistics Assistance Office (AMC-LAO) in each of the theaters visited. These contacts were an invaluable source of liaison, coordination, and administrative assistance to the project director, team members and theater action officers. It was to these AMC-LAO elements the the bulk shipments of MAME-71 materials were mailed, and subsequently, these officers served as a point of storage and distribution of the materials. Such AMC-LAO elements represent an ideal point of informal contact in excercises such as MAME-71, and it is believed that this source should be employed in any future endeavors, resources permitting.

1.10.3.2. Analysis.

The field evaluation investigated three aspects of the MMT Program, as implemented: adequacy of MMT provisioning, utilization of assigned MMT, and recommendations for program improvement. The personnel contacted to derive this data included supervisory personnel, support unit repairmen, using unit personnel, and the MMT themselves. In the Air Defense area, the data was obtained from 21 support units and 15 firing batteries.

Most Air Defense Battalion and Ordnance Companies were authorized one or more MMT, and these were available and on location in most instances. There were a significant number of cases, however, where an MMT was not physically present due to a transfer action in which the former man was being transferred or returning to CONUS and the replacement had not yet arrived. This condition existed in approximately 10 percent of the units visited, which is not excessive. However, it would seem highly advisable to program MMT replacements in such a manner as to preclude these unproductive "gaps" in time and interruptions in continuity. A 30 day overlapping period (i.e., arrival of replacements NLT 30 days before departure date of incumbent MMT) would appear to be a logical period in which to effect an orderly transfer of information, materials, and missions. The lack of this "overlap period" experienced by several units in the past had created a hardship on both the unit as well as on the new MMT.

The number of MMT assigned to a particular unit was a matter of much speculation among the respondents contacted. Many of the firing batteries felt that two MMT per battalion were required in order to provide one for the support element, and another one, perhaps stationed at the Battalion Operations Center, who would rotate among the Firing Batteries. This concept may have merit if resources and funds would permit; however, the preponderance of the units expressed satisfaction with the current authorizations (one MMT per Artillery Battalion or one per missile system at GS). The <u>positioning</u> of this MMT in the organization did appear to be an initial factor. Although there were diversified opinions on this matter, the preponderance of support was for the following assignment criteria:

a. MMT received administrative support and control from the AMC-LAO at the appropriate theater headquarters.

b. MMT be assigned to the Battalion HQ level (or Company HQ in cases of an Ordnance DS/GS or GS Co) and operationally controlled by the commander.

c. MMT be physically positioned (i.e., working location) at the support platoon (or detachment, if applicable).

The rationale for item c above is that the support element is the focal point of maintenance services in the unit where the preponderance of materiel and hardware-oriented problems are located. Further, this element is designated as the source of technical assistance for the whole tactical complex, and the MMT program is essentially one of hardware-oriented technical assistance.

There was some discussion regarding the proposal (or rumored proposal) to echelon the MMT into a centralized office at some higher headquarters level and designate this pool of personnel to provide tech assistance on an "as requested" basis. In the Air Defense system, the vast preponderance of opinion was that this is highly undesirable, since this practice would tend to remove the man from intimacy with the real problems, and thus degrade the program. It is therefore advised that any trend in such a direction be reversed. MMT must be assigned at the lowest organizational level consistent with available manpower and mission effectiveness. This would appear to be appropriate at a level no higher than the battalion or company level.

The Air Defense units are quite dependent upon the MMT program. Obviously this varies depending upon such factors as MMT competence, amount of personnel shortages, magnitude of hardware problems, and adequacy of training. Statistically, 58% of the respondents claimed that there would be a moderate and significant impact created by deletion of the program; 26% stated that this impact would be very serious; and 16% stated that there would be no impact. In other words, 84% of current mission managers feel that the program is necessary in assisting them in doing their job.

It should be pointed out that the manner in which the MMT are utilized gives an insight into why they are needed. The largest single job they perform is technical assistance, and the most prevalent form of technical assistance rendered is personnel training. The deficiencies in training of both Ordnance repairmen and Artillery operators or mechanics are described elsewhere in this report; however, it can be generalized that the field training of new school graduates in system-wide troubleshooting, specialized tasks, and critical maintenance operations constitutes the majority of an MMT work. In the HAWK system, the battery personnel being trained under the "multi-level training concept" were considered to be especially problematic, necessitating considerable OJT on equipment operation and troubleshooting procedures, in many cases presented by unit MMT.

Other tasks being accomplished by MMT include: liaison and point of contact with USAMICOM; source of current information and hard-to-get publications; liaison with other units/headquarters; coordination of critical repair parts shortages; performance of certain critical maintenance operations (such as, repair of N/H Shop 3 Card Reader and BTE); and coordination of the Equipment Improvement Program (EIR) and Changes to Publications (DA Form 2028) program.

Although generally the MMT were used productively, there were several cases of under-or mal-utilization. In many cases this was a result of a misinterpretation or misunderstanding of the intent of the MICOM Technical Assistance Program. Also, there was an attitude in some units that the existance of an MMT in a unit for technical assistance relieved the other unit personnel of conducting tris service. Several commanders and managers expressed a desire to be apprised of the intended purpose scope, and regulation pertaining to the MMT program so that they could better utilize this source of expertise. Such an enlightenment should be diseminated in the CONUS schools (USAMMCS and USAADS) and in the field.

There were numerous recommendations by field personnel pertaining to the improvement of the current MMT program. The more significant ones are portrayed below, with a minimum of amplification and, generally, in order of frequency of mention:

a. There should be closer screening of MMT or applicants; and, particularly during reductions-in-force, the individuals competence should play a larger factor in retention.

b. When an MMT is converted from one missile system speciality into another, he should receive training in that system <u>before</u> field assignment.

c. The Equipment Information Bulletin (apparently recently discontinued) should be made available through the unit MMT, and provided in sufficient copies to enable distribution to support <u>and</u> tactical elements. (NOTE: Usually there is no available reproduction facility in overseas locations.)

d. There is a need for formal refresher training of MMT between assignments or within specified time intervals to apprise them of equipment modifications or new items.

e. Delete certain restrictions (apparently recently imposed in some areas) on MMT: the wearing of suits (or facsimile) instead of fatigues, the prohibition on overtime and travel pay, and the limitation on compensatory time accrual.

f. Make MMT correspondences from MICOM "more-official" enabling actions that can be legitimately implemented within a unit or theater.

g. Place a larger number of engineer-type maintenance technicians in locations where they are accessible to missile units.

1.10.3.3. Summary.

The field evaluation reveals that the MICOM Technical Assistance Program, as manifested in the Missile Maintenance Technicians (MMT), is generally adequate and definitely required. The quantity of one MMT per battalion (or per system supported in the case of GS or DS/GS units) is adequate if these personnel are assigned to the unit headquarters and work out of the support element in day-to-day operations. Concerted action is necessary to insure that continuity of operations is maintained by scheduling an overlap of at least 30 days between replacement and withdrawing personnel. Any trend toward consolidation of MMT at a higher headquarters level, due to personnel drawdowns or other reasons, would deteriorate the effectiveness of the program. Indoctrinations in CONUS training centers and in overseas locations are needed to apprise commanders and operating personnel with information and pertinent regulatory guidance on the purpose, scope and limitations of the program.

The current MMT program could be significantly improved if certain features or criteria were re-examined. Such improvements are needed in the following areas: screening and training of personnel; provisioning of informational data and regulatory guidance; increasing the quantities of items distributed to MMT; formalize refresher training for MMT; deletion of certain program restrictions; and provisioning of more Engineer-type maintenance technicians. Improvements must necessarily be implemented within the constraints of personnel and funding limitations, however, the criticality of the Air Defense mission, and factors of system age and component failures must be considered a significant factor in planning for MMT provisioning.

1.10.4. <u>Deficiencies in Air Defense Equipment Authorizations.</u>

1.10.4.1. Background.

Units in the field are authorized equipment with which to operate by TOE, or in some cases by direct provisioning by the commodity manager. These authorizations can be modified with adequate justification by an MTOE action. The processes for modifying these authorizations, or in acquiring or turning-in items, is usually a cumbersome and involved process. The field survey addressed the matter of equipment authorizations and particularly, the current deficiencies in item provisionings.

1.10.4.2. Analysis.

Considerable data was accumulated in the area of equipment authorizations in both the Nike Hercules and Hawk systems at the DS and GS levels. In some cases, there was almost total corroberations among units contacted in certain recommendations; and, in other cases, there were isolated recommendations. The MAME-71 project group feels obligated to convey to appropriate levels the complete series of recommendations that were collected. Although this data was compiled in literally hundreds of questionnaire booklets and analytically compared for accuracy and applicability, no attempt has been made to make a detailed comparison of these items with current TOE authorizations or changes that may be in process on TOE. It is believed that the current materiel experts in USAMICOM and TOE proponents in USACDC are in the best position to evaluate the validity of these equipment proposals and their attainability.

The following portrayal is organized into two parts: one for Nike Hercules and one for Hawk. Additonally, each of these parts is further divided into two categories of recommendations; those recommendations warranting priority action or for which a majority of respondents cited; and recommendations cited by a minority of units. The relegation of an equipment recommendation into the latter category does not in any way diminish the importance of the recommendation since it may have been coincidential that a minority of respondents recalled that particular deficiency. As will be cited in this portion of the report, some recommendations will be for equipment deletions, some for equipment additions, and others for equipment type-substitutions. The latter category generally consists of items that are obsolete and require a suitable substitute. Recommendations will be annotated to show whether they pertain to the authorizations for DS, GS or both.

NOTE: EQUIPMENT AUTHORIZATION RECOMMENDATIONS CITED HEREIN DO NOT INCLUDE AUTOMOTIVE EQUIPMENT OR MATERIEL HANDLING EQUIPMENT (MHE). THESE CATEGORIES ARE SEPARATELY ADDRESSED IN THIS REPORT (I.E., AUTOMOTIVE IN ITEM NO 1.7.5; AND MHE IN ITEM NO. 1.8.12.).

1.10.4.2.1. NIKE HERCULES EQUIPMENT.

1.10.4.2.1.1. Priority Recommendations.

1.10.4.2.1.1.1. ADD Ultrasonic Cleaner (1 each at DS and GS levels)

The majority of Nike Hercules support units stated that this item is needed in order to clean electronic chassis and other gear when they come into the shop and before it leaves the shop.

The requirement for this item is even more pronounced with the recent emphasis on QA/QC. Present practice is to use trichloroethelene cleaner which is not adequate for cleaning certain items, and tends to loosen or remove identifying decals from components. Also, trichloroethelene is sometimes hard to get through supply channels.

1.10.4.2.1.1.2. ADD BTE Tester. (Mfg by Litton Ind) (1 each at DS level)

Nike Hercules units indicated that they are called upon to provide support to the Battery Terminal Equipment (BTE) even though the DSP does not have the repair mission for this item and no Ordnance MOS receives training on BTE. The present practice is to repair BTE by changing cards and substitution troubleshooting, a process that is time consuming, costly and inaccurate. Provision of a BTE Tester would give DS units and the BN a greater capability for support of this sensitive item of equipment.

1.10.4.2.1.1.3. ADD Air Compressor, Electric - type, 60 cycle, 3,500 psi (1 each at GS level)

Item is required to provide a source of dry air to pressurize the N/H missile container and the Hydraulic Pumping Unit of the missile. The gasoline-driven model currently used by some units (i.e., Davey and Joy Models) is inadequate because clutches fail frequently, repair parts are not available and support for these items is difficult to obtain.

1.10.4.2.1.1.4. SUBSTITUTE Oscilloscope, Model RM-16 (or equivalent) for Oscilloscopes, AN/USM-32 and AN/USM-50A (Substitution on a one-for-one basis in all units)

The currently authorized TS-505 multimeter is obsolete, maintenance prone, and is unsatisfactory for certain repair or troubleshooting applications.

1.10.4.2.1.1.6. SUBSTITUTE a Digital Voltmeter (or suitable equivalent) for the CTUM, GR 1800 (Substitution on a one-for-one basis in DS units)

The GR 1800 VTUM is an old model for which repair parts are hard to get; it is often non-operational and won't pass calibration standards at the 10 MHZ range. An acceptable substitute, such as a Digital Voltmeter is needed.

1.10.4.2.1.2. Other Recommendations (i.e., isolated cases).

1.10.4.2.1.2.1. DELETE M-2 Hydraulic Test Stand. (1 each at DS level)

One DS unit stated that this item is never used since DS never performs the power check of the Nike Hercules launcher.

1.10.4.2.1.2.2. DELETE Fin Rack Assembly. (1 each at DS level)

Item is intended for Nike Ajax use and is not required in Nike Hercules units.

1.10.4.2.1.2.3. DELETE Klystron Power Supply (Ion Pump) (1 each at DS level)

Item is authorized to firing batteries which is sufficient; DS normally is not tasked to repair klystrons.

1.10.4.2.1.2.4. DELETE Tool Kit, Electronic Fire Control System, Field Maintenance, FSN: 4935-322-6014 (1 each per GS unit)

This tool kit is an unnecessary duplication of the equipment currently authorized in the Launcher Tool Kit (A-15) and IFC Tool Kit (A-14).

1.10.4.2.1.2.5. DELETE Capacitor Test Set, ZM 3/U (1 each per GS level)

One unit stated that the authorized ohmmeter can be used more effectively to test capacitors and this is the current practice.

1.10.4.2.1.2.6. DELETE Test Stand, M-14 (OPN: 8001840) (1 each per GS unit)

One unit pointed out that this stand is intended for the Nike Ajax, and is therefore not required in Hercules units.

1.10.4.2.1.2.7. DELETE Tester, Hydraulic Power Package, (OPN: 8529385) (1 each per GS unit)

One GS unit stated that this item is not required, never used, and surplus to their needs.

1.10.4.2.1.2.8. DELETE Power Unit, Hydraulic (OPN: 9034506) (1 each per GS unit)

One GS unit stated that this item is not required, never used, and surplus to their needs.

1.10.4.2.1.2.9. ADD Megger, Cable (Part of Msl Shop Set) (2 each additional at GS unit)

GS units are currently authorized one each of these items, but if they have a cable maintenance mission three Meggers are needed, two for continual use and one for backup. One GS unit made this recommendation.

1.10.4.2.1.2.10. ADD Mechanical Jigs for Repair of N/H Launcher. (1 each set at DS level)

One DS unit stated that it was required to perform repairs on launchers which require the use of jigs. Required items not currently authorized by TOE.

1.10.4.2.1.2.11. ADD Hydraulic Pump Unit (Portapower type) to the Shop Set, Special, Mechanical (1 each per DS unit)

One unit stated that it was required to extract pins (FSN: 1440-571-5979) of the launcher which tend to freeze up. Portapower unit is needed to accomplish this; especially when this service is done on-site.

1.10.4.2.1.2.12. SUBSTITUTE Oil Filter Unit, Portable (FSN: 4935-764-5553) For Pumping Unit, M-30 (FSN: 4935-775-5884) (Substitution on a one-for-one basis in DS units)

One unit cited that the M-30 rig is too large and bulky for practical usage, and the recommended substitute is more compact, more utilitarian, and easier to maintain.

1.10.4.2.1.2.13. SUBSTITUTE Oscilloscope, Tektronics 453 (FSN: 6625-930-6637) for Oscilloscope, Fairchild 765 MH/F (FSN: 4935-045-7276) (Substitution on a one-for-one basis in DS units)

One unit felt that the 765 scope tends to overheat and is too complicated to be repaired in existing support units. The 453 scope is believed to be a better item and simpler to maintain.

1.10.4.2.1.2.13. SUBSTITUTE Oscilloscope, AN/USM-140 for Oscilloscope, LA 239 (Substitution on a one-for-one basis in DS units)

One DS unit stated that the LA 239 scope does not have a frequency response of 60 MHZ which is needed to perform some checks. Suggested replacement would suffice.

1.10.4.2.1.2.14. SUBSTITUTE a Suitable Replacement for the Radaligner of N/H Shop 2, Console 4. (Substitution on a one-for-one basis in DS units)

One unit stated the the Radaligner operates erratically and goes out of calibration within the 90-day calibration cycle. It is therefore undependable and needs to be improved or appropriately substituted.

1.10.4.2.1.2.15. SUBSTITUTE a Replacement or Improved Version Power Meter for the Power Meter, HP 434, Calimetric Type (Substitution on a one-for-one basis in DS units.)

One DS unit stated that the RF head in the HP 434 is too sensitive, and one mistake will damage the item which costs $800.00. Need a more durable and reliable model.

1.10.4.2.1.2.16. SUBSTITUTE a more suitable replacement for the Launcher Electronic Function Tester (Substitution on a one-for-one basis at DS)

Present item is inherently unreliable, particularly, the stepping switch often malfunctions. This item should be modified, redesigned or replaced with a more rugged and reliable tester.

1.10.4.2.1.2.17. ADD Welder, TIG Type (one each per DS unit)

One units stated that there is a requirement for DS units to weld magnesium alloy and aluminum alloy components such as the N/H radars antenna assemblies. A specialized rig using inert gas and high frequency energy is required to do this. Present practice is to evacuate equipment for this service, which is unsatisfactory, or borrow an inert-gas, high frequency welder from the U. S. Air Force.

1.10.14.2.2. HAWK EQUIPMENT.

1.10.4.2.2.1. Priority Recommendations.

1.10.4.2.2.1.1. DELETE the Organizational Missile Test Set (OMTS) (1 each at DS level)

A significant number of HAWK DS units recommended the elimination of the OMTS in the DSP equipment authorizations (seven out of nine units made this recommendation). The reasons were that firing batteries have one each of these items, and since the DSF has a Shop 4, there is no need for an OMTS. Several units felt that the OMTS should be designated as an operational readiness float for the battalion. No unit contacted during the survey actually used the OMTS for purposes other than float or substitution of components for unserviceable OMTS at the Firing Batteries.

1.10.4.2.2.1.2. ADD Ultrasonic Cleaner (1 each at DS and GS levels)

Most DS and GS units contacted felt that an ultrasonic cleaner was required for cleaning incoming and outgoing chassis and other items. This system is part of the QA/QC emphasis that has been implemented in the field. Current practices, which utilize a bath-type trichloroethelene cleaner is not satisfactory.

1.10.4.2.2.1.3. SUBSTITUTE an Oscilloscope, DuMont-Fairchild HN-765MH or Equivalent for Oscilloscope, USM-50C (Substitution on a one-for-one basis in all units)

The vast majority of units (DS and GS) contacted felt that the USM-50C scope is old, bulky and inaccurate. A newer version, preferably portable, with a duel-trace capability such as the DuMont 765 MH is needed to adequately support the system. For example, the Battery Terminal Equipment (BTE) requires a dual-trace scope to troubleshoot. It was further stated that the oscilloscope which is a component of the CW Pulse console is too limited in capability, and is not portable.

1.10.4.2.2.1.4. SUBSTITUTE a more suitable replacement for the Multimeter, TS-505. (Substitution on a one-for-one basis in all units)

Several units indicated that the TS-505 is inaccurate for some required checks; it is also bulky, heavy and the test leads are inclined to break. The request was for a more recent model with increased range, improved design and compact size.

1.10.4.2.2.1.5. ADD CW Pulse Console (1 each at all DS units)

Virtually every HAWK unit worldwide commented that their authorization of CW Pulse consoles was totally inadequate. In some units as much as 90% of the shop work is performed on this console. As a result, these items are often utilized on a three shift, seven day basis. Although fundamentally reliable, these consoles are often overworked and undermaintained due to their high usage. Personnel utilization was seriously degraded simply because of insufficient numbers of consoles for the repairmen to operate. Some respondents felt that the Shop 7 (Contact Team van) should be used as a shelter to house one or two additional CW Pulse consoles at the DS level. The present contents of Shop 7 could be stored in another van or reasonable facsimile. The opinion of the MAME-71 evaluators is that this CW Pulse console deficiency is significant and that many DS problems would be alleviated by increasing TOE authorizations for this item in both Basic and Self-Propelled HAWK units.

1.10.4.2.2.2. Other Recommendations (i.e., isolated cases).

1.10.4.2.2.2.1. DELETE OME Ground Equipment, Palletized Test Equipment (one set per DS unit)

Two DS units stated that the palletized OME ground test equipment that is currently authorized at the DS level is not needed. It was stated that these organizational test sets are used only by battery mechanics. When the Ordnance repairmen are called upon to perform the checks using this OME, the battery test sets are used. The present test sets at DS are the oldest ones in the battalions and are used more like a maintenance float. Therefore, the current authorizations should be classified as a float stock.

1.10.4.2.2.2.2. ADD Engineer Contact Team Shop Set (1 each per DS Unit.)

One DS unit specifically recommended the TOE authorization of a type of contact shop for the Power Generation and Air-Conditioning Support Section. Although not citing a specific proposal, many other units observed that contact team calls on-site by the engineer element of the DSP was an ever-increasing requirement and problem area. The former proposal was to mount selected engineer-type repair equipment, chiefly items to be used in fabricating parts, on a 3/4 ton truck.

1.10.4.2.2.2.3. ADD Flow Meter, Fluid-type (1 each per GS unit)

Two units indicated that there was a need for a flow meter to measure the collant flow rate for the HPI transmitter. Diagnosis includes the determination of whether an indicated trouble is a bad valve, a bad switch, a bad pump, or a fluid restriction. The present procedure is to connect the transmitter package to a float HPI, a practice that is unauthorized and a crude troubleshooting technique.

1.10.4.2.2.2.4. ADD RF Screen Room Fixture (1 each per GS unit)

One GS unit stated that equipment for constructing an RF screen was required for the GS missile repair section in order to isolate the missile guidance package from RF energy generated by the HPI and PAR radars and other environmental sources. No such isolation now exists, to the detriment of the missile guidance package repair operation.

1.10.4.2.2.2.5. ADD Calibration Standard (FSN: 4935-089-4362) (2 each per SP HAWK DS unit).

Currently SP HAWK DSP are authorized 2 each Calibration Standards. This quantity is insufficient because one unit is required for every Mobile Contact Team (of which there are three) and one is required in the DS shop area. Therefore, four units are required instead of the two authorized.

1.10.4.2.2.2.6. ADD Frequency Counter, AN/USM 207 (2 each per DS unit)

Two DS unit recommended that two portable frequency counters were required, one for the Fire Distribution System Support Section and one for an Instrument Repair Section. (NOTE: This latter signal repair function is not currently authorized in DA-approved TOE but several units have created such an element for test equipment repair out of necessity). The frequency counter in the CW Pulse console is not portable, and it does not have a sufficiently high frequency range to accomodate certain checks and repairs.

1.10.4.2.2.2.7. ADD Differential Voltmeter, ME-202 (1 each per SP HAWK DSP)

Currently only one of these meters is authorized in the Fire Distribution System Support Section. Since the FDS element is usually physically separated from the rest of the DSP (i.e., usually located at the BOC) and since recent SP HAWK TM changes have tightened up on voltage tolerances, there is a requirement for at least one additional ME-202 voltmeter in each DSP.

1.10.4.2.2.2.8. ADD Audio Oscillator (3 each per SP HAWK DS unit) -

One SP HAWK DSP stated that each mobile contact team, of which there are three per battalion, required an audio oscillator to perform on-site troubleshooting and repair operations. No specific model number was given but it was indicated that the type currently authorized in the TPQ-21, Engagement Simulator, would be adequate.

1.10.4.2.2.2.9. SUBSTITUTE a new electrical Megger (model not known) for the Megger, ZM-21/U (Substitute on a one-for-one basis in DS units)

One unit stated that the presently authorized Megger is maintenance-prone and difficult to repair and calibrate. Repair parts are also difficult to obtain. It was recommended that a new, electrical type item be substituted.

1.10.4.2.2.2.10. SUBSTITUTE an Oscilloscope, DuMont Model 765MH for the Oscilloscope, Tektronics-type (Substitution on a one-for-one basis in each DS unit)

One DS unit suggested that this equipment substitution be made in order to provide a more accurate scope for repair operations in the HAWK Fire Distribution System Support Section.

1.10.4.2.2.2.11. ADD Microfiche Reader (1 each per SP HAWK DSP)

Some TM procedures for Self-Propelled HAWK are now on microfiche tapes even though units in the field are not authorized readers. Provisioning of this item is necessary to perform mission.

1.10.4.2.2.2.12. Case, Carrying for HAWK Boresighting Equipment (1 each per DS unit)

One unit indicated that the boresighting equipment, which is mounted in Shop 7, is difficult to transport to the firing battery sites. Adequate carrying cases would protect the item during transportation and preserve calibrated reliability of the item.

1.10.4.3. Summary.

A significant factor in the effective discharge of mission responsibilities is authorization and allocation of the right equipment to do the job. The field evaluation determined that equipment deficiencies existed in three categories: items that should be deleted, items that should be added and items that should be replaced with improved or more suitable substitutes. As recapitulated in the preceeding section, there were twenty-three deficiencies in Nike Hercules and seventeen in HAWK. It is anticipated that many of these recommendations may be unattainable due to various restrictions or may have already been appropriately modified in current TOE authorizations; however, it is believed that a careful review of each proposal and attendant justification should be made by appropriate experts in the asset provisioning and TOE authorization organizations.

1.10.5. Provisioning of Advanced Electronic Repair Equipment.

1.10.5.1. Background.

Numerous exploratory studies have been made in recent years by CONARC schools, CDC agencies, AMC Project Officer and DA, DCSLOG, regarding the provisioning of "Advanced Electronic Repair Equipment" in missile support units. This equipment will soon be authorized as a part of the equipment for the Vulcan Team of TOE 9-550G and has been considered for similar application in Air Defense support units. The equipment referred to as "Advanced Electronic Repair Equipment" is also known as "Repair Control Center", FSN: 4940-403-8176. It is manufactured by PACE, Inc., and in two models: PRC 350 and PRC 350C. Essentially this gear enables precision soldering, desoldering and repair on miniaturized components, discreet circuits and other fragile electronic equipment.

The MAME-71 field survey asked whether this type gear, or something equivalent, would be necessary or desirable in missile DS and/or GS unit locations.

1.10.5.2. Analysis.

There were varied reactions by field support units regarding the placement of this specialized equipment in their shops. In general, the direct support units indicated that such equipment would not be practical at that level for the following real or anticipated reasons:

a. This equipment tends to be fragile and sensitive, not adaptable to the environment of a forward support shop.

b. Repairs at DS level are not of the production line variety, and many jobs are accomplished on-site during contact team calls.

c. Anticipated problems in getting replacements for components of this gear through theater supply channels.

d. Susceptibility of this equipment to loss and theft, and general difficulties in control and accountability.

The support units did express dissatisfaction with soldering equipment currently provided. The problems are twofold. First, the soldering equipment now included in the Electronic Technician's Tool Kit is of the older variety and not generally adequate for precision soldering. Secondly, the ability to replace lost, damaged, or worn items through supply channels was defined to be "next to impossible." It is apparent, therefore, that concerted action is imminently required to analyze the acceptability of the soldering gear currently authorized support shops (DS and GS) and action taken to replenish current shortages with replacements, or acceptable substitutes. Several units cited that a highly desirable substitute to the soldering irons now provided would be the new Weller-type irons with multi-purpose interchangable tips.

In contrast to the findings at DS units, the GS units (in some cases combined DS/GS units) all stated that the provisioning of this "Advanced Electronics Repair Equipment" was necessary and desirable. This is true primarily due to the production line techniques employed at GS, the requirement to support the theater or depot stock items, and the associated requirement for strict quality control measures. The quantity of this equipment needed at the GS unit level is a minimum of two sets for each low-density, high-cost system supported. For example, a GS unit supporting both Nike Hercules and HAWK would require four sets of equipment. The basis for this quantitative requirement is the large workload in such units, and provisioning for the two types of support functions performed (e.g., missile and ground handling equipment and ground guidance equipment).

1.10.5.3. Summary.

Significant problems prevail in the field regarding the equipment authorizations in Air Defense support units for performing precision repairs (i.e., soldering, desoldering and services) on sensitive equipment. The current authorizations are not acceptable in view of today's state of the art, and replacement provisioning through supply channels is not satisfactory. Concerted and immediate action is warranted to correct these problems.

The authorization of specialized "Advanced Electronic Repair Equipment" such as the Repair Control Center, Model PRC 350 or PRC 350C is not required at the DS level due to incompatibility of this item with repair operations, and difficulties anticipated in control and maintenance. Such equipment, is needed at the GS (or DS/GS) level in a minimum quantity of two sets per unit for each low density, high cost missile system supported. This requirement at GS is based upon identifiable needs, the type of repairs normally performed, and a universal validation by all the units contacted during the field survey.

1.10.6. Provisioning of NCR 500 for Stock Accounting.

1.10.6.1. Background.

The missile support unit provides maintenance supply support for missile peculiar equipment maintained by the support unit and the using organizations. Maintenance supply support includes the provision of repair parts, expendable supplies needed in the performance of maintenance and float items of equipment to the ultimate users of the materiel. Supply operations involve the actions taken by the technical supply activity to acquire, account for, store and issue applicable items of supply and to provide facilities to expedite the transmission of requirements for items authorized for issue to supported activities but not immediately available for issue. Direct exchange (DX), Missile System Stockage List (MSSL) and Operational Readiness Float (ORF) services are also performed by the technical supply activity. The function of the stock control element is to determine the quantities of supplies and equipment available for issue and to maintain records of location of those items. The objective of stock control is the management of supply operations so that distribution can be accomplished with a minimum amount of supplies and equipment in the distribution system.

1.10.6.2. Analysis.

The field survey reveals that 13 of the 19 Air Defense artillery support units visited were provisioned with an NCR 500 through MTOE actions. The majority of the units had made the change over from manual to automated stock accounting during the tenure of the personnel interviewed in the conduct of the survey. All of these personnel stated that the automated system is far better than the manual system, and that the variable requisitioning criteria (VRC), used by the NCR 500, is far more responsive to missile supply needs than an established requisitioning objective (RO). Personnel interviewed felt that supply support for missile systems, by virtue of their critical mission, should be reliable, effective, simple and able to insure that a perpetual inventory of supplies is available. All of the respondents felt that this could and was being accomplished, for the first time, by the NCR 500. The supporting unit ASL and MSSL averages 4259 lines (worldwide average). This high degree of stockage, unit mission and current field practices, as documented by MAME-71, should suffice to justify the authorization of the NCR 500, with the appropriate mix of personnel, in certain high cost/low density missile support units.

1.10.6.3. Summary.

The majority of the field units have NCR 500 systems on hand. The supply managers uniformly agree that there is a marked improvement in the stock accounting, receiving and issuing of repair parts, and maintenance materials to supported units. The NCR 500 expedites the processing of requisitions for authorized items that are submitted by supported units. It would be desirable to have NCR 500 provisioning in current Air Defense Artillery support units TOE. This would be in consonance with current field practices and justified by the ASL and MSSL workload (avg 4259 lines).

1.10.7. Materiel Problems for Further Evaluation.

1.10.7.1. Background.

Considerable data was accumulated on both the Nike Hercules and HAWK missile systems. The MAME-71 project uncovered many problem areas that could not be identified as being applicable worldwide but which merit consideration. Also, the project group feels obligated to present a complete list of problems documented during the survey.

1.10.7.2. Analysis.

The MAME-71 project identified numerous problems for which desired corrective action is not apparent to the evaluators. They are being presented in the belief that materiel experts from the pertinent USAMICOM elements are in the best position to evaluate the validity of these problems and to take necessary corrective action. The problems will be portrayed by applicable system (HAWK, Nike Hercules) and to what extent they were cited by the respondents contacted during the field survey.

1.10.7.2.1. HAWK.

1.10.7.2.1.1. Air Conditioners.

Every HAWK unit visited by the evaluators stated that air conditioners were a big problem. Respondents stated that 30 - 40 percent of the compressors and a large number of the condensors received through supply channels (usually directly from CONUS) were unserviceable. It was generally felt that acceptance standards must be improved.

1.10.7.2.1.2. HPI Transmitter Test Procedures.

Several people in the field indicated that the test procedures for the HPI transmitter (e.g., Klystron Tuner and Modulator Oscillator) are extremely complicated and must be performed by a highly competent individual who is not always available. They voiced the desire to have these procedures reworked to conform with the level of experience and competence found in the field. Many people felt that an abbreviated alternate procedure is required to supplement the detailed and difficult complete check.

1.10.7.2.2. Nike Hercules.

1.10.7.2.2.1. Wedge Locks.

Numerous units stated that the wedge locks were the biggest problem in the launcher area. An O-ring, which should be replaced in the wedge-lock cylinder whenever the wedge locks are repaired, is not a part of the wedge-lock repair kit. Therefore, the O-ring must be ordered separately, which often results in a non-operational launcher due to awaiting parts.

1.10.7.3. Summary.

The field evaluation identified problems that should be examined by experts and action taken as appropriate. It is anticipated that the solutions to many of the problems may not be readily attainable. However, it is believed that a careful review should be made of each problem by appropriate experts.

1.10.8. Technical Manual Improvements.

1.10.8.1. Background.

The technical manuals (TM) that are presently fielded are envisioned to enable the maintenance technician to repair unserviceable items with the assistance and guidance provided by the maintenance and/or repair parts manuals that are at his disposal. The quality of these manuals has been consistently improved but utilization of these manuals is still considered to be excessively time consuming.

1.10.8.2. Analysis.

The personnel who use the manuals feel that they require an excessive amount of time to locate the component within a schematic, to locate the correct Ordnance Part Number (OPN) and then cross reference it into a Federal Stock Number (FSN). These time consuming procedures are further complicated by items that have no FSN, by schematics that do not portray all items, by excessive manual and FSN changes and manuals that are too large and bulky for ease in handling. There exists a valid requirement for binders to accomodate the standard TM as well as those used on the consoles. The majority of the DS and GS units were not utilizing the "emplacement" and "preparation for travel" portions of the TM and felt it could be eliminated at their level.

All units responded favorable to the idea of using an index of reference numbers to function group.

1.10.8.3. Summary.

The MAME-71 findings indicate that the current system for deriving a FSN from an illustration call out is time consuming, inherently mistake prone, and generally unsatisfactory. Numerous comments were made regarding the need for a system providing illustration call outs in disassembly sequence and followed immediately by a legend giving the description of each numbered component, its OPN and FSN if applicable (e.g., DTM 9-1425-485-34).

Binders should be developed for standard TM to include those utilized on the consoles.

The "emplacement" and "preparation for travel" portions of the DS and GS level manuals should be eliminated and an index of reference number to function group added.

1.10.9. <u>Adequacy of the Repair Parts Special Tool Lists</u>.

1.10.9.1. Background.

The technical publication element of the Missile Command provided numerous questions for the MAME-71 exercise in an effort to determine the adequacy of the repair parts special tool lists. The questions were designed to encourage honest responses and solicit suggested improvements.

1.10.9.2. Analysis.

The newer version of the repair parts special tool lists is generally accepted as being better than the "old" format. Several responses indicated the need to expand the item description portion. It was felt that many "hard to get" items could be substituted for if adequate data was provided such as bolt size, head and thread type, etc. In the absence of this data, substitution is prohibited or, in most cases, an incompatible item is used. The additional reference numbers, the index numbers in column 1, action codes, item description, schematic designator and special note portion of the repair parts special tool lists are used often and are considered beneficial. The delete item index and inventory lists were being used occasionally and were also considered necessary.

1.10.9.3. Summary.

The data collected in the MAME-71 endeavor indicates that the repair parts special tool lists are well received in the field and, as a minimum, the portions mentioned in paragraph 1.10.9.2. should be retained. The responses portrayed the need to expand the item description portion.

1.10.10. Evaluation of "X" Source Coded Items in Equipment Manuals.

1.10.10.1. Background.

The source code is designed to provide the requisitioner, at the repair level, with an indication of the selection status and source for a particular listed item. X source coded parts and assemblies are not procured or stocked and the mortality of which normally is below that of the applicable end item or component. The failure of such a part of assembly should result in the retirement of the end item from the supply system. X1 coded repair parts are not procured or stocked. The requirement for these items will be filled by use of the next higher assembly or component. X2 coded repair parts are not stocked. The indicated maintenance category requiring these parts will attempt to obtain them through cannibalization. When the repair parts are not obtainable through cannibalization, they will be requisitioned, with accompanying justification, through normal supply channels.

1.10.10.2. Analysis.

The field survey indicates that the majority of the people feel the need for these items to be identified in the Technical Manuals (TM). Field personnel stated there was a need for a detailed review and revision of these items. It was generally felt that X source coded items are currently unrealistic. X1 coded items, particularly common hardware (nuts, bolts, screws, etc.), are unrealistic, and if the criteria were rigidly followed, the cost would be prohibitive. It would be common to order a radar pedestal or complete cabinet to get a bolt or washer. It is clear that the failure of X source coded parts or assemblies does not necessarily result in the retirement of the end item from the supply system. X2 coded items are similarly unrealistic due to the fact that there are no missile cannibalization points in the field at the present time. The documentation and requisitioning procedures necessary to get X source coded items is requiring many manhours and resulting in excessive downtime for equipment.

1.10.10.3. Summary.

The field survey depicts current X source coded items as being unrealistic. They cannot be utilized effectively as they currently exist. X1 coded items would be prohibitive on a cost basis alone and X2 items are not available in the absence of a cannibalization point.

The survey documents a firm need for the detailed review and revision of these items. Common hardware should most definitely be eliminated from the X1 source coded category whenever possible.

1.10.11. Nike Hercules Shop #3 Card Reader

1.10.11.1. Background.

Nike Hercules Support Units are provisioned with a Shop #3 which contains automatic test equipment. This equipment uses a deck of punched cards to set up tests and isolate malfunctions for each chassis tested. Therefore, a particular test is programmed by a punch card which is introduced into the system by means of a card reader. This reader is of an "old vintage" and has historically been problematic.

1.10.11.2. Analysis.

Every Nike Hercules unit visited stated that this card reader was in bad condition. The respondents indicated that the item required constant repair. The card readers are corroded, contact points are worn out and most repairs are beyond the capability of the unit. The repair of these items is further complicated by the absence or extreme shortage of repair parts in the supply system.

1.10.11.3. Summary.

Every Nike Hercules unit visited pointed out that their Shop #3 card reader was in a bad state of repair. Units felt the items condition, coupled with repair parts shortages, would soon place the card reader beyond the maintenance capabilities of the unit. Every unit stated that the card readers require rebuild or refurbishment in the very near future if Shop #3 is to remain in service.

2. LAND COMBAT MISSILE SYSTEMS

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2. LAND COMBAT MISSILE SYSTEMS.

2.1. GENERAL INFORMATION AND DEFINITIONS.

In this portion of the MAME-71 Final Report, Land Combat Missile Systems are defined as "high cost, low density" such as SERGEANT and PERSHING which are provided missile support by direct support platoons organic to the field artillery battalions and "medium cost, high density", such as SHILLELAGH and TOW where missile support is provided by direct support detachments using the Land Combat Support System (LCSS). In addition, support provided to Chaparral/Vulcan units is addressed in this section. Throughout this report, detachments organized under TOE 9-550 to support SHILLELAGH, TOW, REDEYE, and Chaparral/Vulcan will be referred to as "LCSS detachments" for simplicity in identification. The data to follow was collected, collated and analyzed by the MAME-71 evaluators on the Land Combat Missile Team (B-2), and the conclusions and recommendations are based upon a survey of U. S. Army Land Combat Missile units in CONUS, Europe, and Korea. This data gethering endeavor encompassed the period April 1971 thru August 1971.

2.2. COMMAND AND CONTROL.

The current command and control structure for Land Combat Missile units in overseas locations, to include the supporting logistical activities, is portrayed in Inclosures 6-4 and 6-5. The CONUS structure is not portrayed due to the small sampling of units.

2.3. AREA DESCRIPTIONS.

In order to better comprehend current problems in the field, it is necessary to understand the basic structure employed for support of Land Combat Systems. The following is a brief portrayal of the support system employed in each area visited.

2.3.1. CONUS.

The LCSS Detachments (TOE 9-550) were the only Land Combat missile units evaluated in CONUS. The CONUS organization, with the exception of the detachment at Fort Bragg, is characterized by a rather limited support role and a shop stock rather than an ASL. The units are attached to maintenance battalions at Ft. Bragg and Ft. Know and a transportation/maintenance battalion at Ft. Meade. The detachments are under the operational control of the battalions and are provided staff representation by the respective materiel staffs although the detachment commander is generally considered as the battalion missile staff officer. In general, the test equipment is in a dismounted configuration and the shop stock is stored in buildings. The supported units do not use their tactical equipment very much and it is a constant effort to get work into the shop. The detachment at Ft. Bragg in support of the 82nd Airborne Division is another story. They have remained in a completely mobile configuration with test equipment mounted on vehicles. Their Authorized Stockage List (ASL) is stored in mobile supply vans and the shop office is maintained in the mobile van provided for that purpose. The unit has the Shillelagh, Vulcan and Redeye support mission for the division and had just received the TOW mission. This detachment is the only one in the world in support of a division force.

2.3.2. USAREUR.

2.3.2.1. General.

In order to discuss the support structure in USAREUR, it is necessary to discuss specific missile systems since support is quite different for each type at the direct support level. However, general support has remarkable similarities.

2.3.2.2. PERSHING.

Pershing direct support is provided by organic direct support platoons assigned to a service battery. Command control is generally exercised by the battery commander with operational control being vested in the Missile Staff Officer (MOS 4515, authorized grade - Major) on the battalion staff. The utilization of the staff officer varies from that of a reports clerk to that of a battalion logistics officer responsible for S-4 functions as well as total missile peculiar support. The Pershing battalions are organized under the Pershing Brigade which has a missile staff element. Although small, this missile staff element provides the commander with necessary information concerning the status of missile maintenance in the brigade.

Pershing direct support is characterized by large DS platoons of 120 to 140 personnel commanded by a Captain platoon leader. The platoons provide the firing batteries with DS maintenance for system peculiar missile, engineer and signal items, as well as Class IX repair parts. The system peculiar signal support is provided by an element of headquarters battery usually under the operational control of the DS platoon.

General support is provided by a Pershing general support company (modified 9-227 TOE) which provides system peculiar missile, engineer and signal general support. Its major mission is to inspect and repair theater missile stocks and return them to the supply system. In addition, the Pershing maintenance float, as well as the system peculiar Theater Authorized Stockage List (TASL), is located at the GSU. The TASL is maintained by a depot supply element attached to the GSU. DSU submit requisitions to the GSU, which fills the requisitions or passes them to the theater inventory control point for screening of theater assets or passing to CONUS as appropriate. DX is utilized heavily at DS and GS. The general support company is provided command and operational control by the Advanced Weapons Support Command (AWSCOM).

2.3.2.3. SERGEANT.

Sergeant direct support is provided by organic direct support platoons assigned to HQ & HQ battery of the Sergeant Battalion. Command control is generally exercised by the HQ battery commander while operational control is vested in the S-3 in the absence of a Missile Staff Officer (MOS 4515) who, although authorized by TOE, was not present in either of the two battalions visited. The battalions are organized with 4 firing batteries per battalion, rather than the two batteries provided for by TOE, and the artillery organizational Missile Maintenance Warrant (MOS 214F) at the battery level has been removed by MTOE.

Sergeant direct support is characterized by small platoons of 30 to 40 personnel commanded by a Lieutenant (neither battalion had one assigned). The platoon provides the firing batteries with DS missile maintenance support, less engineer and signal, as well as missile Class IX repair parts.

General support is provided by a Sergeant general support company (modified 9-227 TOE) which provides system peculiar missile general support as well as backup DS to the DS units. Its major mission is that of checkout and repair of theater stocks and repair and return to the supply system. In addition, the Sergeant maintenance float and the system peculiar Theater Authorized Stockage List (TASL) are located ac the GSU. The TASL is maintained by a depot supply element attached to the GSU. DSU submit requisitions to MATCOM which cuts a MRO to the depot or passes the requisitions on to CONUS as appropriate. DX is heavily utilized at DS and GS. The general support company is provided command and operational control by AWSCOM.

2.3.2.4. LAND COMBAT SUPPORT SYSTEM (LCSS).

LCSS direct support for TOW, Shillelagh and Redeye is provided by separate detachments (TOE 9-550) attached to Corps conventional general support maintenance battalions. Each provides support to an entire Corps. There are no LCSS detachments located in the divisions. Command and control is generally exercised by the CO of the maintenance battalion. Staff representation is provided by the battalion materiel section although the detachment commander is considered the missile staff officer.

The LCSS DSU is characterized by relatively large detachments of from 70 to 90 personnel supporting large numbers of units situated over a widespread area. The detachment provides missile peculiar direct support to users of the Shillelagh, TOW and Redeye missile systems. The detachment is commanded by a Captain (USAREUR MTOE).

General support is provided by an LCSS general support company (TOE 9-550) which provides system peculiar general support for TOW, Shillelagh, Redeye, Chaparral and Vulcan. The mission of the GSU is to provide DS backup to the LCSS DSU and the Chaparral/Vulcan DSU, to provide general support for the LCSS and selected Chaparral/Vulcan DSU, to provide GS backup to the other Chaparral/Vulcan GSU, to provide DS/GS support to prepositioned stock, to provide surveillance of complete rounds stored in Class V depots, to provide DS support to non-corps users, and to provide range support for annual service practice. The unit has no maintenance float mission, however, it does maintain the system peculiar TASL for the supported systems. The TASL is maintained by a depot supply element attached to the GSU. The DSU submits requisitions to MATCOM which cuts a MRO to the depot or passes the requisitions on to CONUS as appropriate. DX is heavily utilized at DS and GS. The general support company is provided command and operational control by AWSCOM.

2.3.2.5. CHAPARRAL/VULCAN (CV).

Chaparral/Vulcan direct support is provided by separate detachments (TOE 9-550) attached to either the supported air defense artillery battalion or a conventional DS maintenance battalion. Although command control is provided by the unit attached to, operational control may be exercised by the artillery battalion commander in actual hostilities. Staff representation is provided by the materiel section of the maintenance battalion, however, the detachment commander is looked upon as the missile staff officer for the maintenance battalion and the artillery battalion.

The CV DSU is characterized by a relatively large detachment of from 50 to 60 personnel supporting one CV air defense battalion. The detachment provides system peculiar missile, engineer, and signal support to the CV users as well as Class IX repair parts and the CV system floats. The detachment is commanded by a Captain. General support is provided by two GS companies, one of which is discussed in paragraph 2.3.2.4.

2.3.3. EIGHTH US ARMY.

2.3.3.1. General.

Since Eighth Army contains only two units evaluated by team B-2 (one Sergeant battalion and one CV battalion), they will be discussed separately here.

2.3.3.2. SERGEANT.

Sergeant direct support is provided by an organic direct support platoon assigned to HQ & HQ battery of the Sergeant battalion. Command control is exercised by the HQ battery commander and operational control is also vested in him in the absence of a Missile Staff Officer (MOS 4515) who, although authorized by TOE, was not present in the battalion.

Sergeant direct support is characterized by a small platoon of 30 to 40 personnel commanded by a Lieutenant (none assigned to the battalion). The platoon provides the firing batteries with missile maintenance support as well as system peculiar and common generator support. In addition, the platoon provides DS peculiar generator support for the Sergeant GSU. The DSU also provides Class IX repair parts to the firing batteries as well as the Sergeant maintenance float.

General support is provided by a combined HAWK, Herc and Sergeant general support company (TOE 9-227) which provides system peculiar missile general support as well as backup direct support to the DSU. Its major mission is to inspect and repair theater stocks and return them to the supply system. There was no missile peculiar depot for Sergeant repair parts at the time of the visit, however, plans were underway to provide the Missile Support Element (MSE) with the TASL of Sergeant peculiar repair parts.

2.3.3.3. CHAPARRAL/VULCAN (CV).

CV direct support is provided by a separate detachment (TOE 9-550) attached to the CV artillery battalion. Command and operational control is provided by the battalion commander. Staff representation is provided by the DS detachment commander.

The CV DSU is characterized by a relatively large detachment of from 50 to 60 personnel supporting one CV air defense battalion. The detachment provides system peculiar missile, engineer and signal support to the CV user as well as Class IX repair parts and the CV system floats. The technical supply is automated under DLOGS. The detachment commander is a Captain.

There is no organization to provide general support in the theater. Although the maintenance concept of CV allows the DSU to accomplish GS repairs, no GS mission has been assigned. The GSU for support of HAWK, Herc and Sergeant (para 2.3.3.2.) has been provided with an ASL for a CV GS element, however, the personnel and equipment are not available in this unit.

2.4. UNITS CONTACTED DURING SURVEY.

The following is a listing of the specific Land Combat Missile System Headquarters and units that were directly contacted during the MAME-71 evaluation.

2.4.1. CONUS (US).

XVIII Airborne Corps (Ft. Bragg, NC)
782nd Maint Bn (Ft. Bragg, NC)
763rd Ord Det (LCSS)
7th Bn, 60th Arty (VULCAN)
HQ, First US Army, G-4 (Ft. Meade, MD)
42nd Trans Bn (Ft. Meade, MD)
181st Ord Det (LCSS)
198th Maint Bn (Ft. Knox, KY)
194th Armor Bde (SHILLELAGH)
D Troop, 10th Cav (SHILLELAGH)
30th Ord Det (LCSS)

2.4.2. USAREUR (Germany)

Advanced Weapons Support Command (AWSCOM)
56th Artillery Brigade (PERSHING)
3rd Bn, 84th Arty (PERSHING)
1st Bn, 81st Arty (PERSHING)
4th Bn, 41st Arty (PERSHING)
579th Ord GMGS Co (PERSHING)
5th Bn, 77th Arty (SERGEANT)
5th Bn, 73rd Arty (SERGEANT)
575th Ord GMGS Co (SERGEANT)
2nd SQDN, 2nd ACR (SHILLELAGH)
2nd SQDN, 4th ACR (SHILLELAGH)
3rd SQDN, 14th ACR (SHILLELAGH)
3rd SQDN, 12th ACR (SHILLELAGH)
223rd Ord Det (LCSS)
116th Ord Det (LCSS)
563rd Ord GMGS Co (LCSS)
2nd Bn, 59th Arty (CV)
280th Ord Det (CV)
2nd Bn, 60th Arty (CV)
92nd Ord Det (CV)

2.4.2. EIGHTH US ARMY (KOREA)

3rd Bn, 81st Arty (SERGEANT)
30th Ord GMGS Co (SERGEANT)
8th Bn, 61st Arty (CV)
90th Ord Det (CV)

In each of the Land Combat Missile units shown above, the MAME-71 team concentrated their efforts primarily in the missile direct support element. In addition, the Battalion/Squadron commander and one or more of the tactical batteries/troops were also contacted in order to verify, amplify, and modify data regarding the logistics support of the system. The missile GS units were surveyed in depth, to include associated supply depots. Those logistics elements of major or intermediate headquarters that provide command control over or staff supervision of Land Combat Missile units were contacted to coordinate data, secure information or coordinate visits to subordinate units. Approximately 250 individuals (including all grades and skill levels) were directly contacted during the course of the survey. Every facet of the logistics support of Land Combat Missile Systems was addressed and examined in each unit surveyed.

2.5. SUPPORT UNITS ORGANIZATIONAL STRUCTURES.

Much of the discussion to follow will refer to certain features of organization currently implemented in the field by missile support units. The internal organizations of these support units were variable with respect to each other and in some cases were in wide divergence from published DA TOE. Therefore, an organizational chart of each missile support DS and GS unit visited has been included in this report. These are provided as Inclosures 2-1 through 2-18.

2.6. REPORT ORGANIZATION.

The data to follow is a resume of the problem areas that the evaluators identify as being significant and fully supported by the data that was collected, collated and analyzed. The problems pertain to all support units unless otherwise specified. Likewise, the problems are treated on a worldwide basis unless identified as being applicable only to a specific area or theater.

The discussion portion of the report is generally subdivided into four functional areas: Doctrine, Organization, Training, and Materiel. However, it is often the case that a problem may overlap from one area to another. In such circumstances the problem description is arranged under the most appropriate functional area with reference made to the other areas affected. This portion of the report is intended to provide backup information, discussion and analysis of selected problem areas. The terminal conclusions and specific recommendations are cited in functional areas 6.2 and 7.2 of this report.

2.7. LAND COMBAT MISSILE SYSTEMS PROBLEM AREAS - DOCTRINE

2.7.1. Consolidation of DS & GS Units.

2.7.1.1. Background.

Current doctrine provides for various levels of maintenance (i.e., organizational, direct support and general support). Generally, the responsibilities of each level are limited based on the technical training of personnel and the authorized test equipment. However, in newer systems such as Pershing and LCSS there is no real clear division between the capabilities of the DS and GS units since many of the tools, test equipment and skills available at GS are also available at DS. Consequently, the capabilities of the organizations are similar.

2.7.1.2. Analysis.

The field survey points out the fact that it may be entirely feasible to field composite DS/GS organizations to support systems such as Pershing, TOE, Shillelagh and Lance. The support of Pershing in Europe is a case for study. At present, the Pershing system has direct support platoons assigned to the artillery battalion service battery. General support is provided by a separate general support company assigned to AWSCOM. The total number of personnel assigned to the 3 DSU and one GSU totals approximately 800 personnel. Each DSU has a separate ASL and the GSU has an ASL as well as TASL.

There are many advantages and disadvantages of combining a DSU/GSU at some level. Some advantages and disadvantages are listed below:

1. Advantages:

   a. Reduction of support personnel.

   b. Combination of many ASL into one.

   c. Better utilization of demand criteria.

   d. Increase in responsiveness.

   e. Better opportunity for work planning since all repair will be done in one shop.

   f. Major Commanders (e.g., Pershing BDE CG) have a check and balance system available by having a separate support unit commander reporting directly to him.

   g. The DSU would remain collocated with the supported BN but would have more influence on maintenance since they would be in a maintenance oriented chain of command.

2. Disadvantages:

a. Difficult to reorient support should a fire unit move great distances from the DS/GS unit.

b. All theater stocks of repair parts are located in one area.

2.7.1.3. Summary.

The doctrine of separate DS and GS missile support units must undergo serious reevaluation in light of the similar capabilities of DS & GS units supporting newer weapons systems. It seems entirely feasible to utilize combined DS/GS organizations to provide theater support for certain missile systems of which Pershing is a prime case for study. In keeping with Maintenance Support Positive, the field evaluation indicates that a combined DS/GS may be the most economical method of supporting certain missile systems. Data is available in the way of an organizational structure which could be used as a starting point in developing a TOE for such a unit.

2.7.2. Organic Direct Support.

2.7.2.1. Background.

Department of the Army has recognized the need to provide missile direct support to certain delivery units thru the use of direct support platoons organic to the field artillery battalion. These platoons are generally found in the headquarters or service battery of the battalion and provide missile peculiar DS to include engineer and signal in certain systems. In the case of Chaparral/Vulcan support, the support is to be provided by a TOE 9-550 detachment attached to a conventional DS maintenance battalion.

2.7.2.2. Analysis.

The question of organic direct support was perhaps the most controversial problem approached during the evaluation. Without exception, the artillery units with organic direct support platoons felt that it was absolutely necessary that the battalion have a direct support capability organic to it. Also, without exception, the personnel of the direct support platoon felt it was essential that the organic platoon concepts be dissolved in favor of a detachment or separate company concept if the Army was to retain the highly qualified missile repair technician. The arguments are perplexing and highly emotional in both cases. However, the organic concept is causing a number of problems to the DS platoon in the field. A list of arguments presented by each side is shown below:

1. The artillery firing battery requires the responsive support capable of being provided by organic platoons. The artillery is not sure missile support could be as responsive as required if it was provided by a separate unit.

2. Missile direct support unit arguments for a separate Detachment/ Company include the following:

a. The organic platoon cannot influence organizational maintenance (i.e., the platoon cannot insist that all organizational work be completed prior to accepting a work request from a firing battery).

b. The artillery has little or no understanding of missile repair shop operations.

c. Platoon personnel get more than their fair share of details.

d. Support personnel don't get promoted as quickly as the artillery personnel.

e. The battery is using highly qualified missile support personnel as clerks in the orderly room.

f. Training requirements are forced on the platoon with little or no consideration of the impact on the support workload requirements.

The arguments continue on ad infinitum. The reasons for the arguments used by the platoon personnel stem directly from the fact or fantasy that the battalion commander is not interested in maintenance and the importance of the platoon's mission. The evaluators found that in a unit where the battalion commander was maintenance conscious and backed up the platoon in recommendations concerning maintenance that there were very few comments to indicate that the organic platoon needed to be abolished. Therefore, the arguments become invalid when a battalion commander understands the peculiarities of the platoon and takes action to insure that the firing batteries are maintenance conscious and to support the platoon's efforts to insure that organizational maintenance is performed in all cases. However, this type of commander appeared to be the exception, rather than the rule.

2.7.2.3. Summary.

The Battalion Commanders who have the best results with organic direct support platoons are those who are maintenance conscious and support the recommendations of the DS platoon. The success is mainly due to the fact that, being maintenance conscious, the BN CO has insured a direct and responsive channel for control of direct support maintenance. In these cases, the missile staff officer usually has been given operational control of the platoon and is the rating officer for the platoon leader. This system removes the platoon in effect from the control of the HQ Battery Commander and insures a balance of mission and non-mission related duties and functions which have a tendency to become unbalanced toward the non-mission side when under control of the Battery Commander. It is necessary that Ordnance as well as Artillery personnel understand the methods of control necessary to provide the ultimate support under the organic concept.

2.7.3. The Detachment Concept.

2.7.3.1. Background.

The detachments of TOE 9-550G are designed to be attached to direct support maintenance units at Division, Corps, Field Army, or Theater level. These units must be provided administrative, financial, mess and logistical support by the unit to which it is attached or assigned. If this support is not provided, teams will be drawn from TOE 29-500 and 29-600 as appropriate as dictated in paragraph 3b of TOE 9-550G.

2.7.3.2. Analysis.

The detachment concept is not working in the field. Detachments have found it necessary to provide their own administrative, supply and motor pool support. The detachments have orderly rooms and are responsible for submission of all reports required of a separate company. The detachments must maintain their own unit supply section to include property book and have found it necessary to operate their own motor pool separately from the unit to which attached. This is made necessary due to the inability of the unit to which it is attached to absorb the additional workload. For example, an average TOE 9-550 detachment has 70 to 80 personnel and from 25 to 35 vehicles plus from 5 to 10 major pieces of engineer equipment not including the supply vans and test equipment vans which require automotive maintenance. It becomes readily apparent that it is difficult, if not impossible, to attach a company sized detachment to a company. The direction in paragraph 3b of the TOE which states that, "If this support is not provided by the unit to which attached or assigned, teams will be drawn from TOE 29-500 and TOE 29-600 as appropriate." This direction neatly places the problem in the hands of the field units which find it practically impossible to augment TOE in anyway during times of austerity as we face now. There are few companies in existance today which can support the additional workload caused by attachment.

2.7.3.3. Summary.

The TOE 9-550 detachment is too large and has too much equipment to be attached to a company sized unit for administration, unit supply and motor pool support, and it is practically impossible for units in the field to receive augmentation from TOE 29-500 or 29-600. As a result, missile support detachments find it necessary to use qualified missile repairmen as motor sergeants, automotive repairman, supply sergeants and unit clerks. The detachments in the field must be made self sufficient or be provided with sufficient overhead personnel to allow attachment without special augmentation.

2.7.4. Reduced Mobility for DSU.

2.7.4.1. Background.

Doctrine insists that direct support units be as mobile as the unit being supported which means 100% mobility. This requirement generally results in a large number of vehicles and equipment for a unit with a small number of personnel authorized.

2.7.4.2. Analysis.

The cry from unit commanders in the field is, "I have too much equipment and not enough people to maintain it." A comparison of the prime movers alone assigned to representative units (Incl 2-19) shows the heavy burden placed on units in the field when it comes to maintenance of organizational automotive equipment, not to mention electronic shops and special mechanical test sets. There are three apparent solutions to this problem. First, the units could be provided additional personnel to maintain and operate the vehicles. Secondly, the Army could procure equipment which requires less maintenance. And finally, the number of vehicles in the units could be reduced. All will solve the problem, but the last is the only method which will accomplish the goal and save money. The implementation of this solution may require that the mobility of certain sections of the DSU be reduced below 100%. In analysis, this is what is actually occurring in the field today. Units have in effect reduced mobility by becoming entrenched in fixed shop and storage facilities. The real question is, "Does the entire DSU need to be 100% mobile?" The answer from the field is no. Certainly, contact teams must be 100% mobile to provide the support required by the user but the base shop, to include much of the electronic test equipment, need not be 100% mobile. The recognition of this fact by Army planners would result in a reduction in mobility with an increase in effectiveness since time spent maintaining organizational automotive equipment could be diverted to mission support.

2.7.4.3. Summary.

The adoption of the support concept discussed in para 2.7.5., "System Peculiar Supply Depots," would facilitate reduction in the number of pieces of organizational equipment required and would also allow for the development of TOE which could be limited in mobility and perform their mission in a more efficient manner.

2.7.5. <u>System Peculiar Supply Depots at GSU</u>.

2.7.5.1. Background.

Current doctrine as depicted in FM 9-59 calls for repair parts companies to provide Class VII and IX repair parts support to missile DS and GS maintenance units. The GSU is to receive items for repair from the repair parts company and then repair and return to stock.

2.7.5.2. Analysis.

Missile DS and GS companies in the field are <u>not</u> provided Class VII and XI repair parts from repair parts companies. In Europe, missile peculiar repair parts are provided by a system peculiar depot section which is part of the GSU. At the time of the visit some GSU were controlled by MATCOM while others had their own stock accountability and had the authority to release items for issue. There is no doubt that the separate system peculiar depots located at the GSU are more responsive than the massive depots under control of a theater inventory control center. (See para 2.10.1.)

The advantages of the missile GSU having an organic supply depot and control of stocks are numerous. Those brought to light by the evaluation are as follows:

1. The GSU is intimately familiar with the state of the missile system it supports, and the GSU Commander can use this information to more efficiently manage stocks as well as maintenance.

2. Repair of unserviceables can be accomplished quickly and with minimum transportation and movement costs.

3. Incorrect directives to PDO repair parts will be sharply reduced.

4. Slack periods in GSU workload can be filled by programming in unserviceables from the depot.

5. GSU shops can more easily and efficiently utilize test equipment time by having access to depot unserviceables to repair on an assembly line method.

6. Repair parts requiring periodic checks or calibration can be checked or calibrated in a more timely manner due to the collocation of the GSU and depot.

7. The close coordination required for responsive missile supply and maintenance support is facilitated.

8. The theater is provided with one unit which is, in effect, totally responsible for the logistics support provided to a particular missile system or systems. At present, there is no one point of focus which has complete responsibility and authority for a particular missile system or systems.

The disadvantages are as follows:

1. The theater may have difficulty in the area of financial management of system repair parts.

2. Control of repair parts common to different missile systems may be difficult.

2.7.5.3. Summary.

It is readily apparent to the evaluator that a direct and responsive supply system oriented towards particular systems and small enough to be managed by personnel aided by computers is the required system for missile support. The GSU, as we know it today, should be totally responsible for the support of the missile systems over a certain area, be it Theater, Corps, or other. The recommended system is shown in Incl 2-20.

2.7.6. Standards of Grade Authorizations for Unit Commanders.

2.7.6.1. Background.

Army regulation 611-101 limits the grade of company and detachment commanders to Captain. Therefore, company sized units are organized with Captains as unit commanders without regard to the complexity of the mission of the company. However, certain TOE such as 9-550 are authorized a Major as the Commanding Officer. The size of the unit is the controlling factor for the grade authorization with some exception.

2.7.6.2. Analysis.

The grade structure for company and detachment size missile support units has little or no correlation to the complexity of the mission. In Europe the Sergeant GSU is in actuality responsible for providing missile supply and maintenance support to the entire theater and in fact maintains the TASL for Sergeant peculiar repair parts as well as the maintenance float. Yet, the Company Commander is a Captain. In Korea, the theater missile GSU provides total theater GS maintenance and supply support for Sergeant, Hawk, and Nike-Hercules and the Company Commander is a Captain. There are many examples of inequities of this type in missile support units and there is no apparent correlation between the complexity of the mission and the grade of the unit commander. The Army expects a Captain of limited experience and training to manage large organizations (150 to 400 men) with responsibility for support of the entire theater in both missile maintenance and supply. Most Captains of today do not possess the required training in management skills nor the experience necessary to manage a total effort such as this.

2.7.6.3. Summary.

There is a definite requirement to tie the grade authorization of a detachment commander to not only the size of his organization but also to the complexity of the support mission. The exact criteria to determine the grade of a unit commander is not readily apparent. However, it is apparent that a general support company has a mission of such complexity and importance that it would easily qualify for a commander in the grade of Major.

2.7.7 <u>Executive Officers for Combat Service Support Companies</u>.

2.7.7.1. Background.

Army Regulation 570-2 does not authorize an executive officer position in the TOE of combat service support companies. Consequently, TOE companies in the field do not have executive officer positions authorized, regardless of the demands placed on the unit by the complexity of the support mission.

2.7.7.2. Analysis.

Of the 4 missile support companies visited, each one had an officer acting full time in the capacity of an executive officer. The need for an executive officer is apparent to the field commander. The missile general support units are large organizations (200 to 400 men) with quite complex and diverse missions. The requirements placed on the commander (generally a Captain) are out of porportion to those placed upon the commander of an infantry company or artillery battery, each of which is authorized an executive officer. Consequently, the commander of a combat service support unit finds it necessary to remove an officer assigned to another section of the TOE and make him a full time executive officer. It is difficult, if not impossible, for the commander to be with his unit on a day to day basis and still maintain proper liaison with supporting and supported organizations. In those units where an executive officer was not assigned (LCSS Detachments) the unit commander was tied to his orderly room and the administration of his unit and had little or no realization of the technical problems of his supported and supporting organizations.

2.7.7.3. Summary.

It is apparent that executive officers are required in combat service support units if the unit commander is to be free to remain in contact with supporting and supported organizations. One of the great problems facing the field commander today is to find enough time to be able to conduct liaison visits to the supported and supporting organizations to determine their problems and to insure that support rendered to their system is the best possible.

2.7.8. <u>TOE Rationale Required by Field Units</u>.

2.7.8.1. Background.

During the process of developing a new or changed TOE it is necessary for the TOE developer to prepare a detailed justification for personnel and equipment authorizations. This justification is used during the various reviews of the TOE and provides a rationale for the organization and functions of the TOE. This rationale is never published and available to the field in a timely basis. The theory of operation of a particular TOE is, in many cases, provided in Department of Army field manuals although in insufficient detail.

2.7.8.2. Analysis.

Unit commanders in the field are finding it difficult to implement the TOE with the information available in DA publications. Consequently, few similar units (e.g., TOE 9-550) are operating in a similar manner. Many of the modifications to TOE have resulted due to a lack of understanding of the duties and functions of the various TOE sections. These modifications would be unnecessary if the unit commander had a thorough understanding of the duties and functions of each section of his TOE. An example of confusion is apparent in the new TOE 9-59G. This TOE prescribes a separate production control section which controls the technical operations of the various support platoons. An E8 assigned to the production control section also has the duty of supervision of the three support platoons. However, the production control section is a section on the same command level with the support platoons. This TOE will undoubtedly cause confusion when implemented and may be the cause of the submission of unnecessary MTOE.

2.7.8.3. Summary.

It is apparent that the commander in the field requires more detailed information concerning the organization and functions of each section of a TOE. This information must be provided on a timely basis concurrent with the order implementing the TOE.

2.7.9. <u>Implementation of Current Series TOE in the Field</u>.

2.7.9.1. Background.

Combat Developments Command is responsible for recommending the integration of new or improved doctrine, material and organization into the Army in the field (AR 10-12). Consequently, there is an ongoing effort to review DA TOE on a recurring basis to insure that they fill the requirements of the units in the field and that they conform to current DA doctrine and guidance. The development of a new series TOE is a long and laborious process in which the final product is subjected to numerous reviews and tests to insure that it is compatible with the organization of the Army in the field.

2.7.9.2. Analysis

The field survey revealed that of the 17 Land Combat missile support units visited, only 4 were organized under the current basic TOE. All other units were organized under earlier series TOE and in 3 cases units were organized under an obsolete TOE (see Incl 2-21). For various reasons overseas commanders have not seen fit to implement the most current series TOE in the field. In many cases the areas of the TOE which were causing commanders problems were rectified in the new series TOE; yet since it was not implemented in the theater, the unit commander could correct the problem only by submitting an MTOE to update his old series TOE. A prime example of this is the Pershing GSU which is organized under the TOE 9-227E. This TOE has been so extensively modified that it has no resenblance to the 9-227E TOE. The current DA TOE 9-58G was specially written to provide the Pershing GSU with an approved DA TOE. To date, this TOE has not been implemented. Another example is the Sergeant GSU which is not recognized as a separate GS company in doctrine. However, USAREUR has determined a need for a separate Sergeant GSU and has extensively modified TOE 9-227 by eliminating the Nike Hercules and Hawk support elements. By not implementing current series TOE the field cannot benefit from current DA doctrine and guidance nor can the field unit benefit from the refinements and improvements inherent in the current series TOE.

2.7.9.3. Summary.

Since there is a requirement to develop current series TOE, it is essential that the field commanders implement it fully and quickly. If the field commanders cannot implement current series TOE for whatever reason, it is rather meaningless to expend the time and effort required to insure that the field has access to the most refined and current TOE available. It is apparent that the field commander must be provided appropriate resources to enable implementation of current series TOE in order to insure that the refinements and benefits inherent in these TOE are made available to his support unit commanders. Further, if the TOE are to be the best available, the field commander must review TOE prior to publication.

2.7.10 Problems of Multiple Source Maintenance.

2.7.10.1. Background.

The ultimate support structure, from the user standpoint, is one in which the user goes to one unit or organization for support. In many cases, this is not totally feasible. However, Army doctrine in the past has stressed the idea of "one stop" service.

2.7.10.2. Analysis.

The goal of one stop support for missile delivery units in the field is far from being a reality. What is particularly frustrating to the missile user is the fact that support for equipment that is in effect peculiar to a particular system is supported by conventional maintenance units. The conventional maintenance unit is generally not prepared to support peculiar items due to the low density of items supported. Generally, the unit does not have the appropriate technical manuals on hand, has no repair parts stockage and in many cases has no qualified personnel to support the item. The fault is not that of the conventional support unit. It is not feasible to expect a unit to provide totally responsive support for the hundreds and even thousands of items it is required to support. It is even less feasible to expect the unit to provide responsive support for low density items. The types of equipment most affected by this includes generators, air conditioners, system peculiar vehicles, electronic test equipment, and special lifting devices. This equipment is usually critical to the readiness of the delivery unit and usually receives much less responsive support than is provided by the missile support unit.

2.7.10.3. Summary.

It is apparent that if missile support is to be totally responsive, then those items of equipment which directly impact the effectiveness of the missile delivery system must be the responsibility of the missile support unit.

2.8. LAND COMBAT MISSILE SYSTEMS PROBLEM AREAS - ORGANIZATION

2.8.1. Provisioning of Sergeant Missile Personnel.

2.8.1.1. Background.

The Sergeant Missile System is scheduled to be replaced by the Lance Missile System sometime in the future. Since there have been slippages in the fielding date for Lance, Sergeant has been required to remain in the field for a longer period than originally planned.

2.8.1.2. Analysis.

Of the three Sergeant Battalions visited, all were short of trained personnel. None of the battalions had an Ordnance Staff Officer (MOS 4516) or Platoon Commander (MOS 4516) assigned. Consequently, one of the two maintenance warrants authorized was performing the duties as Platoon Leader and Staff Officer. The percent fill of Sergeant technical MOS worldwide is 53% (see Incl 2-22). This low percent of fill was not only peculiar to the DS & GS elements. The Sergeant firing batteries also complained of a low percent fill (figures not available). Comments such as these were received from Battery Commanders. One Battery Commander said, "This is putting an additional workload on the personnel. NCO's have to do the manual labor rather than supervise." Another said, "MOS 15B is understrength battalion wide. We are using MOS 13E to fill the shortages." And yet another says, "We cannot maintain weapons security as required by regulations. I don't have enough people to conduct a resupply convoy and a fire mission at the same time." These statements serve to highlight the feeling of Unit Commanders in the field and it is difficult to describe their frustration in trying their best to do the job but not having the personnel to do it. One Sergeant Battalion received so many untrained crewmen that they had to use one firing battery in the capacity of a training battery in order to train replacements for the other firing batteries of the battalion.

There are many contributing factors for this low percentage of fill. However, it cannot be determined which is the major contributing factor. The following is a list of probable contributing factors:

1. Failure of the overseas replacement system to provide qualified individuals.

2. Failure in the theater to properly requisition replacement personnel.

3. Failure of the theater to implement current series TOE which delete MOS 21A.

4. Failure in the theater to properly assign MOS provided by DA.

5. Changing MOS in violation of applicable regulations.

2.8.1.3. Summary.

It is apparent that if the units in the field are to accomplish their mission successfully, qualified personnel must be made available. The TOE provides the bare minimum of personnel to accomplish the mission and it is difficult if not impossible to accomplish it with a 53% fill of technical MOS. The personnel requirements for the Sergeant System must be reviewed to insure that sufficient numbers of user and support personnel are trained and available until the last Sergeant Battalion is removed from the field.

2.8.2. Misutilization of Personnel.

2.8.2.1. Background.

Department of the Army has published many regulations to insure that the Field Commander receives properly trained personnel in the correct quantity to fill the requirements of units in the field. Additional safeguards are available to theater commanders to insure that unit commanders are properly utilizing the MOS available by assigning them to valid TOE position vacancies. Once the individual possessing the appropriate MOS is properly "slotted" in a unit, it is the commander's responsibility to utilize the training of the individual to the benefit of the unit. Recent efforts to establish a Modern Volunteer Army has stressed the need to present an individual with an acceptable level of job satisfaction.

2.8.2.2. Analysis.

The evaluators noted that the units were being tasked with a large number of duties to support the installation as well as a requirement for a great deal of unit administration. This necessitated that the Unit Commander use his assigned personnel resources to fill these requirements. Consequently there are many individuals worldwide who, although they are filling a valid TOE position calling for their MOS, are working out of their MOS. The list shown in Inclosure 2-23 was compiled by evaluators from unit rosters which were collected and by collating information which was provided by only a few (3) of the units evaluated. This list is just a small sample of the actual misutilization that may be going on in the field units. Additional data from individual MOS questionnaires is more revealing of the actual situation. The question asked was, "Are any personnel assigned or utilized outside their MOS?" Of the 88 enlisted men questioned in grades E4 thru E7, 49 responded yes, 19 no, and 20 had no response. When asked what types of duties MOS qualified personnel were performing in their unit the list included the following:

Shop Clerk	Bus Driver	PLL Clerk
Mechanic	Duty Driver	Training NCO
Unit Supply	Unit Policeman	Mail Clerk
27H as 27G	Gateguard	Dispatch Clerk
Wrecker Operator	Orderly Room Clerk	Fuel Handlers
CBR & Arms Room	Education Center	CBR & Arms Room
Training Clerk	27E as 27B	27B as 27C
55G as 76P	Supply Clerk	TAMMS Clerk
Motor Sergeant	Motor Maintenance	
PLL Clerk	Swimming Instructor	

This listing, when compared with Inclosure 2-23, presents some 42 different ways in which an enlisted man may be required to work out of his MOS. With situations like this in existance it is no wonder that the Army cannot retain highly qualified missile repairmen.

The Commander in the field will never be free from the non-mission related duties required in a peacetime Army. Therefore, the TOE must be written in such a way as to provide personnel to fulfill these requirements. Consequently, missile support companies are provided with more technically trained personnel than are absolutely required for the mission. Thus, there are a large number of highly skilled technicians assigned, many of which will be required to perform non-mission related duties on a full time basis.

2.8.2.3. Summary.

There is a definite requirement for overhead personnel to perform the non-mission related duties required of all TOE units. It is an extravagant waste of money to use highly trained missile repairman full time in such jobs as unit policeman or orderly room clerk. There is a definite need to reevaluate the criteria used to authorize personnel for missile support units and there is a need for a number of low skill level personnel to be available for the non-mission related functions. These presonnel must be supplied to the Unit Commander by TOE and the additional duties must be done away with. Much money can be saved if the highly trained individual can devote full time to the performance of his MOS duties.

2.8.3. Work Planning Required in Missile Support Operations.

2.8.3.1. Background.

Most maintenance Unit Commanders are expected to manage the maintenance operations of his support unit based on the training received early in his military career. Although there are some pamphlets available on work measurement, there is no written material available on the subject of work planning in the field unit.

2.8.3.2. Analysis.

There was very little work planning in missile DS and GS units worldwide. There are a variety of reasons for this. The major contributing factor is the fact that shop operations personnel have little or no idea as to how many personnel will report to the shop for work each morning. The unexpected and unplanned requirements placed on support units by higher headquarters is a major factor for this. Secondly, shop personnel are not properly trained in the methods of production planning. Work is generally planned on the spur of the moment basis with little or no thought given to the best method of accomplishing the tasks at hand. Finally, some units don't have enough work to properly utilize the repair talents available. The solution must be a method whereby the shop operations personnel will be provided with the number and MOS of the personnel that will be available for use in the shop the following day. Additionally, the shop operations personnel must know how to plan for the proper utilization of the skills available each day. The lack of work availability can be corrected by fielding combined DS/GS units with a base shop responsible for all assembly/component repair. At present, much productive time is lost by units in the field due to an inability to properly plan for the accomplishment of the repair effort.

2.8.3.3. Summary.

A foolproof method must be devised to insure that support units in the field properly plan for the repair effort. The first step must be to provide a method whereby the shop officer can plan the work schedule based on the number of repairmen available in the shop. Work planning is a must if the Army is to obtain maximum production from a minimum of personnel.

2.8.4. Missile System MACRIT.

2.8.4.1. Background.

Army Regulation 570-2 requires that Manpower Authorization Criteria (MACRIT) be based primarily on manhours to perform a required function. In paragraph 2-7, basic planning factors are given which are to be used in the development of MACRIT. At the present time there is no MACRIT for missile system maintenance.

2.8.4.2. Analysis.

Data from the field survey indicates that the planning factors listed in paragraph 2-7 of AR 570-2 do not apply to missile support TOE. It is reasonable to assume that the mission of some conventional maintenance units will be drastically reduced during peacetime and therefore the basic assumption of a 12 hour day, 365 days per year would apply. This would result in a figure (after subtracting non-productive time) of 2,500 manhours available per man per year. The reduction in mission may well counterbalance the fact that in peacetime the unit works 8 hrs per day and 5 days per week. Less holidays and leave, this results in 1840 manhours per year per man available. However, the mission of organizations supporting high cost/low density missile systems will be greater during peacetime than in wartime. Therefore, any MACRIT developed for TOE supporting these systems should take into account the peacetime figure of manhours available. This figure is arrived at below:

Manhours available for 12 hr day - 365 days per year:	4380
Less 1460 manhours due to 8 hour day:	1460
Manhours available for 8 hr day - 365 days per year:	2920
Less 832 manhours due to 5 day week:	832
Manhours available for 8 hr day, 5 days per week:	2088
Less 72 manhours due to 9 official holidays:	72
Manhours available:	2016
Less 176 manhours due to 22 weekdays of annual leave:	176
Manhours available in peacetime:	1840

Based on data in Inclosure 2-24, the following nonproductive time is deducted from the 1840 manhours:

Nonproductive factors:

Security (Incl 2-24)	3.6% or	73 manhours
Kitchen Police (Incl 2-24)	.7% or	14 manhours
Details (Incl 2-24)	9.1% or	183 manhours
Messing (Note 1)	0% or	0 manhours
Casualties (Note 2)	0% or	0 manhours
Personal Needs (Note 3)	4.1% or	83 manhours
Unit Movement (Note 4)	0% or	0 manhours
TOTAL		353 manhours

Note 1 - Assume messing will not be included in the 8 hour productive day.

Note 2 - Assume no casualties in peacetime.

Note 3 - Assume personal needs are the same in peacetime and wartime and that it will reduce the productive time.

Note 4 - Assume no moves in peacetime.

Based on these figures the total productive manhours available during peacetime for a Category I unit is 1487 manhours per year.

2.8.4.3. Summary.

Due to the fact that the mission of missile support units supporting high cost/low density systems is the same or greater in peacetime as in wartime it is in error to develop MACRIT for such support units using data available in paragraph 2-1 of AR 570-2. Consequently, before any MACRIT is established, the validity of the 2500 manhours must be challenged. The survey concludes that the figure 1487 productive manhours per year is a more valid figure and that the actual productive manhours may be substantially less.

2.8.5. Organization of Quality Control (QC) Sections.

2.8.5.1. Background.

Most current TOE do not contain separate quality control sections reporting directly to the DSU/GSU commander. Instead, the inspectors are fragmented throughout the TOE by being assigned to the various repair sections. There are few TOE which provide adequate quality control organization for DS and GS missile support units.

2.8.5.2. Analysis.

The field survey revealed that quality control in the field existed in name only at the DS level. However, there were significant attempts to form quality control sections at GS using the inspectors and other maintenance personnel assigned to the company. The general attitude of the field was that they didn't have the time or personnel necessary to set up an effective quality control program. The quality of the work is left to the individual section chief and in some cases to the repairman himself. The sophistication and relative simplicity of operation of missile automatic test equipment has lulled the field into the belief that QC is not really necessary. Technicians feel that the inspection element is built into the electronic test equipment. They fail to realize that the nature of the test equipment demands that in-process type inspections be performed continually. The requirement for separate initial and final inspections on electronic chassis is not clear. What is clear, however, is that the inspector must conduct numerous in-process inspections to insure that the repairman is properly repairing the chassis as directed by the automatic test equipment. The lack of QC was brought home hard when a missile failed to function properly during annual service practice and the cause was traced to loose connectors in the guidance section. A well organized and efficient QC section could have caught the error which in wartime would have led to an abort in the delivery of a nuclear weapon. The cost of such an abort in wartime is incalculable.

The need for a well organized, separate, and highly qualified QC section is vital if the planned availability of a particular system is to be achieved. A number of suggested QC organizations submitted by the field are depicted in Inclosure 2-25.

2.8.5.3. Summary.

Quality Control sections must be depicted as separate sections in the TOE and must report directly to the support unit commander. A properly organized QC section would not only insure the quality of work completed by the support unit but could also be used as inspectors when technical assistance is required by the supported unit. Additionally, they could be used as members of MAIT teams to assist other DS and GS units.

2.8.6. <u>Requirement for Vehicle Drivers</u>.

2.8.6.1. Background.

Missile support TOE do not provide for a vehicle driver duty position. This is filled as an additional duty by the personnel assigned to the company.

2.8.6.2. Analysis.

There are requirements in various sections of missile support unit TOE to justify the need for a vehicle driver. Field units feel a driver position is required in each technical supply section and shop operations section to provide a capability to make repair parts runs to the supporting supply and maintenance units. These drivers are in critical demand at DSU level. Data gathered during the survey is portrayed below:

TYPE UNIT		*ROUND TRIP ROAD TIME TO SUPPORT (HRS) SUPPLY	MAINT
SGT DSU		6	6
SGT DSU		8	2
SGT DSU		2	4
Pershing DSU		1	6
Pershing DSU		3	3
Pershing DSU		5	5
LCSS DSU		3	3
LCSS DSU		8	8
CV DSU		8	8
CV DSU		14	3
	TOTAL	57.1	48
	AVERAGE	5.7 hrs	4.8 hrs

*This is the round trip road time to and from the supported unit and does not include any administrative time such as loading/unloading or paperwork transactions. The support unit was either a missile or conventional support unit supporting system peculiar missile, engineer or signal items. In the case where more than one support unit was involved the time to the most distant unit was recorded.

The above table shows that tech supply sections have to drive an average of 5.7 hours to pick up and/or turn-in repair parts where maintenance sections must travel an average of 4.8 hours to evacuate unserviceable items. The policy worldwide is that 2 men are required to ride in the vehicle. These trips may be required as often as once per day for 02 priority supply requests and work requests. There are also numerous other requirements for road travel for the various DSU. The average road travel time listed above would not be reduced in combat and most likely would increase.

The supply sections of the various DSU are particularly hard hit by this driving requirement. The following chart represents the impact of the driving requirement on the tech supply operation.

TYPE UNIT	# OF PERSONNEL AUTH IN TECH SUPPLY	*PERCENT OF PERSONNEL DRIVING DAILY
SGT DSU	8	25%
Pershing DSU	22	10%
CV DSU	7	29%
LCSS DSU	5	40%

*Based on two personnel making a daily trip.

The driving requirement in most cases is a daily requirement which impacts heavily on the capability of the supply section to accomplish the mission.

2.8.6.3. Summary.

There is a definite requirement for a vehicle driver MOS in the tech supply sections of the DSU. This requirement apparently also exists in the maintenance sections, however, since there are few TOE which specify sections for a shop office or production control section, the impact on the effectiveness of the section cannot be measured. Addition of the appropriate number of vehicle driver positions will remove the requirement for more highly skilled supply and missile maintenance personnel in the DSU.

2.8.7. <u>Requirements for Administrative Personnel</u>.

2.8.7.1. Background.

Army Regulation 570-2 prescribes certain numbers of administrative and overhead personnel to be assigned to organizations. TOE developers must utilize the levels as authorized in this AR.

2.8.7.1. Analysis.

The field survey indicates that units are required to utilize a large number of technical type personnel in order to fulfill the requirements placed on them. This has resulted in a large percentage of personnel being utilized out of their MOS in overhead positions within their unit. Examples of this are shown in Inclosure 2-26. This data from a sampling of units provides insight into the number of administrative personnel used by missile support units in the field. One GSU (355 personnel) was using 5 clerks in the orderly room full time. It is the opinion of the evaluator that they were fully utilized. The unit had no administrative support in their immediate area; therefore, they had to drive 175 miles one way to get to the personnel services company. Finance is located 65 miles away. The duties of the clerks in the orderly room are listed below:

Company Clerk (1 ea) - Runs the paperwork in the orderly room. Types all legal paperwork, article 15's, etc.

Finance Clerk (1 ea) - Types travel vouchers, allotments and handles pay complaints.

Morning Report/PIR Clerk (1 ea) - Types all orders on personnel and tracks down lost orders. Works on assignments and transfers.

Correspondence Clerk (2 ea) - One clerk types full time - unit has 72 recurring reports and submits over 90,000 typed pages per year. The other clerk handles the overflow and types duty rosters.

Another GSU (172 personnel) found it necessary to use 5 clerks in the orderly room. The list goes on and on where units are forced to use from 2 to 5 clerks in the orderly room plus many more elsewhere. Many of these personnel are, by necessity, highly trained missile repairmen. Data showing the number of clerical positions utilized by a sample of the units visited is provided in Inclosure 2-26.

2.8.7.3. Summary.

The authorization for clerical personnel in TOE today is not in line with requirements of the field. The authorizations in AR 570-2 are not realistic and must be modified to take into account not only the size of the unit, but also its mission and relationship to administrative support organizations.

2.8.8. Requirement for Missile Staff Sections.

2.8.8.1. Background.

TOE 6-615G provides for a Missile Staff Officer (MOS 4515) on the Pershing Battalion Staff. This officer is responsible to the Commander for all areas of missile maintenance and supply.

2.8.8.2. Analysis.

The Pershing system staff officers all felt the need for a small staff section. All battalion staff officers visited had assembled a small staff section using personnel from the DS platoon. The specific suggestions submitted by the units are shown below:

PERSONNEL

DUTY POSITION	GRADE	MOS	AUTH	NUMBER OF UNITS RECOMMENDING THIS STRUCTURE
Missile Staff Officer	MAJ	4515	1	3
Missile Maint NCO	E7 (NC)	21L50	1	2
Reports Clerk	E4	71H20	1	3
Reports Clerk	E4	46N20	1	1

EQUIPMENT

MAJOR ITEM DESCRIPTION	AUTH	NUMBER OF UNITS RECOMMENDING THIS STRUCTURE
Truck, Utility 1/4 Ton	1	3
Radio Set, AN VRC 46 Mtd in 1/4 Ton	1	3
Trailer, Cargo 1/4 Ton	1	2
Typewriter, 14"	1	2
Desk, Field	1	2

Plus associated field equipment, tent, tables, stove, etc.

When properly utilized in a field situation it is necessary for the battalion missile staff officer to travel to widely dispersed firing locations. In order to accomplish this, he must be provided adequate transportation. The requirement for additional personnel is not totally clear to the evaluator with the exception that a reports clerk/driver is required for a field as well as garrison environment.

2.8.8.3. Summary.

The requirements for equipment and personnel to be assigned to a missile staff officer section are valid in part. The vehicle and radio are definitely required as is the reports clerk/driver. These assets should be provided to all missile staff officers at battalion level. The requirement for the E7 as well as additional field equipment needs further study.

2.8.9. Requirements for the "40" Skill Level in the 27 Series MOS.

2.8.9.1. Background.

Current standards of grade authorization listed in AR 611-201 W/C 17 provide for no supervisory personnel in the career group 27, Combat Missile Electronics Maintenance. The first supervisor provided is in the grade of E7. Earlier versions of the AR provided for MOS 27C at a 40 skill level which was used to provide supervision for 6 or more personnel in a unit performing maintenance and repair of combat systems. The 27C MOS was subsequently replaced by the 27G and 27H MOS which do not provide for a "40" skill level.

2.8.9.1. Analysis.

Units in the field will shortly lack intermediate supervisors in the grade of E6. At present, 27Z personnel with a "40" skill level are available to fill the intermediate level supervisory positions required in the field. Granted, due to the cellular structure of the TOE, few of these supervisors seem to be required. The current TOE 9-550G calls for the following "40" skill levels:

TEAM	LINE	DESCRIPTION	GRADE	MOS	STRENGTH
EC	02	Test Equip Maint Fman	E6	27B40	1
EK	06	LAD Radar Rep Fman	E6	27F40	1

At present, AR 611-201 does not prescribe a "40" skill level in either MOS. In addition, under the present structure, an individual is not provided with the opportunity to act as an NCO supervisor in the grade of E6. Therefore, he can never be provided the experience required of an NCO supervisor in the grade of E7. The Army therefore will be provided with individuals in the 27Z MOS who have had no previous experience as NCO supervisors. These individuals will be expected to act as Platoon Sergeants and First Sergeants in missile support units.

2.8.9.3. Summary.

Army Regulation 611-201 should be changed to provide "40" skill levels in the 27 series MOS to provide for the requirements in TOE 9-550G and for the real requirements placed on the field when implementing cellular TOE (see para 2.2.8.10). Additionally, the "40" skill level must be provided to enable individuals to gain the necessary skills required to perform in the grade of E7 and E8 as missile support unit Platoon Sergeants and First Sergeants.

2.8.10. Lack of Supervisory Personnel in TOE 9-550.

2.8.10.1. Background.

TOE 9-550 is a cellular type TOE that is flexible based on the mission requirements of the support unit. The cells of the TOE can be added or deleted based on the mission of the unit concerned.

2.8.10.2. Analysis.

Units operating under this TOE find a strange and unwelcome phenomenom occurring in the field. Due to the flexibility of the TOE, it can easily become unmanageable due to the lack of intermediate level supervisors. The structure of a typical field unit organized under TOE 9-550 is depicted in Inclosure 2-27. The organizational block diagram for the "G" series TOE has not been published, however, the structure shown would logically follow from the title of the various sections. This type of organization is extremely bulky and does not facilitate good control over either the personnel or the maintenance mission. The lack of intermediate supervisor positions is apparent. The E7 and E8 in team EB are responsible for some 23 separate working sections, only one team of which has an E6 supervisor authorized. This is an intolerable situation. The organization shown in Inclosure 2-28 would insure proper management of personnel and maintenance. This structure is a result of the recommendations of various support units. The grade of the missile officer in team AA is increased to a Captain to provide an executive officer for the detachment. The maintenance control officer in team EB is reduced to grade of Lieutenant commensurate with his decreased responsibility. The E8 in team EB is transferred to team XX and the grade is reduced to E7. Team XX is organized to control the contact team and technical assistance services provided to the user. In this manner the functions of the base shop (teamEB) and the contact team headquarters (team XX) are split and well defined. The unit is now organized to provide much more effective support to the user in that the contact teams can be more closely controlled and utilized to provide continual on site support to the user. The contact team OIC will be totally familiar with the needs of the user. The maintenance control OIC concentrates on operations in the shop and insures that DX items are repaired as required for use by the contact teams. The question of adequate supervision can be settled by authorizing one E6 NCO with the appropriate MOS for each grouping of 3 or more like contact teams. In the case shown in Incl 2-28, team XX would be authorized an additional 3 NCO E6's, one for each grouping of teams EH, EI, and EP.

2.8.10.3. Summary.

The requirement for the flexibility of TOE 9-550 cannot be overlooked. Yet, the need for a manageable organization composed of cellular teams is essential. The flexibility of the TOE teams must be matched by a flexibility in the assignment of intermediate level (E6) supervisory personnel. At present, there is no capability to add or delete supervisory personnel as missions change. The flexibility must be incorporated into TOE 9-550.

2.8.11. <u>55 Series MOS in the Pershing Missile Battalion</u>.

2.8.11.1. Background.

The service battery of the Pershing Field Artillery battalion has the mission of storage and maintenance of Class V stocks. The battery ammunition section, using MOS 15E is responsible for this mission.

2.8.11.2. Analysis.

Although missile DS and GS units stated no requirements for personnel trained in MOS 55 series, one Pershing DSU commented that there may be a need for this type of training in the ammunition section of the service battery. This requirement cannot be validated by the MAME-71 evaluators at this time.

2.8.11.3. Summary.

There may be a need for the 55 series MOS in certain missile delivery units. This requirement should be evaluated by the TOE developers to determine its validity.

2.8.12. <u>Shillelagh Contact Team</u>.

2.8.12.1. Background.

TOE 9-550 states that one Shillelagh contact team (2 men - 1 vehicle) is capable of supporting 27 Shillelagh Missile Systems. TOE 9-550 units are supporting Shillelagh equipped cavalry squadrons consisting of three Shillelagh equipped troops.

2.8.12.2. Analysis.

The Shillelagh users seriously doubted the ability of the present two man contact team to support the system in time of conflict. This is primarily due to two reasons. First, the heavy maintenance requirements of the system based on range firings conducted by the units annually and second, due to the wide ranging and rapid movement of the troops during combat. It is felt that it would be impossible for one team to cover the amount of ground necessary to remain in contact with the troops and perform the large amount of maintenance required. However, the peacetime requirements can be supported by one two-man team.

2.8.12.3. Summary.

The doubt expressed by the Shillelagh user appears to be valid. The recommended solution is to assign two contact teams to each squadron in time of conflict. This should be added as a note to the TOE.

2.8.13. Missile Staff Officers Manual.

2.8.13.1. Background.

TOE for Sergeant and Pershing delivery units call for a Missile Staff Officer (MOS 4515) on the battalion staff. There is little if any published guidance as to the duties and responsibilities of the missile staff officer. Further, many higher headquarters, brigade, corps, etc., have found it necessary to have a MOS 4515 officer on the staff. Again, the duties and responsibilities of this staff officer are not clearly defined.

2.8.13.1. Analysis.

The evaluators discovered that the duties of missile staff officers of similar type units varied widely depending on the energy and drive of the particular officer. A list of the actual duties and responsibilities of the staff officer at battalion level are listed below:

1. Direct support platoon leader.

2. Prepare required reports on the missile system.

3. Logistics staff officer responsible for the total battalion S-4 function.

4. Advising the commander in all areas of missile system supply and maintenance.

5. Staff supervision of the direct support platoon.

6. Operational control of the direct support platoon.

The point of the discussion above is to show the confusion in the field as to the exact duties and functions of the missile staff officer. This points out the real need for a new field manual or portion of an existing field manual which clearly depicts the duties and functions of a missile staff officer at various levels of command. This FM should be a useful tool to assist the staff officer in keeping the commander informed concerning the areas of missile system supply and maintenance. The areas which should be clarified are listed below:

1. Relationship to the direct support maintenance and supply unit.

2. Relationship to other staff officers in the same Headquarters.

3. Methods to use in determining the effectiveness and responsiveness of missile supply and maintenance units.

4. Relationship to CONUS commands such as AMC, CDC, and CONARC.

5. Responsibilities concerning the application of block team type modification work orders.

6. Responsibilities concerning the assignment and transfer of missile trained personnel within the Command.

7. Responsibilities concerning the arrival of a new missile systems or missile support units in the Command as well as new major items such as PIA, etc.

8. Utilization of contractor field technicians and Department of the Army Missile Maintenance Technicians.

9. Responsibilities concerning the Command Quality Assurance/ Quality Control Program for missile system repair.

10. Relationship to the theater supply support organizations such as the theater Inventory Control Center, etc.

11. Responsibilities concerning the coordination of logistics matters between using units and missile support units.

12. Peculiarities of support for the various types of missile systems located in the Command.

13. Responsibilities concerning the provisioning, positioning, status, and control of the operational readiness float.

14. Responsibilities concerning the conduct and coordination of the missile technical assistance program.

15. Responsibilities concerning the proper utilization of missile trained personnel.

16. Responsibilities concerning the development and approval of command level regulations and/or standing operating procedures.

17. Guidance concerning types of supply and maintenance reports required to properly inform the Commander of the status of missile supply and maintenance and a discussion of how to interpret data included in reports.

18. Responsibilities concerning the relocation of missile support units.

The areas listed above have been determined as those most misunderstood or overlooked by missile staff officers in the field.

2.8.13.3 Summary.

The need for a missile staff officer's field manual is readily apparent when evaluating missile support in the field. The lack of understanding of staff officers on high level staffs has caused many problems in the area of missile logistics support in the field. An FM including all the areas listed above is required in the field on an expedited basis.

2.8.14 <u>Standards of Grade Authorization for Career Group 46</u>.

2.8.14.1 Background.

Army Regulation 611-201 provides career progression and Standards of Grade Authorization (SGA) for Career Group 46. The regulation directly impacts on the grade structure of the TOE.

2.8.14.2 Analysis.

Personnel in the field feel that Career Group 46 provides unrealistic lines for normal progression thru the career group as well as an unrealistic grade authorization. The impact of this is felt by the Pershing Direct Support Platoon. The structure of the career group leads to the following grade structure in TOE 6-619G:

Para	Line	Duty Position	Grade	MOS	Auth Qty
07	06	BM Elect-Mech Insp	E6	46N20	3
08	02	BM Elect-Mech Rpmn	E4	46N20	14
08	04	BM Rep Appr	E3	46A10	7
08	05	BM Guid-Con Rep Sec Chief	E7	21L40	1

The problems of this organization are readily apparent. First, the section chief of paragraph 08 is an E7 in MOS 21L40. The job description of the 21L and 46N MOS as presented in AR 611-201 are in no sense of the imagination similar, and secondly, there are no E5 positions in the TOE and therefore no way for an individual to progress thru the MOS in the same unit. These facts are causing great morale problems in the field. The 21L40 assigned as the section chief of paragraph 08 in the TOE is working out of his MOS and feels he is being wasted in the position. The E4 (46N) feels that he cannot be promoted in the unit and therefore has no future in a unit with this type grade structure.

2.8.14.3. Summary.

The career progression and SGA for Career Group 46 must be changed to provide for a more equitable grade structure and line of progression. It is not feasible, for instance, to expect a 46N to progress to a 21L MOS without extensive reschooling. The entire Career Group 46 must be reevaluated and restructured to meet the needs of the field.

2.8.15. Combination of MOS 21L and 21M.

2.8.15.1. Background.

Army Regulation 611-201 presently calls for two separate Pershing electronic repair MOS, 21L and 21M.

2.8.15.2. Analysis.

All units in the field, without exception, felt that MOS 21L and 21M could easily be combined. There is no need for two separate MOS in the field today. Most supervisors felt that the separate MOS was a carry-over from the old Pershing system and is no longer required in the P1A due to a redesign of the computer system.

2.8.15.3. Summary.

The feasibility of combining MOS 21L and 21M should be further studied due to the strongly favorable feelings expressed by personnel in the field.

2.8.16. Creation of a Chaparral-Vulcan Warrant Officer MOS.

2.8.16.1. Background.

Army Regulation 611-112 defines the Occupational Group 27 and presents the qualifications for MOS 271A, the only warrant officer MOS in this group. Although the missile system responsibilities are not defined in this regulation, DA Pamphlet 350-10, U. S. Army Formal Schools Catalog, does define system responsibility to some extent. The 4F-271A, Land Combat Missile System Repairman Course, defines the responsibility in the sense that the individual is trained in Small Guided Missile Systems and the Land Combat Support System. This equates to the DS & GS responsibilities for LCSS, Shillelagh, TOW, Dragon, Lance, Chaparral, Vulcan and Redeye.

2.8.16.2. Analysis.

Warrant officers with a 271A MOS were asked their opinion on the merits of splitting the MOS into two MOS. Those who favored splitting the MOS felt that one man could not be technically proficient in all the systems he is responsible for. They proposed a new warrant officer MOS for Chaparral/Vulcan/FAAR, with the 271A retaining responsibility for all missile systems supported by LCSS (i.e., Shillelagh, TOW, Lance, and Dragon). Most of the warrants felt that Redeye should remain with the 271A, although a few thought it should become the responsibility of the C/V warrant. Those recommending the latter stated this because it has no relation to LCSS.

Creation of a new warrant officer MOS for Chaparral/Vulcan/FAAR appears to be desirable. Units now furnishing direct support maintenance for these systems are attached to the artillery battalion they support. This is in contrast to the units furnishing support for Shillelagh and TOW, which have area support missions which do not include C/V. The 763rd Ord Det at Fort Bragg, N. C., and the 563rd Ord Co. in Germany, the theater GSU, are the only units visited which are exceptions. These units are authorized Vulcan and Chaparral/Vulcan sections respectively, with a warrant officer position.

The present pattern of utilization for MOS 271A is resulting in the warrants being used almost exclusively for support of either Chaparral/Vulcan or LCSS supported systems. Consequently, those working with one are losing proficiency in the other.

Additionally, there is a training "gap" among warrants now in the field. This has been caused by the gradual deployment of the systems they support. The warrant officers initially fielded were trained only on LCSS, Shillelagh and REDEYE, since TOW and Chaparral/Vulcan were not fielded at the time. The MOS POI was gradually expanded to include the latter two systems as they neared deployment. Consequently, many warrants now find themselves faced with the possibility of assignment to Chaparral/Vulcan when they have no background in the system. The warrants interviewed felt that MOS conversion should be based on individual preference and current assignments.

2.8.16.3. Summary.

The benefits of a separate CV warrant officer MOS are not at all clear. However, the large number of 271A warrants which mentioned the desirability of a split in the MOS indicates that further study is required.

2.8.17. <u>Staffing of Technical Supply</u>.

2.8.17.1. Background.

Manpower Authorization Criteria (MACRIT) were established for stock control and warehousing operations by Change 2 to AR 570-2, dated 4 March 1971. Prior to this change, there was no written guidance available for staffing a tech supply. Current series TOE ("G" and earlier) appear to incorporate various methods for arriving at personnel requirements, based upon estimates of the number of lines on an ASL. The MACRIT now published in AR 570-2, Change 2, continues to require estimates of the number of ASL lines a unit will have. However, it does establish standards for the number of ASL lines one man (stock control or warehousing) can handle.

2.8.17.2. Analysis.

A number of personnel interviewed suggested that tech supply be staffed functionally, rather than by the number of line items on the ASL. The intent of their suggestion was to recognize that every tech supply has certain basic functions to perform, regardless of the number of lines stocked. This idea appears to have merit.

Units visited had three basic sections in their tech supply: editing, stock records, and warehouse. In addition to these, most units also had a DX section operating within tech supply. Those units maintaining a shop stock generally located it in the maintenance shop area, but the section was usually staffed with tech supply personnel.

Personnel requirements in tech supply were found to be dependent upon a number of factors to include the number of lines on the ASL, the daily volume of requisitions received, reporting requirements and the distances to and the number of locations for parts runs. Another factor, perhaps rarely considered, is the number of vehicles and their daily maintenance requirements.

Inclosure 2-29 provides a look at the size of the tech supply operation in units visited. DX lines have been separated from other lines carried on the ASL, primarily because most unit DX operations were separated from the editing and stock record sections within the tech supply. The workload figures appear to be lower than might be expected, particularly in the LCSS units. They are based on an average of the number of transactions occurring in the three month period prior to the visit of the MAME-71 team to each unit. The following factors must be considered when examining the workload data:

1. The averages do not reflect DX transactions. These are performed using DA Form 2402 (Exchange Tag) and do not represent a requisition received or an issue made. USAREUR has an extensive program in effect for DX of PEMA secondary items. Generally, these are the fast moving items, particularly in LCSS units.

2. User training is cyclic in nature, leading to peaks and valleys in DS workload. This is particularly true for units equipped with Sergeant and medium cost/high density systems. Peak workload occurs once a year when these units conduct their annual firings. After the firings, training and maintenance efforts taper off for a number of reasons. Pershing units maintain a more even workload distribution throughout the year because of the requirement to maintain one battery on alert. However, even Pershing workload peaks out when the battalions move to the training range at Grafenwoehr once a year.

Most tech supply personnel complained of having too few individuals authorized. Their complaints were primarily based upon the considerable maintenance effort required for vehicles, lack of drivers to make supply runs, the fact that the TOE did not provide for DX, and the extensive reporting requirements. Additionally, each tech supply was short of authorized personnel and rarely had more than one or two school trained repair parts specialists. The remainder of the personnel found assigned to tech supply consisted of 76A supply clerks, missile maintenance personnel, and personnel for which no other job could be found. Inclosure 2-30 is a listing of spaces authorized in each tech supply visited.

MACRIT establishes a TOE staffing criteria of 220 ASL lines per stock control specialist and 172 ASL lines per warehousing specialist. Inclosure 2-31 reflects the number of ASL lines which repair parts specialist in the units visited were actually responsible for, assuming full fill of authorized personnel. The number of lines shown were computed based upon the ratio of ASL lines between stock control and warehousing personnel. Only E4, school trained repair parts specialists are considered, since the Standards of Grade Authorization in AR 611-201 do not provide a mix for E3, 76A10 personnel. Deviation from MACRIT is substantial. Inclosure 2-32 indicates the number of spaces each unit should have, based upon MACRIT. This figure is compared to actual authorizations.

Obviously, there are tremendous deviations from published MACRIT for tech supply personnel. Assuming that the staffing criteria in MACRIT are realistic, most units are short personnel for proper operation of tech supply. That is exactly what the units are saying. How should the situation be corrected and what are the actual personnel requirements?

First of all, units are not able to increase the strength of their tech supply without providing trade-off spaces from elsewhere within the unit. This is unfortunate, but is a result of imposed manpower ceilings. It is very difficult to "sell" an MTOE requiring an increase in strength, even though more than adequate justification exists for such an action. Once a TOE spells out authorization guidelines, MTOE proponents rarely increase, and more often decrease personnel allowances shown in the TOE.

Setting aside the problem of obtaining authorizations, a look should be taken at what is actually required. The senior individual in most tech supplies visited was an E5. Very frequently, he was a Specialist, rather than a Sergeant. Only CONUS LCSS DSU were authorized an E7 76Z50 Senior Supply Sergeant. Units now have a "supervision gap" in tech supply. The senior NCO should be, at a very minimum, an E6 76R40, and preferably an E7, regardless of the number of people supervised. The high dollar value of missile ASL and the complexity of tech supply operations require knowledgeable and experienced NCO supervision.

The question of a tech supply warrant arose often. Pershing DSU are authorized a 761A Supply Warrant. However, these men rarely have a tech supply background. Furthermore, they are rarely assigned to a Pershing DSU. Consequently, Pershing maintenance warrants are called on to act as tech supply officer in addition to their other duties. In units supporting other systems, a warrant officer is usually called on to supervise the tech supply. Commissioned Officers rarely have the background to qualify them for the "nitty-gritty" of daily tech supply actions. A number of solutions present themselves here. First, a tech supply warrant officer MOS should be created. Secondly, a good look should be taken at the desirability of authorizing and assigning these warrants to units engaged in support of systems other than Pershing. Third, maintenance warrants should receive considerably more training in tech supply procedures during their schooling.

MACRIT should consider factors other than just the number of ASL lines in arriving at tech supply personnel requirements. Minimums should be considered for each functional area, such as editing, stock records, warehousing, direct exchange, and maintenance shop stock. A good starting place would be two in each section, with additional staffing based upon the number of ASL lines. Two in each section is suggested to allow for multishift operations, leaves, details, and sickness. The stock records and warehousing would be most affected by estimates of number of ASL lines to be supported. Editing would increase on the basis of anticipated workload. Additionally, the requirement for at least two full time drivers, particularly in Europe and Korea, should be recognized. From a practical standpoint, both should be an E5, since most commands appear to require an E5 in the cab of a vehicle at all times when it is being operated. Reporting requirements may dictate a requirement for a reports clerk. Inclosure 2-33 portrays the reports submitted by units in USAREUR. TOE staffing of a tech supply should also consider vehicle maintenance requirements. The figures in AR 570-2 may take this into consideration in arriving at its authorization criteria. MAME-71 evaluators found that when a tech supply was faced with the problem of a high workload and a shortage of personnel, the operator maintenance of vehicles was among the lowest on the list of priorities. The quality of work in tech supply was the next to suffer.

The above discussion was intended to reflect some of the problem areas with tech supply staffing and to point out some of the considerations involved in adequately staffing a tech supply.

2.8.17.3. Summary.

The average missile maintenance tech supply today is understaffed. Comparisons of actual authorizations to MACRIT guidelines reflect wide deviations. Application of MACRIT would result in a greater number of personnel being authorized. However, an existing unit would find it very difficult to increase its authorization.

2.9. LAND COMBAT MISSILE SYSTEMS PROBLEM AREAS - TRAINING

2.9.1. Training Improvements - Pershing Enlisted MOS Courses.

2.9.1.1. Background.

Ordnance training for the PERSHING enlisted MOS is taught at the US Army Missile and Munitions Center and School at Redstone Arsenal, Alabama. Artillery training for the PERSHING enlisted MOS is taught at the US Army Field Artillery School, Fort Sill, Oklahoma. DA PAM 350-10, US Army Formal Schools Catalog, is the appropriate document for the courses referenced in this section of the report. The findings and recommendations herein pertain to the following resident courses:

MOS	COURSE TITLE	COURSE NO.
21M	Ballistic Missile Digital Equip Repair	150-21M20
21L	Ballistic Missile Guidance and Control Repair	121-21L20
46N	Ballistic Missile Electrical Mechanical Repair	631-46N20
15E	Pershing Missile Crewman	121-15E10
21G	Pershing System Maintenance	121-21G20

2.9.1.2. Analysis.

The information presented herein is a condensation of a large quantity of data gathered from supervisors and maintenance personnel in Pershing units. Individual questionnaire booklets were completed by a cross-section of Pershing personnel as shown:

PERSONNEL DATA

Rank:	E3	E4	E5	E6	E7	E8
Number:	1	4	13	8	12	2

MOS:	46N	21M	21L
Number:	5	7	28

Year Trained:	68	69	70	71
Number:	9	16	10	5

Unit Assignment:	DSU	GSU
Number:	30	10

In addition, this data is augmented by remarks from commanding officers and maintenance warrant officers.

The MAME-71 project personnel have collated the data from these varied sources, and this data has been arranged by specific MOS for which training is provided. Some of the responses received were pertinent to all or many of the PERSHING MOS courses.

These items are presented in a separate section at the beginning of the discussion of each MOS, and this portion should be consulted along with the specific MOS course recommendations in order to secure a total perspective.

2.9.1.2.1. All Pershing MOS Courses (General).

2.9.1.2.1.1. <u>Realities of the On-The-Job Training (OJT) Program in the Field</u>.

There is no formal OJT program in the Pershing units in the field. Although all units stated they had an OJT program, two of the four stated it was definitely informal. The other two units stated they had a formal program, yet, data indicated otherwise (all 40 individuals said no formal OJT existed). Of the four DS/GS units visited, only one used formal classroom training and that was used to train personnel on new equipment. The method of training most utilized was that of assigning the person to be trained to a higher skilled person. This form of training is generally not well supervised and no records are kept to determine training given and skills attained. Although the program is informal, all personnel interviewed felt it was effective.

Units felt that there was very little time available for OJT in any other form than that of assigning a repairman to a higher skilled individual for training. The limitations of this type of OJT are readily apparent and planners at all levels must be intimately aware of the fact that the scope of OJT in the field is necessarily limited due to the lack of time available to the unit for technical training.

2.9.1.2.1.2. <u>Requirement for OJT Prior to Being Qualified in the Field</u>.

Individuals were asked the question, "How many weeks of OJT are required upon arrival in a field unit?" The responses ranged from 2-26 weeks with the average being 9 weeks. The 9 week figure was corroborated by the unit missile maintenance officers. The areas of OJT required, as listed by field personnel, as shown below:

1. Major item troubleshooting.

2. Calibration procedures.

3. TAMMS.

4. Shop Procedures.

This list is rather short and does not cover all the OJT requirements. However, these are the areas of importance to the units in the field. The area of greatest concern in resident training was that the individual lacked sufficient knowledge in the use of tools, test equipment and technical manuals as well as a lack of knowledge of TAMMS procedures.

It was felt that the school should provide individuals to the field who are well versed in the use of tools, test equipment and technical manuals. The individual should have much more "hands on equipment" training and practical work experience. The ultimate goal is a repairman so trained that he can step into a unit and become a useful asset immediately. This most certainly would require a revamping of our training as now conducted and may well require that the training be conducted in the atmosphere of a unit in the field where the student is exposed to shop operations and tech supply operations on a daily basis. The difficulties in administration of a training program of this type are most certainly enormous. However, benefits of such a program would greatly outweigh the difficulties of administration. By reducing the requirements for OJT in the field, our supervisors can be free to administer their units in a more effective and efficient manner.

2.9.1.2.2. All PERSHING Enlisted Courses (Specific).

2.9.1.2.2.1. MOS 21L.

2.9.1.2.2.1.1. Troubleshooting Missile Assemblies.

Nine of ten personnel stated that TM 9-1410-375-34/2 was not used extensively when troubleshooting missile assemblies with the assembly tester.

2.9.1.2.2.1.2. Portable Test Equipment Theory.

Less theory in the area of portable test equipment is required.

2.9.1.2.2.1.3. Missile/PTS Interface.

Seven of eight personnel felt that the interface between the missile and the programmer test station is not taught adequately.

2.9.1.2.2.1.4. Troubleshooting PTS.

Six of eight personnel felt that more training is required in the area of troubleshooting the PTS.

2.9.1.2.2.1.5. Soldering.

Five of eight personnel felt that the soldering training received was adequate.

2.2.9.1.2.2.1.6. Test Equipment in SCTS.

Four of eight personnel felt that the training received on the operation of the test equipment located in the SCTS and electrical repair shop was inadequate.

2.2.9.1.2.2.1.7. Troubleshooting Guidance Section.

Supervisors feel that the training received on the guidance section is inadequate. The person coming out of school has no idea or concept of how to repair or troubleshoot the guidance section.

2.9.1.2.2.1.8. Power Generation Equipment.

Personnel need more training on the operation of power generation equipment.

2.9.1.2.2.2. MOS 21M.

Delete this MOS and assign duties to MOS 21L. This was a unanimous recommendation of personnel in the field.

2.9.1.2.2.3. MOS 46N.

2.9.1.2.2.3.1. Body & Fender Repair.

Personnel require more training in the area of body and fender type repair for launchers, containers, etc.

2.9.1.2.2.3.2. Pneumatic Test Set.

Personnel require more training in the use of the pneumatic test set used on the launching station.

2.9.1.2.2.3.3. C-Level Calibration.

Personnel require instruction on the C-level calibration of torque wrenches.

2.9.1.2.2.3.4. Use of SCTS.

The 46N repairman is used as an assistant operator in the SCTS during checkout of erector-launcher components and to a lesser extent during checkout of missile sections and components. He is rarely used when checking complete missile sections.

2.9.1.2.2.3.5. Repair of G&C Sections.

Two of 14 repairmen stated that they do replace components on the G&C section (e.g., cables, springs, hardware). However, none of the 14 repairmen questioned operate the PTS to check-out missiles in containers.

2.9.1.2.2.3.6. Test Equipment in SCTS.

Repairmen feel they receive adequate training on the operation of test equipment located in the SCTS and electrical repair shop.

2.9.1.2.2.4. MOS 15E.

2.9.1.2.2.4.1. Azimuth Laying Equipment.

Personnel re lacking training in the use and maintenance of azimuth laying equipment. Also, they have little knowledge of TAMMS procedures. One unit stated that training overall was too general and that personnel did not have enough knowledge of specific areas such as missile mating azimuth laying equipment, etc. The Pershing Laying Specialist Course (043-15E30) should solve the problem but evidently the 15E30 MOS is not getting to the field.

2.9.1.2.2.4.2. Fault Isolation.

The 15E crewman is deficient in the area of fault isolation techniques. He doesn't know how to diagnose and isolate an equipment malfunction.

2.9.1.2.2.5. MOS 21G.

Few problems were mentioned in MOS training for the 21G MOS. The most prevalent comment was that he needs to know more about the operation and maintenance of power generation equipment.

2.9.1.3. Summary.

PERSHING training overall is adequate for the needs of the field as far as providing an individual with the basic knowledge required to perform in an MOS. There is however, room for improvement.

Although the comments on training are general in nature, they serve as indicators of possible problem areas which need to be studied by the respective schools responsible for training. The problems mentioned above are as seen by the repairman and his supervisor in the field today and should be further investigated. The most important single problem is the fact that the school trained individual is not capable of performing immediately upon arrival in a unit. This stems from the fact that he is not familiar with tools and test equipment, technical manuals, and troubleshooting techniques. He has not had adequate time on equipment training. Further, the units in the field do not have the time to conduct a formal OJT program and therefore are unable to provide the individual with adequate training in a short period of time. It is necessary to provide the field with the "total" trainee who is capable of performing immediately upon assignment. It is also necessary to analyze the type and amount of training which service schools attribute to OJT type training.

2.9.2. Training Improvements - SERGEANT Enlisted MOS Courses.

2.9.2.1. Background.

Ordnance training for the SERGEANT enlisted MOS is taught at the U. S. Army Missile and Munitions Center and School at Redstone Arsenal, Alabama. Artillery training for the SERGEANT enlisted MOS is taught at the U. S. Army Field Artillery School at Fort Sill, Oklahoma. DA PAM 350-10, U. S. Army Formal Schools Catalog, is the appropriate document for the courses referenced in this section of the report. The findings and recommendations herein pertain to the following resident courses:

MOS	COURSE TITLE	COURSE NO.
46L	Sergeant Electrical Mechanical Repair	631-46L20
21R	Sergeant Firing Set Repair	121-21R20
21S	Sergeant Missile Guidance Repair	121-21S20
21T	Sergeant Test Equipment Repair	122-21T20
15B	Sergeant Missile Crewman	121-15B10

2.9.2.2. Analysis.

The information presented herein is a condensation of data gathered from supervisors and maintenance personnel in Sergeant units. Individual questionnaire booklets were completed by a cross-section of Sergeant personnel as shown:

PERSONNEL DATA

Rank:	E4	E5	E6		
Number:	6	11	1		
MOS:	46L	21R	21S	21T	
Number:	6	3	4	5	
Year Trained:	64	66	68	70	Unknown
Number:	1	3	4	8	2
Unit Assignment:	DSU	GSU			
Number:	11	7			

In addition, this data is augmented by remarks from Commanding Officers and Maintenance Warrant Officers.

The MAME-71 project personnel have collated the data from these varied sources, and this data has been arranged by specific MOS for which training is provided. Some of the responses received were presented in a separate section at the beginning of the discussion of each MOS, and this portion should be consulted along with the specific MOS course recommendations in order to secure a total perspective.

2.9.2.2.1. All Sergeant MOS Courses (General).

Comments in paragraph 2.9.1.2.1.1. and 2.9.1.2.1.2. apply to Sergeant training also. In addition, Sergeant trained personnel require on-the-job training in the following areas:

a. Troubleshooting techniques.

b. Identification of components.

c. Use of technical manuals.

d. Use of schematics.

e. Equipment operating procedures.

2.9.2.2.2. All Sergeant MOS Courses (Specific).

2.9.2.2.2.1. MOS 21R & 21S.

Personnel do not receive sufficient on-equipment training. They lack the practical knowledge required to repair items in the field environment.

2.9.2.2.2.2. MOS 46L.

2.9.2.2.2.2.1. Launcher Electrical.

Personnel are familiar with the mechanical portion of the launcher but are not sufficiently trained in the area of troubleshooting and repair of launcher electrical problems.

2.9.2.2.2.2.2. Mechanical Ability of Repairmen.

Personnel selected for training in this MOS seem to lack the inherent mechanical aptitude necessary to perform in the manner desired. In other words, the repairmen are "all thumbs" when it comes to mechanical dexterity.

2.9.2.2.2.3. MOS 15B.

2.9.2.2.2.3.1. TPI Instruction.

Personnel are not at all familiar with the requirements of a Technical Proficiency Inspection (TPI). Familiarization type instruction should be included in each MOS course where an individual is being trained as a crewman for a special weapons delivery unit.

2.9.2.2.2.3.2. Specialized Training.

Personnel do not receive adequate training in the area of AOS, OMTS and firing set. They are trained very well in the area of missile assembly.

2.9.2.3. Summary.

Sergeant training overall is adequate for the needs of the field as far as providing an individual with the basic knowledge required to perform in an MOS. There is however, room for improvement. Although the comments on training are general in nature, they serve as indicator of possible problem areas which need to be studied by the schools responsible for training. The problems mentioned above are as seen by the repairman and his supervisor in the field today and should be further investigated. The most troublesome feature of Sergeant training is that the personnel are not familiar with technical manuals, tools, test equipment and troubleshooting procedures. This is problem prevalent in all MOS training and must be corrected.

2.9.3. Training Improvements - LCSS System Enlisted MOS Course.

2.9.3.1. Background.

Ordnance training for the LCSS enlisted MOS is taught at the U. S. Army Missile and Munitions Center and School at Redstone Arsenal, Alabama. User maintenance personnel are trained at various service schools depending on the missile system. DA PAM 350-10, U. S. Army Formal Schools Catalog, is the appropriate document for the courses referenced in this section of the report. The findings and recommendations herein pertain to the following resident courses.

MOS	COURSE TITLE	COURSE NO.
27B	Land Combat Support System Test Specialist	121-27B20
27E	Wire Guided Missile System Repair	121-27E20
27F	Light AD System Electronic Repair	121-27F20
27G	Redeye Weapons System Repair	121-27G20
27H	Shillelagh Missile System Repair	121-27H20
45K	Turret Maintenance	643-45K20

2.9.3.2. Analysis.

The information presented herein is a condensation of data gathered from supervisors and maintenance personnel in LCSS units. Individual questionnaire booklets were completed by a cross-section of LCSS personnel as shown.

PERSONNEL DATA

Rank:	E4	E5	E6	E7			
Number:	14	26	14	4			
MOS:	27B	27F	27H	27Z			
Number:	14	11	23	10			
Year Trained:	61	67	68	69	70	71	Unknown
Number:	1	3	8	17	27	1	1
Unit Assignment:	DSU	GSU					
Number:	57	1					

In addition, this data is augmented by remarks from Commanding Officers and Maintenance Warrant Officers.

The MAME-71 project personnel have collated the data from these varied sources, and this data has been arranged by specific MOS for which training is provided.

2.9.3.2.1. All LCSS MOS Courses (General).

Comments in paragraph 2.9.1.2.1.1. and 2.9.1.2.1.2. apply to all LCSS training. In addition, the following comments apply to all MOS in Career Group 27.

1. Individuals require greater training in the area of TAMMS procedures.

2. MMCS instills the feeling in an individual that he is going to be a full time technician when he reaches the field. This is far from the truth. The individual must be prepared to face the numerous additional responsibilities that are placed on him by units in the field.

3. Individuals must be prepared to step into a field environment. Training should prepare him more for his assignment to a field unit.

2.9.3.2.2. All LCSS MOS Courses (Specific).

2.9.3.2.2.1. MOS 27B.

2.9.3.2.2.1.1. Non-operational Training Equipment.

Personnel indicated that the LCSS system used in training at MMCS was non-operational for periods of time and therefore the student did not receive enough equipment training. Since the scheduled equipment time is insufficient, it becomes extremely important that even this minimal equipment time be utilized. Additionally, the students would receive excellent training if they were allowed to repair the defective training equipment.

2.9.3.2.2.1.2. OJT Requirements.

The listing below provides an indication of the areas in which the individual requires additional training in the field.

1. Supply procedures.

2. Use of Technical Manuals.

3. English language programs for LCSS.*

4. Shop operations.

5. Troubleshooting techniques.

6. Use of Automatic Program Listing (APL).*

7. Electronic circuitry in LCSS.

*Units in the field have this information and feel it is necessary.

2.9.3.2.2.1.3. Training on Assembly Repair.

The individual should receive training on all assemblies run in the LCSS.

2.9.3.2.2.1.4. Training in Theory Required.

The training in theory provided in the course has proven to be a valuable asset to personnel in the field. This is one area which cannot be provided by OJT.

2.9.3.2.2.2. MOS 27E.

2.9.3.2.2.2.1. TOW Sight Disassembly.

Too much time is spent in school on the assembly and disassembly of the TOW sight. At present this is not done in the field.

2.9.3.2.2.2.2. Mounting Kit Training.

The repairman is not familiar with the theory and operation of the TOW mount used in mounting the TOW in an M113 armored personnel carrier.

2.9.3.2.2.3. MOS 27F.

2.9.3.2.2.3.1. Vulcan Radar.

Repairmen do not receive sufficient training in the area of the Vulcan radar and the Vulcan radar test set, AN/TPM-22.

2.9.3.2.2.3.2. Test Equipment.

Additional training is required in the area of test equipment operation and maintenance.

2.9.3.2.2.4. MOS 27G.

(See paragraph 5.5.3.).

2.9.3.2.2.5. MOS 27H.

2.9.3.2.2.5.1. Tracker and Transmitter Adjustments.

Repairmen are not capable of performing adjustment on the tracker and transmitter or the LCSS.

2.9.3.2.2.5.2. Missile Test Set.

More training is required on the Transmitter Signal Analyzer (TSA) and the fault locator of the Shillelagh Guided Missile System test set. Units in the field find that repairmen lack proficiency in the use of these items.

2.9.3.2.2.5.3. Mount, XM149.

Repairmen are not familiar with the effect a bad XM149 mount has on the missile system test procedures using the TCP. More theory of operation for the mount should be taught.

2.9.3.2.2.5.4. Sheridan Turret/Missile Interface.

The interface between the Sheridan turret and the Shillelagh Missile System is not understood by repairmen. For example, the overload relay between the 28V power source and the power supply is not taught. Yet, if it fails, the missile system becomes non-operational. Since the organizational turret mechanic is generally not well qualified on the Sheridan turret, the 27H is required to assist in the repair of turret electrical problems and must understand the relationship between the turret and the missile.

2.9.3.2.2.6. MOS 45K.

2.9.3.2.2.6.1. Electrical Turret.

The individual is lacking greatly in his knowledge of the Sheridan electrical turret. Generally, the repairmen understand the M48 and M60 turret but not the Sheridan. The individual is expected to be knowledgeable of too many systems. A new MOS specifically for the Sheridan/Shillelagh system seems to be the only way to provide the using unit with a turret mechanic who is qualified.

2.9.3.2.2.6.2. Missile System Knowledge.

The individual has little or no useful knowledge of the Shillelagh Missile System. The course must stress the interface between the missile and the turret.

2.9.3.3. Summary.

LCSS training overall is adequate for the needs of the field as far as providing an individual with the basic knowledge required to perform in an MOS. There is however, room for improvement. Although the comments on training are general in nature, they serve as indicators of possible problem areas which need to be studied by the respective schools responsible for training. The problems mentioned above are the problems as seen by the repairman and his supervisor in the field today and should be further investigated. The most troublesome feature of LCSS training is that the personnel are not familiar with tools, test equipment and troubleshooting procedures. This problem is prevalent in all MOS training and must be corrected.

2.9.4. <u>Printed Circuit Card Repairman</u>.

2.9.4.1. Background.

Early in 1971, CONARC requested comments on a proposed MOS to specialize in repair of printed circuit cards. During the MAME-71 survey, warrant officer maintenance personnel were asked what they thought of the idea of training a man whose only task would be to repair printed circuit cards. This man would repair the card after system peculiar personnel have isolated the malfunction.

2.9.4.2. Analysis.

The following are the responses received from maintenance personnel as recorded by the evaluator. They are divided into favorable and unfavorable groupings:

1. Favorable:

a. Likes the idea, but must have a qualified troubleshooter to isolate a malfunctioning component. PACE would be good equipment for him. Should be at GS level, particularly in multi-system support units. Not particularly valuable in SERGEANT because system repairmen are not now qualified to fault isolate a card component. (SERGEANT DSU)

b. Likes the idea, but wants the man very well trained in basic electronics and troubleshooting. Then he should be able to take any circuit card and troubleshoot and repair. (SERGEANT DSU)

c. Feels that the approach is a good idea if the man is highly trained and provided with adequate equipment (better than, or equivalent to, PACE). Must be taught the recognition, construction, and sensitivity of components and not so much how they work. Shouldn't be assigned below GS level. Workload at DS doesn't justify. (LCSS DSU)

d. Likes the idea of a printed circuit card repairman. Feels he should <u>not</u> be assigned below GS level. Would not be a tester; would be told <u>what</u> to replace on a card! This is assuming LCSS has the capability to fault isolate components on the card. (LCSS GSU)

e. Smartest idea the Army ever had. Need a man properly trained in piece-part repair. Give him PACE or other similar equipment. Do not give him any troubleshooting - give the man four to six weeks of basic electricity and electronics, although not vital. Must be well trained in soldering. Locate at GSU level. (LCSS GSU)

f. A good idea. Must define where function is to take place. Recommends that DS replace the card and GS repair it. System peculiar repairmen must still have fundamental knowledge so that he can understand readouts and recognize errors. Must know how to operate test equipment. (LCSS DSU)

2. Unfavorable:

a. Doesn't feel workload at DS/GS level would justify creation of a special MOS. Circuit boards should be repaired by systems peculiar personnel trained in troubleshooting. Circuit board should be repaired at DS level. (LCSS DSU)

b. Doesn't like the idea - feels is a waste of time. Card repair should be on an exception basis like the telephone amplifier card when the supply system runs short. Would not provide any special training in school. Provide a little more emphasis on soldering techniques at MMCS in system peculiar MOS courses. (PERSHING GSU)

c. Not good enough! Automatic test equipment in PERSHING will only isolate to a card level and, in some cases, to a circuit on the card. Manual troubleshooting still has to be performed, and this may involve removal of some components in order to determine faulty components. The MOS, by its nature, would be a limited field. What would the highest grade be? E5? What would he progress to? Would he be of limited usefulness to the unit when there are no cards to be repaired. If a man was trained, he would have to have a good background in the theory of electronics, with ability to read schematics and troubleshoot the card. Feels a much better solution is to skim off the top of PERSHING peculiar MOS classes (top 10%) and give two weeks additional training in repair of cards. Give him an additional skill identifier. This man would be of much more use to the unit in that he could then be used as a basic system repairman and also as a circuit card repairman. NEED PACE! (PERSHING GSU)

2.9.4.3. Summary.

The personnel questioned were generally favorable toward piece part repair in the field at GS level. However, better equipment is required, with PACE being mentioned frequently. The idea of a specialized MOS for repairing printed circuit cards met with mixed reaction, most favored it. Those that opposed the idea preferred that the system peculiar repairmen be better trained in troubleshooting and soldering techniques.

2.9.5. Malassignment of Missile Maintenance Personnel.

2.9.5.1. Background.

In theory, the enlisted personnel replacement system is designed to assign the "right man to the right place at the right time." Units report projected losses six months in advance. These projected vacancies are passed up the chain of command to the theater where they are translated into personnel requisitions in the form of grade and MOS requirements. These are then submitted to DA. Through a complex procedure of forecasting projected strengths and requirements for each MOS, training quotas are established and personnel trained. If all works well, a man should be available for assignment from school or another unit to satisfy a requisition from a major command. Since each requisition is submitted against a known loss, personnel should be assigned by MOS to a slot in a specific unit.

2.9.5.2. Analysis.

In most cases missile maintenance personnel trained at MMCS are assigned to missile maintenance units which need them. This is not always true; personnel are malassigned frequently enough for it to be considered a problem. Consider these examples:

1. A 46L20 SERGEANT electrical-mechanical repairman completed 13 weeks of training at USAMMCS and was reassigned to the U. S. Army Overseas Replacement Station, Fort Jackson, S. C. He was

given a reporting date of 2 May 1971 for further assignment to the 21st AG Replacement Battalion in Germany. The MAME-71 evaluator who talked to this man, was given a copy of a special order cut by the U. S. Army Personnel Center at Fort Jackson which reassigned him to the W24A Repl Reg Det, APO NY 09046 24AB, as a Repair Parts Specialist, 76A10. It was only through the man's persistence that he was finally able to find his way to a SERGEANT direct support platoon. He stated that all of his classmates were handled in a similar manner at Fort Jackson. Units in Germany were short authorized 46L personnel at the time of the MAME-71 report (see para 2.8.1.).

2. A 27B20 LCSS Test Equipment Specialist was originally assigned to a specific LCSS unit. Upon arrival at the 21st AG Replacement Station, he was assigned to a Military Police Company where he was used as an MP. After trying unsuccessfully through his chain-of-command to be reassigned he finally contacted his original unit of assignment. This unit was short 27B personnel at the time and successfully obtained his transfer.

3. Early in 1971, units engaged in direct support maintenance of the TOW Missile System were extremely short 27E (TOW Missile Repairman) personnel. At the time, 43 27E personnel had been trained either by Hughes Aircraft Company or USAMMCS. Of these 43, 35 were assigned on orders to Germany. Nineteen of these were force fill and 13 were assigned against valid USAREUR requisitions, orders for three were not available. Thirty-two individuals were sent to the 21st AG Replacement Battalion. These known mal-assignments occurred:

a. The entire first graduating class of ten 27E personnel was malassigned upon reaching Germany. After four months, eight were finally transferred to the 223rd and 116th Ordnance Detachments. The other two remained assigned to a conventional ammunition ordnance company and an administration company until one of the LCSS detachments formally requested their reassignment.

b. Three 27E20 personnel were malassigned to a maintenance battalion which had no use for their skills.

c. One 27E20 was assigned to a divisional maintenance battalion where he was assisting in repair of .50 calibre machine guns.

d. One 27E20 was assigned to a divisional maintenance battalion where he was being cross-trained as a turret mechanic.

The above examples reflect only those situations which were brought to the attention of MAME-71 personnel. They indicate a need for much tighter control of lower grade enlisted personnel assignments. The problem is particularly acute in regards to missile maintenance MOS because they are specialized, low density MOS. In most cases lengthy training, involving a considerable investment of money, is required. While it may be undesirable to establish special assignment procedures for these personnel, it must be considered necessary. Replacement centers and personnel sections are under pressure to lift "bodies" from the replacement stream to fill requirements for which needed MOS are not available, and they do. Until this problem can be eliminated, missile maintenance personnel should be assigned on orders directly to a DS or GS unit. This will not stop malassignment, as shown in example "2", above. However, it will reduce such actions.

2.9.5.3. Summary.

Malassignment of lower grade enlisted missile maintenance personnel is occurring. As a result many units are experiencing shortages in certain MOS which may have overages Army-wide. DA should initiate a policy of direct assignment of these personnel to units authorized these personnel.

2.9.6. <u>Quality of Tech Supply Personnel</u>.

2.9.6.1. Background.

Many complaints were received from units concerning the quality of personnel being assigned to fill tech supply positions.

2.9.6.2. Analysis.

To understand the complaints received about tech supply personnel, it is first necessary to be aware of the fact that school trained repair parts specialists are not being assigned to missile support units. For instance, rarely did a unit have more than one or two school trained 76R Missile Repair Parts Specialists. It appears obvious that one or two things are happening. First, school quotas and outputs are not sufficient to meet the field requirements and, secondly, MOS 76R20 personnel are being siphoned out of the replacement stream before they reach missile maintenance units.

E2 and E3 MOS 76A personnel are being assigned to the units in place of school trained repair parts specialists. While some of these individuals are very good and quite capable and willing to learn, a larger percentage are not.

1. The effects are as follows:

a. Units must spend an inordinate amount of time on OJT with few personnel qualified to conduct this training.

b. The general overall lower quality of personnel results in disciplinary problems.

c. Most missile units stock classified repair parts requiring security clearances for tech supply personnel. Many of those assigned by personnel offices cannot qualify for clearances. Thus, their utilization is restricted.

d. The overall quality of work done in the tech supply is lowered. Considering the high dollar value of many of the items stocked, loose accounting and stockage procedures, which are the result, are not desirable.

2. The solutions are as follows:

a. Widespread recognition of the complexity of supply procedures today and the requirement for qualified individuals capable of working with them.

b. Increased output of school trained individuals or tighter controls on assignments. It is not very intelligent to assign trained repair parts specialists to non-MOS related jobs, while tech supply sections are short the qualified individuals needed to run an efficient and effective operation.

2.9.6.3. Summary.

School trained tech supply personnel are not being assigned to units. The efficiency and effectiveness of the tech supply sections are reduced as a result.

2.10. LAND COMBAT MISSILE SYSTEMS PROBLEM AREAS - MATERIEL

2.10.1. Theater Missile Supply Support.

2.10.1.1. Background.

Doctrine generally separates direct and general support supply. Direct support supply of repair parts for missile systems is provided through maintenance channels and general support supply is provided through supply channels. Firing units obtain missile system peculiar repair parts from their designated direct support missile maintenance unit. Except for the PERSHING missile system, general support supply is provided by missile and aircraft repair parts companies to both direct and general support missile maintenance units.

Parts requisitions are transmitted through the appropriate Stock Control Centers (SCC) at Corps and Army level. The SCC of the Army support brigade directs release of available repair parts from a missile and aircraft repair parts company. Requisitions for nonavailable items are passed to the FASCOM Inventory Control Center (ICC) for transmission to the ICC of the TASCOM Supply and Maintenance Command (SMCOM). SMCOM ICC will direct release of the item from COMMZ stocks at a designated missile and aircraft repair parts company for direct shipment to the requisitioner.

General support supply for the PERSHING 1A missile system differs from the above in that it is provided by the PERSHING 1A Maintenance and Supply General Support Company (TOE 9-58). This company provides theater supply, stock control and receipt/issue of PERSHING Missile System repair parts. This is accomplished through the operation of a theater supply depot for all PERSHING Missile System repair parts less warheads, adaption kits, and automotive items. PERSHING DSU submit requisitions for system peculiar repair parts directly to the GSU supply depot, by passing the SMCOM ICC. The depot in turn, bypasses theater logistical channels and requisitions directly from the Army Missile Command (MICOM) National Inventory Control Point (NICP).

2.10.1.2. Analysis.

Organization for supply support for Land Combat Missile Systems at the time of the MAME-71 survey can best be described as diverse and fluid. Differences exist between each missile system within a theater and also between theaters. All supply operations varied significantly from current doctrine (FM 9-6 and 9-59). Consequently, each theater and missile system will be discussed separately.

1. The flow of repair parts to CONUS missile maintenance units is generally standardized. A typical example for medium cost/high density missile systems, e.g., SHILLELAGH, TOW, CHAPARRAL/VULCAN, supply support is depicted in inclosure 2-34. These were the only type land combat missile maintenance units surveyed in CONUS. All provided both direct and general support maintenance services. Organizational maintenance for these systems is generally restricted to troubleshooting and replacement of malfunctioning assemblies. Supply support for the user PLL is provided by the installation supply office. Flow of assemblies between the user and its maintenance unit is restricted to direct exchange actions or items job ordered to the maintenance unit on DA Form 2407 Maintenance Requests. Missile maintenance units submit repair parts requisitions through their respective installation supply activity. The requisition may be filled at post level, if stockage is maintained, or passed to the NICP. The NICP will direct the appropriate CONUS depot to ship the required repair part to the requisitioner. This system is generally responsive within the limits of repair parts availability and priorities established for CONUS units. However, many of these units are not authorized to maintain an ASL. This restriction is bypassed by calling repair parts stockage "shop stock". One installation prohibited its units from maintaining DX stockage. In practice, these restrictions simply create unnecessary obstacles and make it more difficult for CONUS units to perform their maintenance mission.

2. USAREUR is in the process of establishing a system for missile peculiar repair part supply similar in concept to the doctrinal PERSHING peculiar system described in paragraph 2.10.1.1. At the time the MAME-71 survey was conducted, supply support consisted of two distinct methods: PERSHING, as one type, and SERGEANT and medium cost/high density missile systems as the other. Each of these systems will be treated separately. However, a close look at the current USAREUR support structure for PERSHING 1A is necessary, because it is essentially the model after which the other systems will be patterned.

a. Inclosure 2-35 depicts the flow of PERSHING 1A missile system peculiar repair parts. Supply support provided by the DSU to the firing unit consists primarily of direct exchange of missile repair parts and assemblies with recoverability codes of R, S and T. General support supply is provided by a depot supply activity which is organic to the PERSHING 1A general support maintenance company (579th Ordnance Co.). This depot provides theater supply, stock control, receipt and issue of PERSHING missile system repair parts. The DSU and the GSU tech supply submit requisitions for missile system peculiar repair parts directly to the depot. The depot will either fill the requisition or pass it to the MATCOM ICC for transmission to the CONUS NICP. Therein lies the major difference between the doctrinal PERSHING supply support system and that of USAREUR. Doctrine provides for a "stovepipe" directly from the GSU to the MICOM NICP. USAREUR utilized the "stovepipe" when PERSHING 1A was initially deployed to the theater, but has since placed the requirement on the GSU depot supply activity to requisition through the MATCOM ICC. Reaction of most personnel interviewed indicated that insertion of an additonal activity in the supply system between the GSU and MICOM decreased overall responsiveness by increasing order and ship time and increasing the opportunity for errors.

b. Supply support for the SERGEANT Missile System and medium cost/high density missile systems in USAREUR is provided by system dedicated general support missile maintenance companies. The 575th Ordnance Company (GS) provides support for the SERGEANT and the 563d Ordnance Company (GS) supports all medium cost/high density missile systems. Each of these units has an organic supply depot of missile system peculiar repair parts. However, these depots do not have any stock accounting capability. They serve only as storage and issue facilities, while stock accounting records are maintained by MATCOM. Inclosure 2-36 shows the flow of repair parts within these systems. The primary difference between the PERSHING Supply System and this system is the requirement for DS and GS tech supplies to submit requisitions to MATCOM ICC. This requirement stems from the lack of stock accounting capability at the depots. Most personnel interviewed were very dissatisfied with the requirement to submit requisitions for missile system peculiar parts to MATCOM. High rejection/cancelation rates for first submissions, errors and slow response time were cited as major disadvantages. However, some individuals were pleased in that they were only required to submit requisitions, including non-missile peculiar repair parts (engineer, automotive, etc), to one location. GSU personnel indicated that their depot activities will be given stock accounting capability in the future and that DSU will then requisition directly from the depots.

c. Repair parts flow for the SERGEANT Missile System in Korea is quite similar to that in USAREUR, except that the GSU does not now have depot stock. Inclosure 2-37 depicts the current supply support system. The DSU and GSU submit requisitions to the Korean Support Command (KORSCOM) Inventory Management Center (IMC).

KORSCOM IMC directs release of the necessary parts from ASCOM Army Depot. The IMC is also responsible for passing actions and requisitioning replenishment stockage from CONUS. Inclosure 2-38 indicates changes planned for future implementation in Eighth Army. The Missile Support Element (MSE) 30th Ordnance Company (GS) now stocks only HAWK peculiar repair parts. This stockage will be expanded to include all missile systems. The MSE will be reponsible for stock accounting, receipt, storage and issue. The DSU and GS shops will then submit requisitions directly to the MSE. The MSE will either fill these requisitions or pass them to CONUS. KORSCOM ICC and ASCOM Army Depot will not be involved in supply of missile repair parts. Thus, a separate and dedicated supply system is being established at the GSU level with direct access to CONUS.

2.10.1.3. Summary.

The trend today is toward separation of missile supply support channels from normal supply channels in overseas theaters. USAREUR, with the greatest number and variety of missile units, is collocating its depot stockage and accounting facilities with system peculiar general support units. These units will act as the supply source for all supply transactions at general support level and below. Requisitions will continue to flow from the depot through the ICC to CONUS. Eighth Army has one GSU supporting all missile systems and is also planning to locate its depot at that level. However, the missile supply support system will be completely independent with direct access to CONUS. Eighth Army, in essence, is implementing the doctrinal PERSHING "stovepipe" for all missile supply support. USAREUR has not gone quite that far, but should seriously consider doing so. It would mean a net increase of three requisitioners on the MICOM NICP; but the increased responsiveness to the field would offset this.

2.10.2. <u>USAREUR Program for Direct Exchange of PEMA Secondary Items</u>.

2.10.2.1. Background.

On 1 July 1971, U. S. Army Materiel Command, Europe (MATCOM) established a direct exchange program for reparable PEMA Secondary Items. This program was announced in a special edition of the MATCOM <u>Customer Assistance Logistics Bulletin</u>, dated 10 September 1970, under the subject title of "PEMA Secondary Items Exchange Procedure." Another special edition was published in April, 1971, incorporating changes made to the program after operating experience was gained. The objectives of the program are to:

1. Assure that serviceable PEMA Secondary Items are issued, so far as possible, upon concurrent receipt of a like unserviceable item.

2. Insure positive and immediate control by USAMATCOMEUR of unserviceable, reparable components.

3. Provide efficient, effective service to the customer with a minimum delay.

4. Reduce order/ship time and theater levels.

5. Assure optimum utilization of serviceable assets, both on hand and generated by maintenance facilities.

All reparable PEMA Secondary Items on the Theater Authorized Stockage List (TASL) are included in the program. Replacement of these items does not occur unless a like unserviceable is turned in, accounted for as a loss, or an initial issue requirement is established.

2.10.2.2. Analysis.

Missile maintenance efforts are oriented toward the idea of getting the customer back on the air as soon as possible after a malfunction has occurred. The modular design of the newer Land Combat Missile Systems lends itself quite readily to a "repair by replacement" concept at the user level. When a malfunction can be fault isolated to a specific subassembly, the user or a contact team from support maintenance can exchange it for a serviceable one. For this reason, the establishment of the PEMA Secondary Items Exchange Procedure by MATCOM is worth noting.

MATCOM prepares DX lists for each missile system. These are divided into two parts, (1) PEMA Secondary DIRECT Exchange Items and (2) PEMA Secondary NON-DIRECT Exchange Items. The lists are furnished to appropriate depot activities and supported units.

In operation, the system works as follows: Each DSU has established a DX point with stockage selected from items appearing on the PEMA Secondary Direct Exchange List. Generally, all system peculiar items with a recoverability code of R, S, and T, are on this list. Users will direct exchange an item with their supporting DSU using a DA Form 2402. When an item required by the using unit is not available at DSU, the DSU will DX with the GS maintenance activity using a DA Form 2402. If not available at the GSU, an informal due-out is established and the GSU then initiates a DD Form 1348-1 turn-in document for the unserviceable item and a

DD Form 1348 requisition for a serviceable item. These are submitted to the GSU depot supply activity where release is made if stock is available.

Repair of items which have been direct exchanged takes place at the level at which the DX action occurs. If it is beyond the repair capability of a DSU, it must direct exchange with the GSU, as above. In no case, may a DSU job order an item on the PEMA Secondary Direct Exchange List to the GSU. In the case of a depot activity, it will job order its unserviceable stockage to the GSU maintenance activity on a DA Form 2407.

Missile support unit personnel were generally well pleased with the DX system as were user personnel. The system has apparently succeeded in its goal of providing fast, efficient and effective service to the customer. One of the tangible benefits of the system is the reduction in paper work between the user and the DSU and between the DSU and GSU. A DA Form 2402 is used in place of the DA Forms 2407, 2765, and 2765-1 previously used for items appearing on the DX list.

Only two problem areas really surfaced. One was related to a general shortage of repair parts. The system breaks down when parts are not available to repair the unserviceable items which have been exchanged. The other dealt with lack of MTOE staffing of personnel to operate the DX point. These have to be taken from unit assets.

One problem did occur during the initial phase. The MATCOM computer which processes requisitions for repair parts was programmed to reject requisitions for PEMA Secondary Items. All existing requisitions for these items were cancelled and units had to scramble to locate turn-in documentation for unserviceables. This necessitated establishment of turn-in credit so that direct exchange could be effected when assets became available. It was only midway through the MAME-71 visit (May-Jun 71) that support units finally began receiving DX lists from MATCOM. Prior to that time, these units were blindly submitting requisitions with a resultant fallout of rejections/cancellations from MATCOM.

2.10.2.3. Summary.

A theaterwide direct exchange program for PEMA Secondary Items has been initiated in USAREUR. The system has proven to be responsive and user and support level maintenance personnel alike, are pleased with its operation.

2.10.3. Impact of the Army Stock Fund at DS/GS Level.

2.10.3.1. Background.

The Army Stock Fund is essentially a uniform system of money management. At the unit level, it provides a means of financing the purchase of repair parts based upon budgeted allocations.

2.10.3.1. Analysis.

Application of stock funding varies from unit to unit depending upon the financial accounting policies of a major commands involved. Personnel at the unit level exhibited very little understanding of the Army Stock Fund. This analysis is being written from their viewpoint in an attempt to illustrate the impact the Stock Fund has on maintenance operations.

Unit personnel generally felt that stock funding of repair parts has an adverse affect on maintenance operations. Two main problem areas were cited:

(1) Stockage levels were not being adequately maintained due to lack of funds to submit replenishment requisitions, and (2) both Corps in USAREUR ran out of money at one time or another during FY71, which resulted in units having to cancel all outstanding requisitions or cease submission of replenishment requisitions. These problems were caused by a combination of fund shortages and probable inadequate financial management.

Financial management at the unit level varied from none to imposed budget ceilings which could not be exceeded. The following is a summary by system and theater.

1. Medium cost/high density missile systems:

a. CONUS - Of the three DS/GS units visited only one indicated that it was under a budget ($15,800 per year) and was required to maintain records of expenditures. It had experienced no shortage of funds, although adjacent units on that post were under funding constraints resulting in large backlogs of work orders due to lack of repair parts. The other two units had both experienced repair parts shortages due to funding problems at post level. In one unit, replenishment requisitions were halted, and in the other, 02 NORS requisitions were the only type allowed to pass. It was indicated that the high dollar value of some missile repair parts created problems for posts with limited funds.

b. USAREUR - Each of the two Corps DSU supporting SHILLELAGH, REDEYE and TOW operated differently. One unit was under a monthly budget and was required to maintain records of expenditures for repair parts. Close management supervision was required to insure that the budget was not exceeded. The main impact was in the area of replenishment requisitions. Daily decisions had to be made as whether to order for replenishment or save funds for shop use in requisitioning specific repair parts to complete a job. The other Corps DSU indicated that stock fund money was retained at Corps level with all units requisitioning against the "pot". The Corps was experiencing funding problems and the unit was not able to submit replenishment requisitions. The only requisitions allowed were those for critical items at "0" balance and against a job order on a deadlined piece of equipment. The unit was experiencing repair parts shortages which prevented it from repairing DX items. As a result, some cannibalization was occurring. The theater GSU was required to maintain a record of expenditures but was not having any funding problems.

c. EIGHTH Army - The one divisional CHAPARRAL/VULCAN detachment visited was not required to maintain expenditure records at its level. No funding problems were indicated.

2. SERGEANT:

a. USAREUR - SERGEANT funding in Germany appeared to be handled in the same manner as medium cost/high density systems. One Corps DS platoon was under an $8,000 monthly budget ceiling with the resultant requirement to maintain a record of expenditures. The supply clerk keeps a running tally and a monthly report is sent to the battalion S-4. The budget generally presented no problem, although one requisition could deplete the entire fund. In December 1970, the Corps ran out of money and the battalion was told not to requisition any stock funded repair parts until further notice. All existing requisitions for stock funded repair parts were cancelled at that time. This constraint was lifted about 15 January 1971 and the unit then submitted requisitions for all cancelled items. Credit for turn-ins or unused money went to the Corps. In the other battalion, the DS platoon was not aware of any budget ceiling for repair parts although a record of expenditures was maintained at battalion staff level. At the time of the MAME-71 visit, most stock funded repair parts were fringe items. This was primarily due to the extensive DX program in effect at that time. The theater GSU was not experiencing any problems in its tech supply. However, the block modification teams were placing demands upon the GSU tech supply which were not programmed for. These teams were using the GSU tech supply as a source of repair parts to keep their equipment operational.

SERGEANT personnel were very concerned with an impending change of DX items coded R, S, and T to stock funding. One individual stated that about 800 lines of PEMA Secondary Items would be redesignated as stock funded on 1 July 1971. All opposed this action and stated preference for the DX system then in effect.

b. Eighth Army - DS personnel contacted in the SERGEANT battalion in Korea were not aware of any funding ceilings at their level and were not required to maintain expenditure records. No funding problems were cited.

3. PERSHING - USAREUR PERSHING battalions were apparently operating under budgets since two of the three said they were. However, no one was paying any attention to the ceiling. Only one stated that it maintained a record of expenditures, although it continually exceeded the budget and had never experienced any problems.

2.10.3.3. Summary.

From the foregoing analysis, it is obvious that stock fund management is not uniform at Corps and unit level. Personnel do not understand it. They are concerned only with obtaining the repair parts necessary to complete job orders. Most CONUS and USAREUR missile maintenance units were experiencing fund shortages which reduced or prevented submission of replenishment requisitions. This, in turn, was hampering maintenance efforts by increasing the average time to repair due to parts shortages and "0" balances of ASL items. Whether, the funding problems are due to Army-wide fund shortages, inadequate programming, inadequate management, or all three, is unknown. However, a close look should be taken in this area and an effort made to standardize procedures at the unit level. FM 9-6 and 9-59 should include sections on the Army Stock Fund which clearly explain the purpose and operation of the system.

2.10.4. <u>Mechanization of the DSU Tech Supply in USAREUR</u>.

2.10.4.1. Background.

The TOE for Land Combat Missile Maintenance Units make no provision for mechanized stock accounting in tech supply.

2.10.4.2. Analysis.

USAREUR is presently engaged in a program to automate tech supply operations in missile direct support units. This is being accomplished primarily by satelliting missile DSU on nearby maintenance units authorized an NCR 500. A mechanized stock control school has been established at Oberamergau to train tech supply personnel in the use of the NCR 500. After returning to the unit, these personnel, with the assistance of the Computer Systems Command, convert their manual stock records to NCR 500 ledgers. Most missile DSU will time share the NCR 500 with the owner on a two shift basis. Each unit furnished its own supply personnel to operate the NCR 500 during its shift.

One Corps DSU reported that its battalion planned to consolidate all stockage at battalion level. Each individual unit ASL will retain its identity and be stocked in separate trailers. This is to aid in identification in the event a unit is required to move out. The DSU, however, plans to retain 20-30 percent of its stockage on a manual system. Lines to be retained are secondary and classified items.

Pershing DSU reported rumors of a change to NCR 500 accounting procedures. Date of the changeover was unknown.

Response to conversion to NCR 500 was generally favorable. However, MTOE should be submitted to document personnel requirements.

2.10.4.3. Summary.

USAREUR is converting missile tech supply operations to NCR 500. This is being accomplished by satelliting them on units now authorized an NCR 500.

2.10.5. <u>The Army Master Data File</u>.

2.10.5.1. Background.

The Army Master Data File (AMDF) is available on microfilm for use by tech supply operations. Updates are distributed monthly to those units on the mailing list.

2.10.5.2. Analysis.

Of the 16 Land Combat Maintenance Support Units visited, only six were using the AMDF on microfilm in their tech supply. Two of these were USAREUR general support units having NCR 500's. All three PERSHING DSU in USAREUR were authorized film readers, although tech supply procedures were manual.

Response to the microfilm AMDF was enthusiastic. Units were particularly pleased with the monthly updates received. However, the fact that the AMDF was more current than some parts TM, created some problems in cross referencing. Occasionally, the MATCOM ICC computer rejected new FSN because they had not yet been entered in its data base.

2.10.5.3. Summary.

Units are pleased with the microfilm AMDF. However, only six of 16 Land Combat Maintenance Units visited were authorized the film reader.

2.10.6. <u>Demand Criteria for Missile System Peculiar Repair Parts</u>.

2.10.6.1. Background.

AR 711-16 establishes stockage criteria for Authorized Stockage Lists (ASL) of direct and general support units. Among the items which are contained in DS/GS authorized stockage lists are:

1. Demand supported items.

2. Operational readiness float items when specifically authorized.

3. Initial stockage.

4. Items on the Direct Exchange List.

Normally, six demands in the most recent 360 day period are required to add an item to the ASL. The item must continue to experience at least six demands during each 360 day period in order for it to be retained on the ASL. Major commanders do have the authority to apply less stringent stockage criteria and must inform DA if such action is taken. AR 711-16 states that the DA guidelines for demand criteria are "designed to provide an economic yet reasonable demand accomodation of 80 percent." Demand accomodation is the percentage of all requisitions received which match line items contained in a unit's ASL.

2.10.6.2. Analysis.

Missile unit maintenance personnel were very unhappy with the shortages of repair parts. They felt that their maintenance backlog was unnecessarily high. One of the most frequently cited problems was the lack of authority to stock needed repair parts because of unrealistic demand criteria.

Demand accomodation for all Land Combat Missile Maintenance Units visited in USAREUR averaged 60%, ranging from a low of 28% in a SERGEANT DSU to a high of 74% in a PERSHING DSU. By type system the following averages were computed based on data provided by direct support units:

SYSTEM	DEMAND ACCOMODATION
Medium Cost/High Density	31%
SERGEANT	34%
PERSHING	67%

Compare these figures to the 80% goal stated in AR 711-16 and you get the impression that unit personnel are perhaps justified in stating that lack of repair parts is the most frequent cause of delay in returning equipment to a serviceable condition.

It is assumed that the criteria of six demands per year is predicated upon 360 day usage of equipment. This is perhaps a realistic assumption for more conventional equipment in the Army inventory, such as automotive equipment. The criteria may also be considered realistic for those items which are common to most units and therefore exist in sufficient density to generate the necessary demands. Existing Land Combat Missile Systems meet neither of these conditions, at least not to the extent that more common items do. Again, a discussion concerning Land Combat Missile Systems must necessarily consider each system separately.

The problem of stocking the required repair parts is perhaps most critical for SERGEANT Direct Support Platoons (DSP). Each DSP in Europe supports four firing batteries. Each battery has one launcher, for a total of four launchers per battalion. Obviously, the density of systems is low. High usage rates for each system would have to exist in order to obtain demand data to meet the stockage criteria. However, this situation does not exist. Each platoon fires one missile annually, funds permitting. Training, while supposedly a year round effort, is conducted at a low level until just prior to the annual firings. At this time, perhaps one or two months in advance, training is intensified in order to prepare the launch crews for the firings. Emphasis on organizational maintenance by the user generally follows the training cycle. It can be expected to reach its peak just prior to the firings and drop shortly thereafter. Deletion of battery maintenance warrants by MTOE action has also reduced emphasis on maintenance. Obviously, the training and maintenance cycle is very restrictive and does not produce the demands necessary to stock critical repair parts.

Medium cost/high density systems have problems very similar to Sergeant. The training and maintenance cycle is also keyed to annual service firings. Between firings, personnel turnover, lack of training areas and emphasis on other activities generally tended to reduce training and maintenance time. Equipment usage is reduced proportionately, resulting in a low demand rate for repair parts. Another aspect contributing to the low demand accomodation which should be considered, is the length of time these systems have been fielded. They are relatively new and in most cases have not begun to show the deterioration of continued usage and age. Failures are generally random with insufficient repetition to meet stockage criteria.

Employment of PERSHING 1A is characterized by the requirement to maintain one battery in each battalion at full alert readiness at all times. The remaining batteries are maintained in varying degrees of readiness, ranging from a condition of being ready to move out to a firing site to one of maintenance standdown. It is safe to say that PERSHING is exercised far more frequently than SERGEANT and medium cost/high density systems. As a result, equipment is malfunctioning as it might under fully operational conditions and recurring demands for repair parts are being placed on the supply system. This enables the DSP to stock a greater number and wider variety of repair parts needed, resulting in a demand accomodation twice as high as the other systems.

Suggestions to solve stockage problems fell in two categories. The first solution would be to decrease the demand criteria. However, while one individual in an LCSS unit stated that USAREUR had reduced his demand criteria to three demands in 360 days, it had not increased his ability to match requisitions against the ASL.

The most frequently recommended solution by unit personnel would be to increase the line items designated for mandatory stockage. Most wanted a voice in what was to be designated. They felt that this solution offered the most practical way to effectively support their particular system. The stockage level of each item would be a minimum, subject to increase based on demand data.

Ideally, the solution should incorporate a little of both. Mission essential parts should be designated for mandatory stockage for each system. Maintenance personnel should be consulted prior to preparing a list of mandatory stockage items so that "ground level" experience can be provided to supplement engineering predictions. Mandatory stockage levels should be only minimums, subject to upward revision based on demand data. Demand criteria should be reduced to compensate those systems which are experiencing low usage rates.

2.10.6.3. Summary.

Demand criteria is unrealistic for missile system peculiar repair parts. Low system densities and utilization rates adversely affect stockage of critical repair parts by reducing demands below DA criteria. The result is low demand accomodation rates despite current mandatory stockage lists. Unit personnel are recommending that the number of mandatory stockage lines be increased and that stockage levels be designated as minimums, subject to upward revision if demand experience dictates. Unit maintenance personnel should be consulted prior to publishing mandatory stockage lists.

2.10.7. Cannibalization as a Source for PERSHING Repair Parts.

2.10.7.1. Background.

Repair parts are assigned a source code which indicates the selection status and source for a particular item. One of the source codes provided is "X_2" which indicates that a particular repair part is not stocked. A maintenance activity requiring such a part must attempt to obtain it through cannibalization. If the part is not available through cannibalization, the unit will requisition through normal supply channels with accompanying justification.

2.10.7.2. Analysis.

PERSHING maintenance personnel indicated dissatisfaction with the practice of designating certain repair parts with "X_2" source code. The density of the PERSHING System is too low to support a cannibalization point. Therefore, no "X_2" coded items are available. They would prefer that these items be stocked.

2.10.7.3. Summary.

Consideration should be given to stockage of PERSHING repair parts currently source coded "X_2". They are not available through cannibalization points.

2.10.8. Repair Parts Shortages.

2.2.10.8.1. Background.

Personnel interviewed were asked to identify repair parts shortages they were experiencing.

2.10.8.2. Analysis.

The subject of repair parts shortages was a very sensitive area for discussion with most maintenance personnel. When asked the most frequent cause of delay in repairing an item, all but one or two said lack of repair parts. Production control statistics and the quantity of open requisitions in tech supply tend to confirm their reply. The chart at Inclosure 2-39 is a tabulation of the status of production control and supply efforts in each unit visited. Also portrayed are the average workload figures for a 30 day period. This will give an indication of the backlog of job orders due to lack of repair parts.

Several reasons exist for the repair parts shortages, some of which have already been mentioned elsewhere in this report. Among these are:

1. Unrealistically high demand criteria required to be met in order to add an item to the ASL or to retain it.

2. Stock fund shortages which prevent units from submitting replenishment requisitions to meet actual requirements. This results in stockage of fast moving items being reduced to zero.

3. Stock fund shortages which result in units being forced to cancel all requisitions or prevent submission of any new ones.

4. High cancellation/rejection rates by Inventory Control Centers. This was a particularly sore point with all units visited in USAREUR. Rejected or cancelled requisitions are returned to the requisitioner about 10-15 days after submission to the MATCOM ICC. This represents 10-15 days additional delay before items can be repaired and returned to stock or to the user. Quite frequently, it required two or three submissions to MATCOM before a requisition would be accepted. Field personnel do not like having requisitions rejected and returned with a code stating essentially, "If you still need this part, resubmit with advice code___". They were of the opinion that if they did not need the part in the first place, they would not have submitted the requisition. The "fill or kill" requisition is not too popular.

5. Turn around time for circuit cards repaired only at CONUS depots is too long. This time must be shortened in order to support field requirements for these cards.

6. Purchase quantities of some repair parts are apparently inadequate to support actual field requirements.

The following is a listing of repair parts shortages reported by Land Combat Missile Maintenance personnel. Comments made by the personnel interviewed are included:

1. Medium Cost/High Density Missile Systems - USAREUR:

a. CHAPARRAL, LCSS and SHILLELAGH circuit cards. These cards are not repairable in theater. They are returned to CONUS depots for repair and return to stock. Personnel interviewed felt that the turn-around time from CONUS was too slow. The units are returning cards to CONUS, but not getting any back.

b. Conduct of Fire Trainer (COFT). Limited or no provisioning for COFT in theater. One individual stated that COFT parts were not on the TASL and that there were no COFT parts in theater. One unit reported that some COFT job orders had been open nearly a year awaiting parts.

c. TOW repair parts - One individual stated that there was no TASL for TOW in Europe, although some cards came in initially. According to him, USAREUR rejected the MICOM SLAC deck and said TOW would be demand supported and that it would not buy any repair parts.

2. CHAPARRAL/VULCAN - Korea

a. "Extremely difficult to get piece parts for the VULCAN."

b. "Repair parts for commerical test equipment are non-existent."

3. SERGEANT - USAREUR

a. Time generator assembly.

b. 3G52 Assembly (Training Set). Needs parts, but can't get any. The MATCOM computer cancels all parts requisitions for this item; will not fill or pass any requisitions. RESULT: Batteries have to use tactical rounds for training.

4. PERSHING - USAREUR

a. Squibs, initiators, explosive cartridges - Items are controlled by serial number and are short in the theater. Release procedure is slow. DSU calls AWSCOM. AWSCOM givès the DSU a due-in control number and then calls the GSU to give the MRO.

b. Cable ends.

c. PERSHING peculiar general supply items (lightbulbs, sockets, switches).

d. Walter-Kitty air compressors (for the power station).

e. Theodolites.

f. PTS headsets (Evaluator's Note - A large quantity of at least 15 to 20 were located at the GSU awaiting repair. The artillery personnel seem to be mishandling these and breaking them).

g. Selected Circuit Cards - (Evaluator's Note - The telephone amp card is one that was specifically mentioned. In this case, the artillery batteries still have a number of old PERSHING PTS headsets on hand and are still using them. This headset has a different impedence than the new PERSHING 1A headset, and the telephone amp card is "blowing" as a result).

h. Mil standard engines (1.5, 3 and 5 KW).

i. Selected cables for the cable mast.

j. Teleprinter repair parts.

k. Remote control keylocks in the CDCP.

l. Klystron tubes for the TRC-80.

m. TRC-133 parts.

n. The CDCP power supply.

o. Circuit breakers for the erector-launcher control box.

p. Cable tester parts.

q. Soldering irons, masking tape.

r. One DSU stated that it had been receiving new ST 120 which did not work.

2.10.8.3. Summary.

Missile maintenance units are experiencing repair parts shortages which seriously affect their maintenance mission. Specific shortages are listed as are some reasons for these shortages.

2.10.9. Commercial Vehicles for Direct Support Units.

2.10.9.1. Background.

Personnel in every tech supply visited in USAREUR begged for a commercial truck to be used for supply, maintenance, and transceiver runs.

2.10.9.2. Analysis.

Tactical vehicles are not withstanding the constant use and abuse they are subjected to in support of tech supply and maintenance operations. In USAREUR, these vehicles are used daily on autobahns and hard surface roads to make supply runs to depots, to take requisitions to transceiver sites and to haul job ordered equipment between direct and general support maintenance shops. Transceiver sites are located as far away as 80 KM, one way, from maintenance units. Some direct support units are required to haul parts and job orders distances in excess of 150 miles one way. Trips of this distance are often two day round trips considering road and weather conditions in some locations.

The maintenance problems and deadline rate for these vehicles were a constant headache for direct support units. Apparently, operation of these vehicles over great distances at highway speeds is tearing them up. Additionally, they present a safety hazard to commercial and public traffic, particularly on two lane roads. They just don't have the power to keep pace with traffic. This endangers both civilians and military personnel.

It seems apparent that a problem exists which could easily be solved by furnishing these units with commercial trucks for peacetime operations. All the personnel interviewed favored, indeed suggested, this action be taken.

AR 310-49 makes no provision for adding commercial vehicles to MTOE. This could easily be rectified by making a provision for adding a Section IV to MTOE to meet situations such as that described here. Another solution would be to place them on the USAREUR TDA or at some intermediate level where a TDA currently exists.

2.10.9.3. Summary.

Use of tactical vehicles to make daily long distance trips to meet supply and maintenance requirements is not satisfactory. Every Land Combat Missile Maintenance Unit visited in USAREUR complained about the maintenance problems and the length of time these trips took. Use of tactical vehicles also constitutes traffic and safety hazzards for other drivers.

2.10.10. Deficiencies in Land Combat Equipment Authorizations.

2.10.10.1. Background.

Units in the field are authorized equipment by TOE, or in some cases by direct provisioning by the project manager. These authorizations can be modified, with adequate justification, by MTOE action. The process for modifying these assets, or in acquiring and turning-in items, is usually a cumbersome and involved process. The field survey addressed the matter of equipment authorizations; and, more particularly, the current deficiencies in item provisioning.

2.10.10.2. Analysis.

Considerable data was accumulated in the area of equipment authorizations, for all systems, at the direct and general support level. In some cases, there was almost complete correlation of all units contacted and in other cases there were isolated recommendations. Although this data was compiled from literally hundreds of questionnaire booklets and analytically compared for accuracy and applicability, no attempt has been made to make a detailed comparison of these items with the TOE authorizations or changes that may be in process on TOE. It is believed that the current materiel experts at USAMICOM and the proponent agency of USACDC are in the best position to evaluate and validate whether the equipment proposals are valid and attainable.

The following portrayal is organized into four parts: Pershing, Sergeant, LCSS and Chaparral/Vulcan. Subsequently, each of these parts is further subdivided into two categories of recommendations: one for items which our data indicates warrant priority action or which a majority of respondents cited; and one for those items that were cited by a minority of units. The relegation of an equipment recommendation into the latter category does not in any way deminish the importance of the item since it may have been coincidental that a minority of respondents recalled that particular deficiency. As will be cited in this portion of the report, some recommendations will be for equipment deletion, some for equipment addition, and some for equipment type substitutions. The latter category generally consists of items that are obsolete for support operations and require a suitable substitute. Annotation will be made as to whether the recommendation pertains to the authorization for DS, GS or both.

2.10.10.2.1. Pershing Equipment.

2.10.10.2.1.1. Priority Recommendations.

2.10.10.2.1.1.1. ADD - 10,000 LB Capacity Forklift (one per DSU).

This item is required to move 1st and 2nd stages as well as other heavy items in and around the shop. The wrecker is not satisfactory since it is a safety hazard to put a 1st stage in the shop using a wrecker. One unit uses the wrecker and in order to get a 1st stage in the shop building the boom had to be extended to maximum length and then move the wrecker into the shop. People had to stand on the front of the wrecker to hold it down. Movement of G&C sections is also a slow and hazardous process when using the wrecker.

2.10.10.2.1.1.2. SUBSTITUTE a Suitable Replacement for Cable Tester, AN/GSM-45, FSN-6625-996-7292 (one per DSU/GSU.

The field is not capable of repairing this item, the manuals are out of date and it is difficult to keep operational. Either a new and more reliable item should be made available or the present item improved so it is useable in the field.

2.10.10.2.1.1.3. DELETE, Guided Missile System Supply Office, LIN J95545, (one at DSU).

This van is too small to be used as a supply office. Not one unit had any intention of using it as an office in the field. It was generally used to store field gear or other miscellaneous items.

2.10.10.2.1.1.4. DELETE, Preservation and Packaging Shop, Truck Mounted, LIN P47075, (one at DSU).

Although the DSU needs some packing and preservation capability this van provides an over-kill. Not one unit used the van although they did use some of the equipment. There is a need to be able to repackage electronic assemblies and cards into moisture proof packs. However, only a minimum amount of this sealing equipment would be required.

2.10.10.2.1.1.5. ADD, Keypunch Machine, (one at DSU and GSU).

This machine is required to enable technical supply to keypunch requests for repair parts and to transceive them to supporting supply activities. Most units visited had a keypunch machine in the technical supply section.

2.10.10.2.1.1.6. ADD, Truck, Van, Expansible, 2 1/2 Ton LIN X61929 (one at DSU).

At present, the DSU has no capability to move the shop office to the field. Most units have used fixed facilities for the shop office and have become relatively fixed in the facility. A van of this type would provide adequate space for sustained operations in a highly mobile field environment.

2.10.10.2.1.1.6. ADD, Lifting Device (one at DSU).

Some type of lifting device is required to lift heavy items in the engineer shop. Some units have overhead cranes and others don't. Those who don't have lifting devices improvised to their own specifications. An example of its use would be to replace an engine on a 45 KW generator in the shop. The wrecker is not suitable for inside use yet, most of the work is accomplished indoors.

2.10.10.2.1.1.7. DELETE, Tool Kit, GTGS, LIN W31360 (two at DSU).

This item is seldom if ever used because it takes too much time to hook up. There are three each now authorized and the unit feels that one is enough.

2.10.10.2.1.1.8. SUBSTITUTE, Load, Bank, 0-45 KW, AC/DC for Load Bank, 0-30 KW, AC/DC (one at DSU).

The 0-30 KW load bank does not provide enough load for testing the power station.

2.10.10.2.1.1.9. ADD, Soldering and Brazing Outfit, Resistance Heating, FSN 3439-337-6447 (one at DSU).

This item is required to solder ground cables, power cables, and other large prong connectors. The use of a blow torch results in cold solder joints.

2.10.10.2.1.1.9. DELETE, Training Set GM, System: PERSHING, FSN 6920-967-9727, LIN X04484 (unknown quantity and location).

This "Hayes" trainer is not used in the field. It is not compatible with the P1A system and other methods are used to train personnel.

2.10.10.2.1.2. Other Recommendations (Isolated Cases).

2.10.10.2.1.2.1. DELETE Truck, Wrecker, 5 Ton, LIN X63299, (one at DSU).

Only one wrecker is required at DSU. The second wrekcer is used by the battalion and is seldom available for platoon use. Should two wreckers be required, one could be borrowed from the organization motor pool in any battery.

2.10.10.2.1.2.2. DELETE, Cable Assembly, AN/GSA-110 LIN C60381, (two at DSU).

It is very seldom that the DS platoon runs in-container checks. These cables are available in the firing batteries and if required can be borrowed.

2.10.10.2.1.2.3. DELETE, Tool Kit, Electronic Repairman, LIN W01351, (eight at DSU).

Too many tool boxes are authorized. Of the sixteen authorized one unit felt it could easily get by with eight. However, care must be taken to insure that two repairman don't share a tool box (see para 2.10.11.).

2.10.10.2.1.2.4. DELETE, Shop Set, Spare Parts Storage, Set # 2, LIN T36442, (two at DSU).

The six ton shop vans (5 ea) provide sufficient storage for repair parts.

2.10.10.2.1.2.5. SUBSTITUTE, Hewlitt - Packard Oscilloscope for Dumont Oscilloscope.

The Hewlitt - Packard scope is smaller, has fewer controls, and the trace is easier to see.

2.10.10.2.1.2.6. ADD Erector/Launcher Tire Changing Tools, (one at DSU).

The TM says to get the special tools required out of the mechanical shop, but these tools are not part of the mechanical shop and ordinary tire tools break when used for this purpose. The platoon uses two wrecking bars, two crowbars, one sledgehammer, one porta-power, and much manpower to change a tire in about 40 minutes. Better tools should be made available.

2.10.10.2.1.2.7. SUBSTITUTE a Suitable Replacement for Contact Truck, LIN T10138 and Shop Equipment, Organizational Repair, Lt Truck Mtd, LIN T13152 (one at DSU).

The items should be modernized. A contact team vehicle on a Dodge "power wagon" type chassis would be ideal. The shop equipment, FSN 4940-294-9516, LIN T13152, is not mounted on a sturdy enough chassis. It is difficult to provide good support with the equipment in its present state.

2.10.10.2.1.2.8. ADD, Florescent Lamp With Magnifying Glass, (one at DSU).

The electronic section performs repair on many items with small electronic components and requires a device to aid their vision.

2.10.10.2.1.2.9. DELETE, 1st and 2nd Stage Heater Blankets.

These blankets are not required in Germany and are difficult to properly store at unit level. They may be required in colder climates but they should be maintained in the supply system until required.

2.10.10.2.2. Sergeant Equipment.

There were relatively few comments on Sergeant tools and test equipment. Since the system is soon to be removed from the field there will be no comment recorded in this section.

2.10.10.2.3. LCSS and Chaparral/Vulcan Equipment.

2.10.10.2.3.1. Priority Recommendations.

2.10.10.2.3.1.1. DELETE - Individual Tool Boxes

General comment is that units are authorized too many tool boxes.

2.10.10.2.3.1.2. ADD - Lifting Device

Chaparral/Vulcan support units require a device to use to pull the mount for the Chaparral and also some sort of fixture to place it on while working on it.

2.10.10.2.3.1.3. ADD - Radio Set, AN/GRC-106 Mounted in 1/4 Ton, LIN Q33089.

The detachment commander of a C/V detachment has no way to talk to his shop office. At present, the shop has an AN/GRC-106 mounted in a shop van but no FM radio. The Detachment CO has an AN/VRC-47 mounted in his 1/4 ton which is necessary to talk to the Artillery Battalion he supports. However, there is no FM radio authorized in any other section of the CV detachment (TOE 9-550). The additional AN/GRC-106 would allow the CO to have complete control over his unit in a mobile field situation.

2.10.10.2.3.2. Other Recommendations. (Isolated Cases)

2.10.10.2.3.2.1. ADD-Digital Voltmeter (one at DSU).

This item is needed for use as supplementary test equipment when troubleshooting the LCSS (primarily in DMM). The Chaparral/Vulcan/FAAR team EK has this equipment. It should be added to team EC in TOE 9-550.

2.10.10.2.3.2.2. ADD - Decade Resistance Standard (one at DSU).

This item is required for normal testing and comparison purposes.

2.10.10.2.3.2.3. ADD - Chaparral NICAD Battery Charger (one at DSU).

This item is required to repair NICAD batteries at GSU.

2.10.10.2.3.2.4. ADD - PACE Type Soldering Equipment (two at GSU).

Required for precision soldering work in the field. Much of the present day field soldering equipment is obsolete.

2.10.10.2.3.2.5. ADD - Chaparral Tool Kit, FSN 5180-808-5074, (one at GSU).

This set should accompany the "95" van. It includes the necessary gages to checkout the missile in the 95 van. The tool kit is presently used by MOS 24N.

2.10.10.3. Summary.

A significant factor in the ability of a unit to accomplish its mission is the authorization of appropriate equipment to do the job. The field evaluation determined that a number of equipment deficiencies existed as depicted above. It is anticipated that some of these recommendations may be unattainable for various reasons or may already have been incorporated in current series TOE; however, appropriate CDC agencies should review each deficiency mentioned above for possible inclusion in or deletion from current TOE.

2.10.11. Individual Tool Sets.

2.10.11.1. Background.

The current policy used by TOE units to authorize individual tool boxes is on the basis of one per TOE position authorization for MOS requiring the use of the tool boxes. Special tools used infrequently are authorized in shop sets or special tool sets.

2.10.11.2. Analysis.

Repairmen in the field are generally dissatisfied with the composition of the current individual tool boxes used by missile maintenance personnel. The tool boxes contain too many tools that are seldom if ever used. It is difficult to control loss and pilferage of these tools and in all theaters it is extremely difficult to get replacements. The repairman would like a small tool set consisting of certain basic tools and limited in number. For an electronic test equipment repairman it may simply consist of a few screwdrivers, assorted pliers, wire cutters, crecent wrench and a small soldering iron. The remainder of the tools should be placed in a special shop set or contact team set which could be made available to the individual repairman on an as required basis. Accountability would be greatly enhanced and consequently the cost of replacement for missing tools would be greatly reduced. Sufficient data was not gathered to allow for a determination of the optimum individual tool box.

2.10.11.3. Summary.

There is a definite requirement to analyze the content of tool boxes issued to individual missile repairmen with the goal of reducing the number of tools to a minimum consistent with the day to day usage. This tool box should include no more than 20 individual tools in order that it be small, compact and easy to carry and store.

2.10.12. Equipment Failures.

2.10.12.1. Background.

Personnel interviewed were asked what equipment was experiencing the most failures and to indicate their analysis of the problems being experienced. Replies varied from unit to unit. The following is a breakdown of their responses by system.

2.10.12.2. Analysis.

2.10.12.2.1. Shillelagh.

The tracker was mentioned most frequently as having the highest failure rate. The following are the comments recorded:

1. Tracker - one warrant officer in USAREUR attributed tracker failures to the number of firings of conventional rounds. Feels the ratio of conventional to missile firings is higher than the system was designed for. The resulting shock and vibration tear up the tracker optics. He very seldom gets pure electrical failures. The following are specific comments on the tracker:

a. Tracker subassembly - (Replaced by DSU) - Most of failures are adjustment failures, rather than "hard" failures. Adjustments get so far out that he can't bring them into tolerance.

b. Tracker subassembly - appears to be the result of tolerance and adjustment procedure during the Scale Factor Test of LCSS. Epicyclic Coupling Adjustment - tolerance is too tight. Can't adjust to it. Gear is freezing on the shaft. System will operate with greater tolerance, even though LCSS fails. Tolerance is now 24.5 $\pm$ 1.5 milli-sec. He gets a go system with $\pm$ 3.0 milli-sec.

c. Tracker subassembly - motor and gear are failing.

d. Preamps and detector are failing.

2. Transmitter -

a. Filter panel - keeps blowing capacitors and diodes while in the vehicle.

b. Starter assembly is failing, but DSU does not repair (two USAREUR DSU reported this).

c. Filter panel - CR-i diode is usually bad on the first LCSS run.

d. Burned out bulbs are reason most transmitters are received at DS level.

3. SDC - only random failures were reported.

4. Power supply -

a. Modified power supply failure rates are climbing. Failures are occurring in the modified modules (A2, A4, A6). A2 is the highest, but A6 is failing with it. Can't tell if one is causing the other to go.

b. Timer module continually "blows".

c. Filters.

5. M149 Mount - this is a WECOM item. USAMMCS is not training MOS 27H how to repair, but they are having to do it in the field.

a. Solenoid assembly - plunger is corroding and sticking. Looks like moisture is getting in.

b. Electronic failures - solenoid, switching circuit, and chopping motor.

6. Modulator - CR-11 diode in the Modulator Subassembly (per GSU).

7. COFT - the recorder in the ICU was mentioned as a problem area. Parts are difficult to get.

8. Fault locator - difficult to calibrate.

2.10.12.2.2. TOW.

Most of the DSU workload in USAREUR appears to be charging batteries and purging the optical sight. One maintenance warrant called the humidity indicator on the optical sight a "primary" problem. He also noted that the traversing units tend to have "play" in elevation. A CONUS DSU reported problems with the bridge clamp cable. Another stated that the breech block cable was breaking, the optical sight couldn't be boresighted, and the simulator was getting carboned up from the blast.

2.10.12.2.3. REDEYE.

Most warrants stated that they had too little volume to determine trends. One individual reported that diodes are failing in the XM-76 trainer when left plugged in. He also mentioned freon flow adjustment and balancing cards for the collimator in the XM-82 GMSTS.

2.10.12.2.4. LCSS.

Units using the Phase 7 LCSS are very pleased with it compared to earlier models. They were, however, unhappy with the small amount of space in the clean booth. Failures were said to be random. The USAREUR GSU reported a Mean Time Between Failure (MTBF) rate of 96.7 hours. Mean Time to Repair was two hours.

2.10.12.2.5. CHAPARRAL.

The XM-54 air compressor was mentioned as failing by DSU in Korea. The unit in Korea and the USAREUR GSU both mentioned the generator control box. The GSU stated that it was a mechanical problem. The nuts holding cables are loosening, with arcing across the bus bar as a result.

2.10.12.2.6. VULCAN.

Moisture problems were mentioned both in CONUS and USAREUR. The CONUS DSU reported that moisture was getting in the distribution box and in the azimuth and gun elevation drive motors. The CONUS DSU was also having problems with the receiver-transmitter in the radar set (ROR). Seven out of twelve guns in the battery were deadlined. The C/V warrant officer in the USAREUR GSU stated that the klystron power supply in Unit 2 of the receiver-transmitter was arcing and overloading, causing diodes and other parts of the unit to burn out. He suspected that the operators are pushing the reset switch while the radar is operating. He also attributed arcing to humidity and said the set needs a dehumidifier.

2.10.12.2.7. SERGEANT.

The hydraulic system of the Launching Station appears to be causing the greatest workload in SERGEANT direct support platoons. The actuators, control valves, outriggers and rear leveling jacks are leaking. One warrant said the major problem is not so much the equipment as it is the operator. Apparently the operators fail to wipe off the jacks before retracting, and sand gets in and destroys O-rings and seals. Two warrant officers mentioned problems with rotary telephone switches. The switches are "pretty well worn out". Firing set subassemblies are the items received most frequently from the batteries. One individual mentioned the ground sensor, guidance sensor and counter in the firing set. The USAREUR GSU cited the platform in the G&C and the power pack as the items received most frequently for repair. One warrant stated the O-rings in the power pack are deteriorating and that he was afraid it may be getting to the end of its shelf life.

2.10.12.2.8. PERSHING.

1. G&C - The G&C was mentioned by all three DSU as giving the most problems. Within the G&C, the ST120, guidance computer and control computer were mentioned most frequently, although units said that failures seem to run in cycles. The ST120 servo amp was cited by one individual. The A5 module in the guidance computer is failing in one unit. Another unit said problems with the control computer are primarily marginal adjustments.

2. Cable Mast - Primarily damage occurring to connectors during handling by artillery personnel. The collar is breaking off the main power cable. The collar is of soft material and is breaking around the keyway. Collar should be made of stainless steel.

3. Erector-Launcher - One unit reported that preformed packing in the hydraulic system is deteriorating. Leaks in the nitrogen system are also a problem. One unit reported that the pre-charge valve is leaking and that the nitrogen pressure gage is failing.

2.10.12.3. Summary.

Each unit seemed to have its own pet complaints concerning equipment failures. No effort was made to cross-check failures in one unit against those in another. This would have involved re-visiting units. However, the problems cited are occurring and do warrant looking into with corrections made where necessary.

2.10.13. Air Conditioner Maintenance.

2.10.13.1. Background.

PERSHING direct support platoons have organic engineer sections with personnel trained in repair of air conditioners. Most other Land Combat Missile direct support units have no air conditioner maintenance capability.

2.10.13.2. Analysis.

Air conditioners are extensively used within PERSHING and SERGEANT firing batteries and in all missile system maintenance units. Most units reported that their air conditioners were a significant maintenance problem. These problems appear to fall in four major areas: (1) Lack of maintenance capability; (2) inadequate organizational maintenance, (3) Shortage of repair parts; and (4) the variety of makes and models in the field.

LCSS and SERGEANT support units do not have organic air conditioner repair capability. The density to be supported is not considered sufficient to justify such a capability. These units do, however, experience difficulty in obtaining maintenance support from outside sources. The problem is primarily one of locating a unit with a capability to provide the necessary maintenance. As a result, many units visited had several air conditioners deadlines at one time. Shelters, such as the LCSS, were operating with only one of two air conditioners working. The air conditioner in the LCSS Repair and Storage Shelter was often removed and used with the Test Station, in order to continue testing of assemblies. It appears to be quite feasible to provide adequate maintenance spares at the DSU so that it can replace a malfunctioning air conditioner immediately. At the same time, missile system peculiar general support companies should be provided with a maintenance capability. That way, the DSU can job order or better yet, DX a malfunctioning air conditioner with the GSU and obtain a good spare immediately.

PERSHING direct support units reported a parts shortage for air conditioners. One warrant attributed this to the seasonal usage of air conditioners which precluded obtaining the demand data necessary to obtain the correct level of parts stockage to support summer usage. He felt that demand criteria should be based upon the six months during the year that air conditioners are in use. Also to be considered are the variety of models required in PERSHING units as a result of system design considerations. The use of two or three different models dilutes demand data.

One PERSHING engineer warrant reported that firing batteries were not checking and exercising the air conditioners during winter months. This may be a source of maintenance problems.

2.10.13.3. Summary.

Air conditioner maintenance is a problem area in the field. Most units do not have an organic maintenance capability. Their problems might be alleviated by furnishing them with spare air conditioners and providing all missile GSU with a capability to support the item. The seasonal usage of air conditioners precludes developing the necessary demand data to stock sufficient repair parts. Inadequate organizational maintenance efforts may be causing some malfunctions.

2.10.14. <u>45 KW Generator Problems</u>.

2.10.14.1. Background.

Most missile maintenance test equipment require a power source providing a line frequency of 400 Hz. To meet this requirement, 45 KW diesel generators are authorized in most applicable TOE. SERGEANT direct support platoons are authorized 30 and 45 KW gas turbine generators.

2.10.14.2. Analysis.

Response from field personnel reflected widespread dissatisfaction with 45 KW, 400 Hz diesel generators currently on hand. The following is a summary of complaints received:

1. Generator is not reliable enough for prolonged field use.

2. Maintenance requirements are excessive.

3. Frequency is not stable enough.

4. Cold weather starts are difficult. Must use ether.

5. In Utah, sand will get lodged between the contacts of frequency adjust controls. This results in erratic frequency.

6. Generators on firing site (PERSHING Bn) are running at less than 10% load. 30 KW generator would be adequate since 16.7 KW is maximum estimated power requirement on site. Ordnance does require the 45 KW generator.

7. Rebuilt generators are subject to frequent breakdown.

8. CONUS units generally have the only 400 Hz generators on post. Repair parts and maintenance are problems. Post floats are not maintained.

9. Deadline rates are excessive.

10. Availability of diesel fuel is a problem (only one USAREUR unit stated this).

Only one unit had no complaint. Personnel in that unit (a GSU) attributed their lack of problems to the fact that they had a "tremendous" motor Sergeant and a good organizational maintenance section. Most missile direct support units are not authorized a motor Sergeant and very few have authorization for an organizationsl mechanic. These units are generally dependent upon the unit they are attached to for maintenance. As an example, TOE 9-550G is a cellular TOE which provides guidance for organizing units to provide maintenance support for medium cost/high density missile systems. The only generator repairmen contained in the TOE are in teams supporting the CHAPARRAL/VULCAN system. The C/V base shop team also provides for an E6 Engineer Missile Equipment Supervisor. These are the only teams so staffed. Teams supporting LCSS, SHILLELAGH, TOW, REDEYE, and LANCE make no provision to maintain generator equipment. If density of engineer items is too low to support inclusion of generator maintenance personnel, then USAMMCS should provide the necessary training to missile maintenance and supervisory personnel during their instruction.

Many comments were received relative to the fact that generators were not being operated at full load. PERSHING personnel pointed out that maximum firing site power requirements were about 17 KW. A 30 KW generator should be provided rather than a 45 KW generator to meet this requirement. PERSHING maintenance personnel also complained about the lack of dummy loads for use during maintenance operations.

With the foregoing discussion in mind, problems appear to be attributable to these factors:

1. The 45 KW generator is not reliable and maintenance is a constant headache. Availability rates are lower than they should be.

2. Many generators are operated at loads far less than 45 KW. This, in itself, may be responsible for many of the problems encountered.

3. Organizational maintenance efforts are generally not adequate. This is due to lack of supervision, lack of trained personnel, and in many cases, lack of emphasis.

It is difficult to separate the reliability and maintenance problem from those relating to organizational maintenance. It is possible that if all units were authorized the necessary maintenance and supervisory personnel, and if the generators were maintained properly, fewer problems would occur. However, PERSHING DS platoons do have an engineer section to maintain battalion generators and yet, they were having problems with their generators.

2.10.14.3. Summary.

The 45 KW generator is a source of many complaints in the field. The generator is not reliable and excessive maintenance and deadline time is the result. Many units are not staffed properly to maintain the item. Generator power capability often exceeds that actually required and smaller generators would suffice. Maintenance sections have a need for dummy loads.

2.10.15. Commercial Power in Garrison.

2.10.15.1. Background.

Missile maintenance units have peculiar power requirements. Almost all test equipment used by these units require 400 Hz power sources. TOE authorize organic 400 Hz power sources in the form of 45 KW diesel generators or 30 KW and 45 KW gas turbine generators. Commercial power cannot be used unless the requisite convertors and transformers are provided to change the line frequency from 50 and 60 Hz to 400 Hz.

2.10.15.2. Analysis.

Discussions with missile maintenance personnel revealed that electrical power is a continuous problem area - except in those units which have managed to obtain equipment to convert the line frequency of commercial power to 400 Hz.

Over half of the units visited were dependent upon organic generators as a source of power for garrison maintenance operations. All but one of these units were experiencing maintenance problems with their generators. On occasion, deadline rates have come close to halting maintenance operations. Additionally, one USAREUR SERGEANT DSP was restricted to operations only between the hours of 0730 - 1700 during the week because of complaints from German citizens about the noise. This unit could not operate on holidays, weekends, or at night. Personnel in one PERSHING DSP noted that they had received complaints about generator noise, but that no action had yet been taken to restrict operations.

Many of the units dependent upon generators had submitted work requests for installation of converters. In most cases, the need was recognized by higher command levels, but a shortage of funds and higher priority work requests prevented immediate action on the requests.

2.10.15.3. Summary.

Over half of the units engaged in maintenance support of Land Combat Systems are forced to rely on TOE generators for power during garrison operations.

2.10.16. PERSHING Theodolite Maintenance Problems.

2.10.16.1. Background.

Theodolites are one of the many "most critical" items required to complete a successful missile firing mission. It is a piece of optical equipment similar to a surveyor's transit, only far more accurate. Theodolites are used to align gyroscopes in the G&C systems for large, inertially guided missile systems such as PERSHING, SERGEANT, and LANCE. Lack of theodolites or use of a faulty one will result in the missile missing its target.

The MOS designated and trained to repair theodolites is the 41B Topographic Instrument Repairman. He receives 12 weeks training at the U. S. Army Engineer School, Fort Belvoir, Virginia. PERSHING direct support platoons are authorized one 41B.

2.10.16.2. Analysis.

PERSHING maintenance personnel reported a shortage of qualified 41B personnel to repair theodolites. In most units the space was either vacant, or the man filling the position had not seen a theodolite since he attended AIT (one or two years prior to his PERSHING assignment). Action should be taken to provide qualified theodolite repairmen if the shortages still exist.

2.10.16.3. Summary.

Theodolites are critical to PERSHING units. The DSP reported a shortage of qualified maintenance personnel to repair them.

2.10.17. Equipment Serviceability Criteria for the Sheridan Vehicle.

2.10.17.1. Background.

TM 9-2350-230-ESC provides equipment serviceability criteria for the Sheridan Weapons System M-551. The criteria for the serviceability of the system, given that the vehicle is not capable of firing a missile, is amber. Equipment so scored is reported on the quarterly materiel readiness report on DA Form 2406 reporting the readiness status of the combat unit.

2.10.17.2. Analysis.

Using units as well as missile support units felt that the Sheridan system should be rated red if the missile system were not capable of firing. Squadron commanders felt that the missile was their prime weapon during hostilities in a European type environment. Support units felt that if the ESC indicated red for a nonoperational missile system then greater emphasis would be placed on preventive maintenance and corrective maintenance actions would be treated on a higher priority basis. These actions would insure a more operationally ready missile system and would provide better demand data which would in turn insure adequate support during a wartime situation. At present, relatively little emphasis is placed on the maintenance of the Shillelagh System in the field. This is generally due to the lack of urgency, lack of trained personnel, other higher priority requirements and the relative inactivity of the vehicles and systems due to lack of maneuver areas. All these factors together lead to a somewhat degraded effectiveness.

2.10.17.3. Summary.

Because of the problems mentioned above, it is necessary to place added emphasis on the importance of the Shillelagh System by changing the ESC to indicate red for a vehicle with a non-operational missile system. The red rating would provide a more true indication of the combat readiness of the unit in question. At present, unit readiness reports indicate a higher state of readiness than that which actually exists.

2.10.18. <u>Shillelagh Guided Missile System Test Set, AN/MSM-93</u>.

2.10.18.1. Background.

The Guided Missile System Test Set (GMSTS), AN/MSM-93, is used to augment the SHILLELAGH guidance and control system self-test operations. It provides an external capability for monitoring signals and indicating, displaying, and locating G&C system malfunctions. It is composed of two primary components: The Transmitter Signal Analyzer (TSA) which tests the SHILLELAGH transmitter's beam intensity and the fault locator, which monitors vehicle G&C operations and is capable of analyzing and identifying malfunctions within the G&C system and vehicle cabling.

The GMSTS is the primary piece of equipment for the SHILLELAGH contact teams provided for in TOE 9-550. At the present time there is no means for testing the GMSTS using the Land Combat Support System (LCSS).

2.10.18.2. Analysis.

During visits to missile maintenance units providing support for the Shillelagh Missile System, several personnel complained about their lack of capability to test the GMSTS with the LCSS. At the present time, all repair and troubleshooting is accomplished manually using long and tedious procedures contained in the TM. According to experienced personnel, the TM check procedures for the fault locator contain significant errors, forcing repairmen to rely on "field fixes" to acccomplish repair. There is no self test capability built into the fault locator. Personnel stated a need for the necessary tapes and hardware to accomplish automatic fault isolation and operational verification using the capabilities of the LCSS.

2.10.18.3. Summary.

Field personnel stated a need for automated test and checkout capabilities for the SHILLELAGH GMSTS using the LCSS. Current manual check procedures are inadequate and are too long and tedious to perform.

2.10.19. Typical TOE 9-550 DSU Workload.

2.10.19.1. Background.

Individuals often express an interest in the workload of maintenance units. One direct support unit in USAREUR maintained figures on its workload. These are presented for information.

2.10.19.2. Analysis.

The following workload figures were obtained from a USAREUR DSU engaged in support of SHILLELAGH, TOW and REDEYE. They are only totals, and are not indicative of the complexity of work performed. Contact team actions are primarily of a trouble-shooting nature. The using units will report an end item non-operational, and the contact team responds to determine the nature of the problem. In the case of REDEYE, the contact teams have a surveillance mission. The figures given are for the period 1 Jan 1971 to 17 May 1971:

SHILLELAGH	JOB ORDERS
#M551	242
*Tracker	42
*Transmitter	25
*Modulator	23
*Power Supply	96
*TCP	9
*SDC	36
*Rate Sensor	16
MSM-93 GMSTS	4
#XM-41 COFT Launcher	5
#XM-42 COFT Target	7
ICU	9
Visual Effects Simulator (VES)	7
Prime Power Supply (PPS)	3
Power Control Unit (PCU)	8
Lamps	4
M149 Telescope Mount	41
Other (Subassys)	13

*LCSS Test
#Contact Teams

TOW	JOB ORDERS
#Launcher	55
#XM-70 Trainer	0
Tube	2
Battery (Primarily charging)	89
*Battery Charger	4
*Msl Guidance Set (MGS)	25
Traverse Unit	8
*Optical Sight	15
*Target Source	10
*Power Supply Modulator	11
*Instructor Console	14
Other	13

*LCSS Test
#Contact Teams

REDEYE	JOB ORDERS
#XM-41	200
XM-46 Trainer	1
XM-76 Trainer	31
TSM-82 GMSTS	25
Other	1
#Contact Teams	
LCSS - ALL	6
OTHER	2

2.10.19.3. Summary.

The workload figures are for a 137 day period. Extensive use of contact teams in all systems is indicated.

2.10.20. Maintenance Allocation Charts (MAC).

2.10.20.1. Background.

Department of the Army technical manuals contain maintenance allocation charts which define the responsibilities of each level of maintenance pertinent to a specific item of equipment and further call out special tools which may be required to perform maintenance. The CDC Air Defense Agency asked that units be questioned concerning the need for the MAC.

2.10.20.2. Analysis.

The following is a summary of the responses received from the units in the field. The questions asked, and the responses received are listed below:

Question: To what extent are MAC utilized by you or personnel in your activity? The answers varied from seldom to quite extensively.

Question: How closely do the MAC parallel the division of maintenance responsibilities in your unit to include units supported or supporting? The answers varied with the systems.

SERGEANT - Parallel closely.

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PERSHING - Organizational level should be able to do more work. DS and GS have about the same responsibility, should be better defined.

LCSS - Organizational level is fine. DS & GS have about the same responsibility, should be better defined.

Question: What would be the impact incurred by deleting MAC from missile system TM?

Answers:

	DSU/GSU	USER UNITS
Not used - Removal would cause no problem	1	5
Used - Removal would cause problems	11	6

2.10.20.3. Summary.

The data indicates the DS and GS units feel that the MAC is required and should remain in TM while usefulness of the MAC at unit level is questionable. It is apparent that the MAC should be retained in equipment technical manuals.

2.10.21. Technical Assistance in the Field.

2.10.21.1. Background.

FM 9-59 states that "technical assistance is the service of providing instruction and technical guidance to supported units to enable them to perform their mission in a more efficient manner." Further, it explains that TOE for most missile support units do not separately identify specific personnel for the performance of the technical assistance mission. The support unit is ultimately responsible for organizing to provide this service to the supported units.

2.10.21.2. Analysis.

The understanding of and the implementation of technical assistance in the field is poor at best. Unit Commanders fail to realize the importance of a close working relationship with supported units. The programs range from daily technical assistance as provided by some organic direct support units to that of basically no technical assistance provided by GS units to DS units. A listing of the MAME-71 data provides insight into the program as it exists in the field today (see Incl 2-40). The startling fact is that most DSU and GSU commanders rarely if ever visit the units they support, even though the shop warrants maintain a strong close liaison with the supported units.

2.10.21.3. Summary.

The importance of a DS or GS unit commander making frequent visits to the supported units cannot be underestimated. At present, few commanders make it a practice to maintain close contact with supported units. The importance of this liaison must be stressed in resident instruction provided to missile and munitions officers.

3. CONVENTIONAL AMMUNITION

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3.1. COMMAND AND CONTROL.

The current command and control structure for conventional ammunition units in overseas locations, to include the supporting logistics activities is protrayed in Inclosures 6-1 thru 6-5. The command and control structure employed in CONUS is not portrayed due to the small sampling of these type units that was made during MAME-71.

3.2. AREA DESCRIPTIONS.

In order to better comprehend the current problems or situations in the field, it is necessary to understand the basic structure employed for conventional ammunition support. The following is a brief portrayal of the supporting system employed in each area visited.

3.2.1. CONUS.

In CONUS, conventional ammunition support for training requirements and basic load support is provided through a garrison activity operated by civilian personnel. TOE units visited do not have an active support mission assigned but do provide personnel in support of garrison ammunition supply points. The 8th Ordnance Company and the 608th Ordnance Company are both full strength TOE 9-17 companies and have contingency support missions assigned. At the time of this survey, the 8th Ordnance Company at Fort Bragg was conducting MOS 55A ammunition helper training for personnel who had not complete the AIT to which they had been assigned.

3.2.2. USAREUR.

In USAREUR, conventional ammunition basic load and training ammunition is provided by the operation of small ASP operating at major training areas. The 144th Ordnance Company of 15th Ordnance Battalion, V Corp Support Command operates ASP at the Wildfecken and Baumholder training areas. The 663rd Ordnance Company of the 101st Ordnance Battalion, VII Corp Support Command operates ASP at the Grafenwoehr and Hoenfeld training areas.

General and limited direct support is provided by the Miesau Army Depot. The 84th Ordnance which is under operational and administrative control of the Miesau Army Depot is responsible for 60 prestock points and 4 reserve ASP. Prestock points are operated by 6956th Labor Service and the RASP are operated 184th and 501st Ordnance companies.

3.2.3. EIGHTH US ARMY.

Conventional ammunition units are organized under the Korean Support Command which retains operational control of all ammunition companies. The 23rd Direct Support Group and the 6th and 83rd Ordnance Battalions act as administrative headquarters for the ammunition companies. These companies operate depot type activities and provide both direct and general support. They were organized under TOE 9-17 series, and at the time of the survey one unit, the 696th Ordnance Company, was scheduled for conversion to TOE 9-38G. The 58th Ordnance Company is scheduled for deactivation due to decreased theater logistical requirements.

3.2.4. USARYIS.

Logistical support on Okinawa is under the 2nd Logistical Command. Conventional ammunition support is furnished through the Chibana Army Depot where the ammunition area is operated by the 196th Ordnance Battalion. Activities consist of limited direct support and a considerable amount of general support maintenance generated by retograded ammunition from Vietnam.

3.2.5. USARAL.

Conventional ammunition support organizations are limited to garrison activities in support of limited training and basic load maintenance requirements. At the time of this survey no TOE ammunition organizations were in existance.

3.2.6. USARV.

Operational control of conventional ammunition organizations in Vietnam is provided by the Ammunition Division of DCSLOG, USARV with command of ammunition organizations retained by appropriate support command. In the Saiagon and Cam Ranh Bay Support Command, the ACofS Ammunition is the ammunition battalion commander. The 3rd Ordnance Battalion of the Saigon Support Command and the 191st Ordnance Battalion of the Cam Ranh Bay Support Command operate consolidated ammunition depots. At the DaNang Support Command operational control is exercised through ACofS ammunition with command lines through a general support group and a battalion to a ammunition company.

3.3. UNITS CONTACTED DURING SURVEY.

The following is a list of specific Conventional Ammunition Headquarters and units that were directly contacted during the MAME-71 evaluation:

CONUS (USA)

HQ, IV Corp
Director of Industrial Operations, Ft. Benning
US Army Infantry School
12th Support Brigade
197th Infantry Brigade
269th Ordnance Group
8th Ordnance Company
608th Ordnance Company

USAREUR (Germany)

HQ, USAREUR DCSLOG
HQ, Miesau Army Depot
15th Ordnance Battalion
84th Ordnance Battalion
101st Ordnance Battalion
6956th Labor Service
144th Ordnance Company
184th Ordnance Company
501st Ordnance Company
663rd Ordnance Company

Eighth US Army (Korea)

HQ, Eighth US Army, G-4 and Liaison Assistance Office
Korean Support Command (KORSCOM) ACofS, Ammo
23rd Direct Support Group
6th Ordnance Battalion
83rd Ordnance Battalion
7th Ordnance Company
55th Ordnance Company
58th Ordnance Company
609th Ordnance Company
696th Ordnance Company

USARYIS (Okinawa)

HQ, USARYIS, Liaison Assistance Office (MICOMO
HQ, 2nd Logistical Command
HQ, Chibana Army Depot
196th Ordnance Battalion
137th Ordnance Company
175th Ordnance Company

USARV (Vietnam)

HQ, USARV, DCSLOG, Ammo
HQ, Siagon Support Command
HQ, Can Rahn Bay Support Command
HQ, DaNang Support Command
54th General Support Group
3rd Ordnance Battalion
191st Ordnance Battalion
40th Ordnance Company
60th Ordnance Company
71st Ordnance Company
182nd Ordnance Detachment
504th Ordnance Detachment
576th Ordnance Company
606th Ordnance Company
611th Ordnance Company

USARAL (Alaska)

HQ, USARAL, G-4
HQ, USA Garrison, Fort Richardson
HQ, USA Garrison, Fort Wainwright

3.4. REPORT ORGANIZATION.

The data to follow is a resume of the problem areas that the evaluators identified as being significant and fully supported by the data that was collected, collated, and analyzed. The problems are treated on a worldwide basis unless identified as being applicable only to a specific area/theater.

The discussion portion of this report is subdivided into three functional areas: Doctrine, Materiel, and Training; however, an item may overlap into several areas (e.g., doctrine and training). In such circumstances, the problem description is arranged under the most appropriate functional area with reference made to other areas affected. This portion of the report is intended to provide backup information, discussion, and analysis of selected problem areas. The terminal conclusions and specific recommendations are cited in functional area 6.1 and 7.1 of this report.

3.5. DOCTRINE

3.5. General.

Doctrine as presently developed provides for the conduct and support of combat operations. A recognized fact which is not taken into account in current doctrine is that two different requirements exist for conventional ammunition support, one for peacetime situations and one for hostilities. In peacetime, ammunition organizations are basically custodians of large stocks of ammunition with support activities limited to supporting training requirements and basic load maintenance. Quantities of ammunition issued are small and stock are managed by condition code for issue to supported units. The main activity of ammunition organizations is storage and maintenance (organizational, direct and depot level) of stocks with GS maintenance being performed by TOE organizations modified by MTOE and/or by TDA organizations. Operational control of the supply system is centralized at theater level for more efficient management with battalions and groups functioning as administrative headquarters.

In a wartime situation, large amounts of ammunition are handled and issued in support of combat operations with the main consideration in issue being that the ammunition is either serviceable or unserviceable. Little maintenance (usually organization level only) is performed and unserviceable ammunition and ammunition requiring maintenance is evacuated out of the combat zone and usually out of the theater of operation to receive required maintenance or is destroyed, depending on quantity involved. Every attempt is made to limit the amount of ammunition stored in the combat zone to facilitate security and to provide for rapid turnover of stocks in order to reduce maintenance requirements due to deterioration. Management is decentralized to provide maximum control of ammunition organizations with battalions and groups providing operational and administrative control.

Provision of combat service support is the primary consideration in the development of doctrine and it cannot be degraded to provide for peacetime requirements. However, peacetime requirements could be satisfied concurrently with wartime requirements by considering them during the development of doctrine. The result would be improved flexibility and effectiveness of ammunition organizations in providing support. Problem areas listed below impact on doctrine to include recommendations for both peacetime and wartime situations.

3.5.1. Organization Problem Areas.

3.5.1.1. Security.

Internal physical security is a day to day requirement which is essentially a unit's mission and requires a large commitment of personnel and equipment. It is required in peacetime to prevent pilferage and during wartime provides early warning for defensive forces and prevents pilferage. Doctrine, in the form of TOE personnel and equipment, does not provide the assets necessary to perform the required physical security function without augmentation.

The requirement exists for a physical security element to provide internal security for each ammunition company TOE 9-17 series or TOE 9-38G which has the mission of ammunition storage. The ammunition guards MOSC 55A10 and 55B20 provided in paragraph 01 of 9-17 series TOE and paragraph 08 of 9-38G TOE are provided to secure critical ammunition shipments and operate essential ASP guard posts, i.e., security of classified ammunition stocks. The authorization for these personnel limits performance of security to only the minimum essential requirements. Doctrinal guidance is required and TOE must be modified to provide for required internal physical security personnel and equipment.

3.5.1.1.1. Summary.

Doctrinal guidance and TOE modification is required to provide required internal physical security personnel and equipment for conventional ammunition organization.

3.5.1.2. Organization and Employment of Conventional Ammunition Companies.

Present methods for modification of personnel and/or equipment levels in conventional ammunition organizations include the use of General Orders, MTOE, use of Strength Levels in TOE and augmentation by additional TOE detachments. The use of Strength Levels in basic TOE has not proven adequate as they do not provide sufficient flexibility to meet mission requirements. (See Discussion Item No. 3.5.1.3.) The 29 series TOE Composite Service Organization and TOE 9-550 Ordnance Service Organization do not provide adequate equipment and personnel due to the increased use of palletization and containerization in the shipment of conventional ammunition. MTOE has been used exclusively to modify units because the MTOE provides the only effective method of modifying TOE. Action is required to modify TOE Strength Levels to provide increased flexibility.

Additionally, augmentation requirements could be best satisfied by TOE 9-550D detachments, provided the TOE is aligned with TOE 9-17 series and TOE 9-38G to provide for mechanized handling of ammunition. TOE 29 series organizations are designed for warehouse operations and should not be employed in handling conventional ammunition.

As shown in Inclosure 3-3, TOE now in use in the field include TOE 9-17 series and TOE 9-38G for conventional ammunition companies and TOE 9-86 series and TOE 9-36G for ammunition battalions. During this survey, many problems were presented by organizations operating under older series TOE that could have been eliminated had the unit been organized under the more recent TOE. Upon close examination it was determined that MTOE changes were updating old TOE to the extent that they were equivalent to the later TOE. It could be expected had the most recent TOE been used, the changes would have been less extensive since a more up-to-date base document is used in preparation. Use of one standard TOE would facilitate the processing of MTOE documents and the development of new series of TOE since input to USA Combat Development would be based on a single base document.

3.5.1.2.1. Summary.

Review of TOE 9-550D is required to align it with TOE 9-17 series and TOE 9-38G so that effective augmentation can be provided. TOE 29 series should not be used to provide augmentation. Requirements for TOE modification will be reduced if only the most recent TOE is utilized in the field.

3.5.1.3. <u>Direct Support Ammunition Supply</u>.

Present concepts call for the use of one conventional ammunition company TOE to be used for both direct support and direct support/general support roles. At full strength, this company (TOE 9-17 series or TOE 9-38G) can provide support at two separate locations through the use of two storage and issue platoons. For short periods of time, the company may be divided so that each of the six magazine sections operates at separate locations. When operating two separate locations (ASP) normal distance between these locations does not exceed 10 miles (distance is not stated for TOE 9-38G).

In Germany, conventional ammunition companies are operating small ASP with training and basic load support missions or as reserve ASP. These companies operate in two separate locations which are at considerable distances from one another. Similarly in Vietnam, ammunition companies are operating small support operations with split companies or companies which have been reduced by MTOE and general order to provide a small support organization. In these units, personnel and equipment is split and every effort is made to make each operating element self sufficient. Normally these elements operate one ASP of a limited size and the level of support is limited to direct support with only organizational level maintenance being performed. These requirements exceed the assets provided by the TOE 9-500D Detachment BB Ammunition Supply and are too small for present organizational TOE 9-17 series or 9-38G. As can be expected, such employment adversely affects the administrative and operational control of the units with the result that capacity is less than that stated in TOE. The use of TOE 9-17 series or 9-38G to provide operating elements for widely separated ASP is very inefficient.

Current doctrine does not provide for a small, self contained and self sufficient organization to provide this type of support. Such a capability could be provided by development of a separate TOE or modification of equipment and personnel strength levels in present TOE.

3.5.1.3.1. Summary.

A TOE should be developed or present conventional ammunition company TOE modified to provide for a small direct support ammunition organization to operate a small on-location ammunition storage area.

3.5.1.4. Maintenance of Conventional Ammunition.

Maintenance systems used in the field vary between theaters. In USAREUR, organizational and limited direct support maintenance is performed by DS/GS ammunition companies operating ASP which support basic load and training requirements. Companies operating reserve ASP and prestock points perform organizational and direct support maintenance to the maximum extent possible, however, they are limited by the large tonnages involved. Ammunition requiring DS and GS maintenance which cannot be performed on site is evacuated to Mieasu Army Depot. Mieasu Army Depot is a TDA organization which operates a fixed permanent facility using local national labor.

In Korea and Okinawa, TOE DS/GS ammunition companies operate ammunition depot-type activities where general support and limited depot maintenance is performed. These organizations have been modified by MTOE and have been augmented with equipment and local national labor.

In two locations in Vietnam, the 3d and 191st Ordnance Battalions which operate consolidated ammunition depots, the ammunition companies perform no maintenance. Renovation detachments, belonging to these battalions, perform all organizational and direct support maintenance. General support maintenance is limited to fabrication of boxes and pallets. In the DaNang Support Command DS/GS ammunition companies, which operate separate locations and do not have a renovation detachment assigned, perform organizational and limited direct support maintenance. All ammunition requiring general support maintenance is evacuated from Vietnam to an out-of-country depot, primarily to Okinawa.

As shown, currently established categories of maintenance are not followed by the intended type organization. The level of maintenance performed at a location is established by the local command and by assets available to perform a specific level of maintenance. Economics, not the specific organization, is the deciding factor as to the level of maintenance to be performed. Every effort is made to accumulate large quantities of ammunition requiring the same or similar type maintenance. Establishing maintenance facilities is an expensive undertaking and is minimized by volume production. As can be seen, categories of maintenance as defined in doctrine have little effect on the specific organization that will perform a specific level of maintenance.

3.5.1.4.1. Ammunition Maintenance Detachment TOE 9-500D.

The concept of general support maintenance being performed by the Ammunition Maintenance Detachment TOE 9-500D appears sound in theory but is not supported by application in the field. Presently, there are three active detachments organized under this TOE. Two are in Vietnam (performing DS maintenance) and one is in CONUS (training mission).

The evaluation of general support maintenance in the field can not be accomplished in Vietnam due to the limited amount of general support maintenance required to be performed. The quantity of ammunition requiring maintenance is limited because only serviceable ammunition is being supplied to the theater and is normally consumed before it requires maintenance. Limited quantities of unserviceable ammunition are generated but not in sufficient quantities to warrant establishing general support level maintenance operations. Unserviceable ammunition is normally evacuated out-of-country if it can be economically recovered. If not, it is destroyed.

The problem to be resolved is; what level of maintenance is required to meet contingency planning requirements for the future?

If general support maintenance is not required, then these detachments and the concept of GS maintenance should be eliminated. In the event that GS level maintenance in the field is required to provide maintenance support of critical items without regard to cost, then these units must be maintained and provided an active maintenance mission in order to retain skill levels of military personnel and to keep TOE current. Failure to assign GS maintenance missions to these units will negate the value of retaining these units on active status.

3.5.1.4.1.1. Summary.

Reevaluation of the concept of general support maintenance for conventional ammunition by TOE organizations in the field is required. If the concept is still valid then TOE 9-500D Ammunition Maintenance Detachments must be assigned an active maintenance mission. If it is not valid, then the concepts and supporting doctrine must be eliminated.

3.5.1.4.2. <u>Ordnance Company Conventional Ammunition DS/GS</u>.

Current doctrine states that maintenance will be performed by the Storage and Issue Platoon using TOE hand powered tool sets. Standard practice is to operate a consolidated maintenance facility for the company which is separate from the ammunition storage area. Very little maintenance is performed in the storage area due to the non-availability of work facilities and safety requirements. The construction and complexity of these maintenance facilities varies between units and usually consists of an inspection (segregation) line and a maintenance line. The inspection line is used to perform inspection of unit turn-ins and surveillance of receipts and unit stocks.

In this way, company assets are consolidated to provide more efficient maintenance operations. Supervision is provided by Department of the Army Ammunition Surveillance Inspectors and is the responsibility of the Technical Support Section, TOE 9-38G Company, or a Surveillance and Maintenance Section operating directly under the Operations Section, TOE 9-17 Company. Management and production control of the maintenance activity is under the Operations or Control Section of the company. Operation capability is limited by TOE equipment; if large tonnages are to be processed additional equipment is required. Maintenance is usually not performed when the company is operating in two separate locations due to lack of maintenance assets although an inspection line is normally established. The level and quantity of maintenance to be performed is established by directives from higher headquarters and restricted by available assets. Economics is the primary consideration and maintenance is performed at the level and location where it is most economically feasible. The concept of on-site maintenance is the most desirable due to the large tonnages of ammunition usually involved and transportation required to evacuate ammunition for maintenance.

This maintenance function should be separated from the storage and issue function of the company and would best be performed by MOS 55C Ammunition Renovation Specialist. Inspection of maintenance activities should be performed by MOS 55X40 Military Ammunition Inspectors under the supervision of DAC Surveillance Inspectors. Organization of personnel and equipment should enable the maintenance element to operate in the two separate storage locations of the ammunition company when established.

3.5.1.4.2.1. Summary.

A separate maintenance element is required to be established in the conventional ammunition company.

3.5.1.5. <u>Non-Availability of Transportation for Conventional Ammunition</u>.

Non-availability of transportation for conventional ammunition is presently a worldwide problem. Ammunition units presently provide transportation of stocks for intra ASP or depot levels as limited by TOE equipment. All other transportation requirements external to ASP or depot operations are filled by either using units or through requests to local transportation offices.

Transportation requirements for ammunition present some unique problems in that it is a hazardous cargo and hence, there are stringent safety requirements for explosive transport and transporting vehicles. These requirements are enforced through vehicle inspections using DD Form 626 (Motor Vehicle Inspection Report) and inspection of cargo and vehicles by Ammunition Surveillance Inspectors.

The problems generated by these safety requirements are the rejection of vehicles as suitable for the mission and associated delays in obtaining replacement vehicles. These rejections result from the inspection of vehicles by ammunition personnel after the vehicle/convoy arrive at the ASP or depot for loading. A thorough inspection of transportation vehicles by TC operations and maintenance personnel prior to dispatch would significantly reduce the number of rejections and the resultant delays in shipping. Delays usually range in time from a few hours to as much as a day or more. This often results in excessive resources expenditure in the supply system and the loss of supported unit training time in a peacetime situation.

3.5.1.5.1. Summary.

Review of the problem of non-availability of adequate transportation for conventional ammunition transport is required.

3.5.2. MOS Structure.

3.5.2.1. MOSC 55A10 Ammunition Helper.

The "helper" concept, when utilized with relatively long training (OJT) periods for helpers (apprentices) prior to promotion, has merit. However, present supply concepts and increased complexity of supply systems have negated the requirement for MOS 55A Ammunition Helpers. Currently, the Army is experiencing a worldwide shortage of 55A personnel and in order to resolve this shortage, the 8th Ordnance Company, Fort Bragg, NC., is conducting a program to train MOS 55A personnel. Personnel trained in this course are those who have been reassigned because they failed to complete the AIT course to which they were previously assigned. The quality of personnel sent to this course is low; approximately 50% are eliminated from the Army by administrative action before they can complete the course. The remainder of personnel worldwide assigned this MOS are bulk filler personnel from CONUS or personnel usually reassigned within the theater because they are unable to satisfactorily perform in other MOS. Personnel assigned this MOS, in general, do not meet skill, knowledge and mental requirements as listed in AR 611-201 when assigned. Since there is no requirement that personnel be school trained prior to award of the MOS, there is no recourse to prevent unsuitable personnel from being awarded the 55A10 MOS

Factors affecting 55A MOS are; (1) current personnel promotion policies and procedures, and (2) current trends in ammunition handling/shipping methods. The normal minimum time in grade for an E-2 is four months; promotion from E-3 to E-4 requires six months in grade with a total service time of one year. With waivers, it is possible for an individual with only three months in grade to be promoted provided he has a total service time of seven months. With this accelerated promotion policy, an individual in MOS 55A has a potentially short utilization period.

It is considered obligatory and therefore common practice by unit commanders receiving promotion quotas to promote eligible personnel rather than return unused quotas. As a result, an individual with MOS 55A who meets the time in grade and time in service requirements will, more likely than not, be promoted. Accelerated promotions and overall personnel shortages seriously affect qualifying helpers as journeymen through OJT. The end result is that the individual finds himself promoted before he has had sufficient time or training to become proficient in the skills and knowledge associated with his current grade and duty position.

Since MOS 55B is a CONARC training speciality, field units are provided with a CONUS training base source as well as an OJT source for this MOS. A large number of promotions, due in part to accelerated promotion policies, may result in a shortage of 55A and an overage of 55B. As shown in Inclosure 3-4, approximately 20% are reclassified to 55C20, 25% to 55B30 (76M) and 50% to 55B20. It becomes obvious that a disruption of programmed inputs to the 55B20 and 55B30 resident instruction courses will occur as a result of overages and shortages not anticipated by planners.

The concept of ammunition shipment and movement has changed in recent years. The trend is towards palletized and containerized shipments which require handling by material handling equipment such as rough terrain forklifts and cranes. The result is a significant decrease in the manual labor previously required to physically move ammunition and an increased requirement for skill, knowledge and mental ability for ammunition personnel. Inclosure 3-4 shows that, when assigned, 55A10 personnel are in many cases used for other than ammunition related functions..

It also must be noted that elimination of the 55A MOS would not preclude progression of non-school trained personnel or personnel with other MOS from entering the ammunition field under present regulations. The elimination of the 55A MOS should result in a cost reduction since the MOS and supporting documentation will not be required to be maintained. The 55A MOS contributes little to the ammunition career management field and should be eliminated.

It is realized that the elimination of the 55A10 MOSC will result in an increased authorization of MOSC 55B20 and therefore, an increased CONUS training load. This will provide an increased education level of basic ammunition personnel which will do much towards improving the quality of ammunition personnel and the ammunition supply system.

It must be recognized that with increased sophistication of the ammunition supply system that the requirement for manual labor personnel has been replaced by a requirement for ammunition personnel with higher levels of intelligence and knowledge. Ammunition in addition to being hazardous and expensive has become a very sensitive item requiring increased control of storage and security procedures. Only personnel of high caliber and qualifications should be utilized in ammunition storage.

3.5.2.1.1. Summary.

MOSC 55A10 Ammunition Helper should be eliminated as it is no longer required. MOSC 55A10 TOE authorizations should be converted to MOSC 55B20 or 55C20 where required.

3.5.2.2. MOS 55B Ammunition Storage and Operations Specialist.

Due to changes in concepts of ammunition shipment and movement in recent years, the trend is toward palletized and containerized shipment of ammunition, which requires handling by materiel handling equipment. As a result of adding additional MHE and operators, 55A and 55B ammunition personnel positions have been reduced in the recently developed TOE 9-38G (Ordnance Company, Conventional Ammunition (DS/GS).

The Rough Terrain Forklift (RTF) is normally operated by the 62M Rough Terrain Forklift and Loader Operator who has an entry grade of E-4. Ammunition units in the field do not have sufficient MOS 62M personnel and are forced to use 55A and 55B (primarily 55B) personnel to operate RTF and other MHE. Even when 62M personnel are available, 55B personnel are preferred to operate forklifts because of their training in ammunition storage and the safety hazards of storage and handling of ammunition. Also the number of MOS 62M personnel authorized in the TOE is not sufficient to meet requirements for a 24-hour operation.

With the increased use of palletization and containerization, 55B personnel now must know how to operate and maintain MHE as part of their daily duties. This is not to say that 55B duties are exclusively MHE operations, but where facilities and equipment availability permit, it is approximately 40 to 50% of his duty requirements. Action should be taken to modify the 55B job description contained in AR 611-201 to include MHE operator responsibilities. Such action would require the present 55B20 POI be modified to include more concentrated individual training in this area.

3.5.2.2.1. Summary.

AR 611-201 should be revised to include operator maintenance of MHE equipment for the 55B MOS.

3.5.2.3. Requirement for Career Education for Ammunition Career Field MOS.

During this survey, it was found that 59% of the enlisted personnel grades E5 to E9 had not received formal training in the ammunition field. Statistical data to document this can be found in Incl 3-1. This survey was not a 100% sampling of personnel in these grades, but was directed to enlisted personnel holding responsible positions in surveyed organizations and it is possible that this percentage would have been higher had a 100% sample been taken. This high percentage of untrained personnel can only have an adverse effect on the ammunition supply system.

Personnel in the grades E5 to E9 who were not school trained came from three sources. The first source is personnel that upon entry into the Army were assigned to ammunition organizations without school training and have progressed from the 55A MOS into one of the higher skill level MOS. These personnel are not considered to be a serious problem since they receive a considerable amount of OJT and are qualified to work in the ammunition field. They are, however, a very small part of the total personnel in the ammunition field. The second source is personnel who are promoted into ammunition MOS because they cannot be promoted in MOS or position in which they are actually working. Promotion is not based on experience in, or knowledge of, the ammunition field and upon reassignment they fill positions for which they are not qualified. The centralized promotion system is designed to prevent this but it is difficult to prevent at the E5 level. Personnel in this category are usually younger and more aggressive with the capacity to learn and progress if provided proper training. Most of these personnel can be trained if the Enlisted Education System Second Level Course now planned for E4 and E5 personnel is aggressively supported to insure all eligible personnel attend this course and/or if they participate in a non-resident instruction program of training.

The third source is personnel in higher grades who are reclassified into the ammunition career field due to physical profiles, excess MOS in other fields or upon request of the individual. This category of personnel is the least satisfactory since they are already established in a supervisory grade and occupy a supervisory position for which they are not qualified when assigned to ammunition organizations. These personnel do not have the opportunity for OJT prior to being assigned in supervisory positions and are older and less capable of readjusting.

In addition to adversely affecting the supply system, the promotion system and career field are adversely affected. The lower grade personnel are not competitive for promotion under the centralized promotion system since schooling is one of the considerations for promotion. The higher grade personnel experience the same problem and additionally they disrupt the promotion system by filling positions they are not qualified to hold. This in turn, blocks the promotion of qualified personnel. Promotion is a key morale item and definitely affects the retention of qualified personnel.

The large number of untrained personnel presently in the ammunition field is an immense problem and the proposed EES Second and Third Courses will do much towards improving the overall educational level of ammunition personnel. This training program will require a considerable period of time to train sufficient personnel to affect the system. The courses were originally developed to meet the increased educational requirements brought about by the increased sophistication of the ammunition supply system, and not to train unqualified personnel presently in the ammunition field.

3.5.2.3.1. Summary.

Formal school training or successful completion of a required non-resident instruction program should be a prerequisite for promotion to grade E5 and above or award of ammunition MOS to personnel in the grade of E5 and above.

3.5.2.4. Award of MOSC 55X40 Military Ammunition Inspector.

The award of MOSC 55X40, Military Ammunition Inspector as stated in AR 611-201, requires successful completion of appropriate service school training or a waiver of such requirement by Commandant of USAMMCS. Presently numerous personnel are being awarded the MOS without school training or the required waiver. In some cases personnel are not even in the ammunition field, i.e., an E6 MOSC 11B40 Drill Sergeant was converted to MOSC 55X40 in CONUS and shipped to Vietnam. As of this report date only one waiver of school training has been granted. Action is required to screen personnel records of individuals assigned this MOS and revoke award of the MOS where personnel were not authorized to hold it. Failure to do this will result in unqualified personnel being assigned to positions which require a high degree of technical knowledge and proficiency.

3.5.2.4.1. Summary.

Personnel are being awarded MOSC 55X40 in violation of AR 611-201, and action is required to prevent recurrence and to revoke award of MOS to unqualified personnel.

3.5.3. Personnel and Grade Authorizations.

3.5.3.1. MOSC 55X40 Military Ammunition Inspector.

MOSC 55X40, Military Ammunition Inspector, is a new MOS for which training has just been initiated. This MOS is intended to augment present Department of the Army Ammunition Surveillance Inspectors, in the inspection of conventional ammunition. TOE authorizations in the field will not be established until Consolidated Change Table 300-48 is distributed and implemented.

The establishment of this MOS has provided military personnel with a level of technical skills and knowledge not previously available. Personnel in the field, military and civilian, unanimously commented favorably on the establishment of this MOS. Comments indicated a need to increase the number of this type personnel in the field for use in the area of technical assistance and inspection and/or supervision of ammunition storage.

It was recommended that 55X positions be established for division ammunition offices and similar type organizations to assist the Division Ammunition Officer (DAO) in developing and planning ammunition supply and maintenance procedures within a division. The military inspector would provide technical assistance, under direction of the DAO, to using units to aid them in maintaining their ammunition in a ready to use condition.

It was further recommended that 55X positions be established down to the brigade size organizations based on size of basic load of ammunition. Personnel would provide supervision of the basic load storage and to advise the commander on ammunition matters. Additionally, 55X positions should be established on any staff which is required to conduct inspection of conventional ammunition (i.e., AGI inspection teams).

3.5.3.1.1. Summary.

Requirements exist to establish MOS 55X, Military Ammunition Inspector, positions in division ammunition offices and similar activities, inspection teams and brigade headquarters to provide technical knowledge for inspection, supervision, and/or technical assistance to organizations storing conventional ammunition.

3.5.3.2. Conversion of TOE Positions from Grade E2 to E3.

Present TOE positions for the grade E2 have been established by manpower authorization criteria documents. Present promotion policies provide for promotion from grade E2 to E3 with four months in grade which results in individuals arriving at TOE units already in the grade of E3 or due for promotion very shortly after arrival. Eligible personnel are promoted to E3 regardless of TOE vacancy and are assigned to E2 positions in the TOE. TOE positions in the grade of E2 serve no practical purpose in present TOE and should be converted and consolidated with present E3 positions.

3.5.3.2.1. Summary.

All TOE positions for grade E2 should be converted to grade E3 and consolidated with presently authorized E3 positions.

3.5.3.3. Communications Chief Grade Authorization TOE 9-38G.

The Communication Chief position presently authorized in paragraph 02, line 05, is grade E5. This individual is responsible for the supervision of eight personnel, to include one E5, four E4 and three E3, and the maintenance of a considerable amount of high-dollar value communications equipment. In view of the responsibility placed on this individual, consideration should be given to upgrading this position to E6.

3.5.3.3.1. Summary.

Communication Chief position, paragraph 02, line 05, should be upgraded to E6.

3.6. MATERIEL

3.6.1. Equipment Authorizations.

Recommendations contained below represent a consolidation of the most pertinent comments received from personnel surveyed. The majority of comments referenced were of a recurring nature but isolated comments are included when deemed valid. Recommendations include comments for the addition, deletion or substitution of equipment with the intent to improve TOE equipment authorizations. Not all recommendations are detailed or specific; but problem areas where several courses of action are available are presented. Further review by responsible agencies will be required in order to resolve the problem.

3.6.1.1. Communications Equipment.

Presently, vehicle mounted and back-pack military radios are being used worldwide within ammunition storage areas for controlling ammunition and security personnel. Organizations consider radio communications essential to unit operation due to the large size of storage areas. Telephones are not considered adequate because of the need for mobile communications plus the extensive effort required to install and maintain telephone equipment.

There is a valid requirement for an internal radio communications system which would be best satisfied by small transceiver type radios. Present use of military radios is not economical due to the high cost of equipment. Additionally, the use of relatively high powered radio equipment presents a safety hazard if used near ammunition items containing explosive bridge wires (i.e., electric blasting caps). The use of low power transceivers used in conjunction with base stations would provide required communications capability at a low cost with improved safety.

3.6.1.1.1. Summary.

Ammunition organizations require a low-power radio communications system for control of ammunition and security personnel.

3.6.1.2. Ammunition Slings.

Slings are used with cranes, wreckers and other lift equipment by virtually every ammunition unit in the world to handle loose and palletized projectiles, palletized boxed ammunition, CONEX containers, and drum-type munitions. Often forklift and other MHE available in ammunition units can not be used to load trucks, open railcars, barges and ships because of limited maneuvering space, restrictive terrain, time restrictions, and/or nonavailability of equipment.

Ammunition units throughout the world fabricate slings of their own design and use whatever materials are locally available. These home-made devices are seldom, if ever, properly load tested and have failed under load.

The requirement for ammunition slings can be satisfied by local fabrication or through the supply system. Design of slings and load test requirements must be supplied to the field if local fabrication is used to satisfy requirements for slings. If the requirement for slings is to be satisfied through the supply system, authorization for the slings and requisitioning information must be supplied to the field. Presently there are several slings available in the supply system that would in part meet the requirement. Review is required by appropriate agencies to determine adequacy of available slings and what method will be used to satisfy field requirements.

3.6.1.3. Roller Conveyer.

With the advent of MHE and palletized and containerized ammunition, units are receiving nearly 75% of stocks in this configuration. Current authorization for roller conveyer contained in TOE 9-17 series and TOE 9-38G can be reduced by approximately two-thirds because MHE and new packaging concepts have reduced the requirements for man-handling ammunition. Review of these TOE is required to reduce the authorization for roller conveyor equipment.

3.6.1.4. Truck Forklift Authorization TOE 9-38G.

Truck forklift, line number X49051, 10,000 lb capacity as authorized by TOE 9-38G should be replaced with truck forklift, line number X48914 6,000 lb capacity. The 10,000 lb capacity is not currently utilized by conventional ammunition organizations. Additionally, its size makes it more difficult to maneuver than the 6,000 lb forklift. By standardizing the size of forklifts, a reduction in maintenance problems would result. The 6,000 lb capacity forklift, supplemented with heavy-lift equipment, such as cranes, currently authorized, will sufficiently satisfy the unit's lift requirements.

3.6.1.4.1. Summary.

Action is required to replace 10,000 lb capacity forklifts in TOE 9-39G with 6,000 lb capacity forklifts to standarize equipment.

3.6.1.5. Decontaminating Apparatus, Truck Mounted LN F82154.

Decontaminating apparatus, truck mounted, line number F82154, currently authorized in TOE 9-17 series is not required for mission performance. No authorization for this item is contained in TOE 9-38G. Authorization for this item of equipment should be deleted from TOE 9-17 series.

3.6.1.6. Beam Hoisting Liquid Tank LN B52875.

Beam Hoisting Liquid Tank, line number B52875, currently authorized by TOE 9-17 series is not required for mission performance. This item is not authorized in TOE 9-38G. Authorization for this item should be deleted from TOE 9-17.

3.6.1.7. Beam Hoisting Airplane Smoke Tank LN B51916.

Beam Hoisting Airplane Smoke Tank, line number B51916, currently authorized by TOE 9-17 series is not required for mission performance. This item is not authorized in TOE 9-38G. Authorization for this item should be deleted from TOE 9-17.

3.6.1.8. Adapter Line Filling One Ton Container LN A09002.

Adapter Line Filling, One Ton Container, line number A09002, currently authorized by TOE 9-17 series is not required for mission performance This item is not authorized in TOE 9-38G. Authorization for this item should be deleted from TOE.

3.6.1.9. Wrench Valve Removing LN Y64375.

Wrench valve removing, line number Y64375, currently authorized by TOE 9-17 series is not required for mission performance. This item is not authorized in TOE 9-38G. Authorization for this item should be deleted from TOE.

3.6.1.10. Wrench Valve Removing LN Y64512.

Wrench Valve Removing, line number Y64512, currently authorized by TOE 9-17 series is not required for mission performance. This item is not authorized in TOE 9-38G. Authorization for this item should be deleted from TOE.

3.6.1.11. Scoop Mine Laying LN S54756.

Scoop Mine Laying, line numbers 54756, currently authorized in TOE 9-17 series and TOE 9-38G for use with TOE bulldozers is not required for mission performance. Authorization for this item should be deleted from TOE.

3.6.1.12. Banding and Sealing Equipment.

3.6.1.12.1. Construction of Banding and Sealing Equipment.

Banding and sealing equipment currently in use is not durable and requires improved construction. Life expectancy of this equipment ranges from two months to one year depending upon the utilization and care of the item. Upon becoming unserviceable, repair parts are difficult if not impossible to obtain due to nonstandardization of equipment and lack of FSN being assigned to repair parts. Basic construction of equipment requires improvement and if equipment is to be repaired, repair parts must be made available.

3.6.1.12.2. Authorization for Banding and Sealing Equipment.

Current authorization of equipment for conventional ammunition companies is not sufficient for mission requirements. Authorizations, as a minimum, should be doubled to permit banding operations to be performed concurrently in multiple locations. Authorization of 1¼" size equipment should be increased to 6 sets per company due to increased use of palletization and limited durability of the equipment.

3.6.1.13. Fuel Handling Capability.

In TOE 9-17 series, conventional ammunition company and TOE 9-36G and 9-86 series, a problem exists in that only one type of fuel can be handled in bulk quantities by TOE equipment. TOE equipment is both gasoline and diesel powered and consumes fuel in considerable quantities. TOE 9-17 series and TOE 9-86 series authorize one Tank and Pump Unit which mounts on a cargo truck. Both gasoline and diesel cannot be stored in the pods because only one pump and filter unit is available to handle the fuel. TOE 9-38G resolved the problem by authorizing two each Tank Units, Liquid Dispensing, Trailer Mounting LN V19950 one for each type of fuel, and two each trailers cargo 1½ ton to transport the tanks. TOE 9-36G authorizes only one Tank Unit Liquid Dispensing and Trailer which is not sufficient. TOE 9-17 series, TOE 9-86 series and TOE 9-36 require authorization of two each Tank Units Liquid Dispensing and two each Trailer Cargo 1½ ton to provide adequate fuel handling capability.

3.6.1.14. Requirement for Portable Scale.

A requirement exists for a small portable scale for weighing ammunition components and materials. Weight information is required for completion of shipment documents and is not available in reference publications for many items. Some examples of items in this category are salvage brass or steel and bulk shipments of packing materials. Requirement would be best satisfied by a small portable truck scale as most shipments are transported by cargo trucks.

3.6.1.15. Trailer Moving Equipment.

Ammunition companies are experiencing problems in moving 12T S&P trailers within ammunition storage areas. Ammunition shipments are received and shipped on this type transportation; however, trailers cannot be spotted as TOE 10 ton tractors will not mate with the trailers. Since the unit cannot move the trailers with its own equipment, it becomes dependent upon transportation units to provide the necessary tractors. This is unsatisfactory as operations are sometimes limited by the availability of externally supplied tractors. Equipment must be provided to ammunition companies to enable them to position trailers within ammunition storage areas.

3.6.1.16. Vegetation Control Equipment.

Conventional ammunition companies require vegetation control equipment to maintain fire breaks and control vegetation in storage areas to reduce fire hazards. Use of TOE bulldozers (tractor, full tracked) is not satisfactory as they are slow and erosion problems usually result from their use. The size of area to be maintained is large and thus also precludes efficient use of manual labor for this operation. The use of a discus-type plow which could be towed by a truck or bulldozer would provide an effective and efficient method of providing vegetation control.

3.6.1.17. Safety Tools.

Non-sparking safety tools are not being received through supply channels. The reason for this could not be determined but does not appear to be the fault of requisitioning organizations. Further examination of this problem is required as this lack of tools effects maintenance operations of ammunition units.

3.6.1.18. Fire Fighting Equipment.

Fire fighting equipment currently authorized by TOE 9-17 series and TOE 9-38G is not adequate for use in areas other than hard surface storage areas and roads. Fire fighting equipment such as the 40 lb wheel mounted fire extinguisher is too large and bulky to be man transported off of hard surfaces. All fire fighting equipment should be capable of being readily transportable in rough terrain areas either by vehicle or ammunition personnel. Conventional ammunition companies require additional portable fire fighting equipment for use in rough terrain areas.

3.6.1.19. Standardization of Cargo Vehicles in TOE.

Five-ton cargo trucks in TOE 9-17 series and TOE 9-38G should be replaced with 2½ ton cargo trucks to provide uniformity of equipment. Standardization of equipment will result in reduced maintenance problems. The full capacity of 5-ton cargo trucks is not normally utilized in transporting ammunition and TOE equipment. A considerable cost savings would be realized by this action without affecting mobility of the company.

3.6.2. Materiel Development Requirement.

In order to improve ammunition operations there is a need for development of the following items of materiel.

3.6.2.1. Portable Ramp for Use With MILVAN Trailers.

With the advent of MILVAN containerized shipment of ammunition, a requirement exists for a portable ramp for loading and unloading MILVAN trailers. Construction of these trailers is such as they must be loaded and unloaded by forklift. Loads consist of two or more pallets of ammunition placed one behind the other and are loaded from the rear of the trailer. The size of the trailer doors limits entry of MHE to small forklifts. When a forklift is used without a ramp or dock to unload a trailer, the pallets must be pulled to the door before they can be forklifted. Since floors are designed to prevent sliding, this is obviously a time consuming, marginally safe operation which is in conflict with the basic principles of containerization.

Ramps or docks are not normally available in ammunition storage areas and would be expensive to install in sufficient quantities to expedite loading and unloading of MILVAN. Use of a centralized dock or ramp facility would result in requirement to transport ammunition to storage locations either by forklift or cargo vehicle. The use of a portable ramp would allow a small forklift to load MILVAN at storage locations with a minimum effort.

3.6.2.1.1. Summary.

A requirement exists for the development of a portable ramp for use with MILVAN containerized trailers to expedite loading and unloading.

3.6.2.2. Requirement for Small Forklifts.

Development of a small forklift for use in ammunition storage areas is required because of limiting factors in presently available military and commercial forklifts. The 6,000 and 10,000 lb RT forklifts are adequate for handling ammunition which is palletized and is to be stored on open pads or under shed type storage. However, these forklifts are too large to operate inside magazines or MILVAN containers. Additionally, exhaust emissions present a serious safety problem in operating this type equipment in enclosed areas.

Electric-powered forklifts are currently used in depot type operations with very good success. They are small enough to operate inside magazines and eliminate the hazard associated with exhaust emissions. Operation of this type forklift is limited to areas where hard surface storage facilities and roads are available. Also available is a gasoline powered forklift with the same capabilities as the electric forklift except that it cannot be operated in enclosed areas due to exhaust emissions.

Development of a small forklift to operate within an ammunition storage area is required. It must be small enough to operate inside magazines and MILVAN containers and must not present a safety hazard to ammunition or personnel. It must have a rough terrain capability and the design should be kept simple to reduce maintenance. Lift capacity should be sufficient to handle palletized ammunition loads (approximately 3,000 lb). TOE authorization should be provided upon development since the item of equipment could supplement or possibly replace some of the currently authorized TOE forklifts.

3.6.2.2.1. Summary.

Requirements exist for the development of a small rough terrain forklift for ammunition handling to replace current small forklifts and supplement larger forklifts.

3.6.2.3. <u>Requirement for a Small Crane</u>.

Requirements exist for the development of a small crane for use in ammunition handling. Current series of cranes are not adequate due to their large size, slow reaction time to displace and slow operating characteristics. In some models of the rough terrain crane, the operator remains stationary while the boom turns, making observation and control of the crane difficult. Truck mounted cranes have limited mobility and a high center of gravity which results in the equipment being unstable. Use of a 5-ton truck mounted wrecker for handling ammunition is not satisfactory due to its limited reach capability and frequent hydraulic failures when used for extended periods of operation.

Present equipment is designed for use in earth moving and construction work where speed of operation and sensitive control is not essential. In ammunition handling, these characteristics affect the rate at which ammunition can be handled. Maximum lift capacity normally required for ammunition is approximately 6 tons and loads are usually less than this. Many favorable comments were received from personnel on the effective use of a small Japanese manufactured crane by the Han Jin Transport Company at the Quin Nhon Army Depot. The use of a small quick operating crane would provide more effective utilization of lift capability than is now realized from larger heavy-lift capacity cranes.

3.6.2.3.1. Summary.

A requirement exists for the development of a small crane for use in ammunition handling activities.

3.6.2.4. Mobile Ammunition Maintenance Equipment.

Mobile ammunition maintenance equipment is required for performing onsite maintenance of conventional ammunition. Due to transportation costs it would be more economical to perform most required maintenance onsite than to evacuate the item. Development of mobile maintenance equipment would allow maximum utilization of equipment and reduce maintenance costs by allowing maintenance to be conducted where it is most economically feasible.

3.6.2.4.1. Summary.

Requirement exists for the development of mobile maintenance equipment for onsite maintenance of conventional ammunition.

3.6.2.5. Design of Cargo Vehicles and Containerized Equipment.

Present design of cargo vehicles and containerized equipment precludes ready access of MHE, primarily forklifts, to cargo. It is recommended that in the future, all cargo trucks, trailers and containerized equipment be equipped with side boards or doors that are removable or hinged to enable MHE direct access to all cargo. Improved design of cargo vehicles and containerized equipment will preclude the requirement for special equipment to handle cargo and will expedite cargo handling.

3.6.2.5.1. Summary.

Design of cargo vehicles and containerized equipment requires improvement to provide for expedited material handling of cargo.

3.6.2.6. Lead Wire Seals.

Lead wire seals presently used to seal ammunition containers should be replaced with a self-sealing clip type. Clip type seals are easier to use, require no additional tools such as seal presses, would be more economical to use, and would provide same security as lead wire seals.

3.6.2.6.1. Summary.

Lead wire seals presently in use should be replaced with self-sealing clip type seals.

3.6.3. Maintenance Problem Areas.

3.6.3.1. Maintenance of Forklifts.

3.6.3.1.1. Maintenance of forklifts is a problem in all organizations visited. This problem seriously impacts on the handling ability of ammunition organizations. A major contributing factor is operation of equipment by untrained personnel, which results in lack of adequate operator maintenance being performed and abuse of equipment during operation. Ammunition organizations are not receiving authorized operator personnel and, to meet mission requirements, ammunition personnel are receiving OJT as operators. A discussion as to what type personnel are desirable as equipment operators was presented in paragraph 3.5.2.2. Regardless of what type of personnel utilized to operate equipment, increased operator training is required to reduce maintenance problems on forklifts.

3.6.3.1.1.1. Summary.

An extensive operator maintenance training program must be initiated in order to reduce forklift maintenance problems.

3.6.3.1.2. Repair of unserviceable forklifts is a problem in that repair is usually delayed due to a lack of repair parts. This was also a problem in all organizations visited and is a result of the inability of the supply system to respond to requirements. Action is required to improve the responsiveness of the supply system in order to reduce the high dead line rates for forklifts.

3.6.3.1.2.1. Summary.

Action is required to improve the responsiveness of repair parts supply in order to reduce the high dead line rates for forklifts.

3.6.4. Reports and Records.

3.6.4.1. Use of DA Form 2765-1 For Requisitioning Conventional Ammunition.

USAEUR has supplemented AR 711-16 for conventional ammunition supply and its requiring the use of DA Form 2765-1 DOD Single Line Item Requisition System Document (Manual) for requisitioning ammunition by using units. The result is that a large volume of paper work is being created at direct support ammunition organizations.

Separate DA Forms 2765-1 are required to be submitted for each required DCDAC, therefore, increasing the total number of supply documents submitted. Previously one DA Form 581, Request for Issue and Turn-in of Ammunition was used to requisition multiple items of ammunition. A separate DA Form 2765-1 is then prepared by the ammunition unit for each lot of ammunition to be issued. The requirement to keypunch all documents introduces errors in processing requisitions and the large bulk of documents results in handling problems. The use of DA Form 2765-1 is not justified for ADP purposes due to insufficient volume of transactions. ADP equipment is not available for automatic processing of requisitions and the use of DA Form 2765-1 delays manual processing due to the volume involved. Additionally, DA Form 2765-1 is not as versatile as DA Form 581 for processing requisitions for conventional ammunition. The DA Form 581 should be retained for use when processing requisitions between using units and direct support conventional ammunition organizations.

3.6.4.1.1. Summary.

DA Form 581 should be retained for use when processing requisitions from using units to direct support conventional ammunition organizations.

3.6.4.2. Use of Non-Standard Forms in the Ammunition Supply System.

There is considerable use of locally generated forms in the conventional ammunition supply system. This is negating the requirement for DA Forms and CONUS school training of personnel. These non-standard forms are being generated for ease in preparing local reports and records. Review of current standard forms is required to determine if formats are adequate to meet field requirements.

3.6.4.2.1. Summary.

Review of standard forms currently in use in the ammunition supply system is required to determine if formats are adequate to meet field requirements.

3.6.5. Publications.

3.6.5.1. Ammunition Reference Publications.

Personnel required to use ammunition reference publications (Identification and Management Listings) were not satisfied with present formats now in use. The preferred format is the one used in the older series of Supply Manuals (SM) where all the information on an item is contained in one location. Presently, Identification List (IL) supply catalogs consist of a description section and storage and package data section. This requires personnel to look in two locations when preparing shipping documents and requires extra time to obtain required data. Personnel would like to have data listed at one location in a publication similar to the older type formats.

Additionally, the present system of providing changes to basic publications is unsatisfactory. Presently, a change is another complete publication that must be used in addition to basic publication. All supply catalogs should be printed similarly to SB 700-20 in a loose-leaf form for insertion in a binder and changes should be printed to permit a page for page exchange.

3.6.5.1.1. Summary.

A requirement exists for ammunition publications to be printed in a loose-leaf page form with changes provided as a page for page exchange. Format of ammunition reference publications should provide for total information on an item to be displayed in one location in the manual.

3.6.5.2. Informal Reference Publications.

Numerous favorable comments were received on the PS Magazine and the format it uses to present information. The format stimulates personnel interest and reception of information. It was recommended that increased use be made of PS Magazine or a similarly formated publication to stress safety, storage, and maintenance of conventional ammunition in an effort to reduce damage to and deterioration of ammunition.

3.6.5.2.1. Summary.

A requirement exists for increased use of PS Magazine or a similar type publication, to provide information to the field to stress safety, proper storage and maintenance of conventional ammunition.

3.7. TRAINING

3.7.1. General Comments.

During the survey it was noted that the level of training worldwide is a problem area which requires action. The problem area can be divided into two categories; personnel without formal school training and personnel who have received formal school training but are deficient in required skills and knowledge. The latter category must be qualified in that personnel receiving formal school training are performing adequately in the field but training programs presently in use can be improved.

The problem of personnel (primarily enlisted personnel) who have not received formal school training is addressed in paragraph 3.5.2.3., "Requirement for Career Education for Ammunition Career Field MOS" and will not be covered again. This area is not considered a problem for commissioned officers due to the limited number of personnel involved. It is a problem area for warrant officer personnel and will be addressed in detail below, under MOS 411A.

A problem common to both officer and enlisted personnel without regard to MOS was a tendency to train primarily entry-level personnel to a technical level greater than was required to perform the functions of the grades held. Technical training at entry level should be limited to that extent required to qualify personnel to perform in entry-level positions for two to three years. Detailed technical training can be provided, if required, after an individual has completed a field assignment. Personnel presently receive considerable technical training which is not utilized or required by entry level personnel. When POI are developed, consideration must be given to the fact that personnel will normally perform duties under the supervision of qualified senior personnel.

Retention of information presented during formal training is also a problem. Personnel, when assigned to the field, require extensive OJT periods prior to becoming effective performers. Much of the OJT is spent on subject areas which are presented in formal training. Recommendations were made that maximum use be made of practical exercise-type training with a minimum use of conference-type training. Practical exercise training should be as realistic as possible and should be oriented toward field situations.

School trained officer and NCO ammunition personnel are generally technically qualified to perform in supervisory positions requiring limited technical knowledge. These same individuals however are deficient in the areas of management and administration, without which they cannot efficiently utilize their technical knowledge and the assets available to them in performing required missions.

Feedback programs are in effect for the ammunition career MOS through the use of mailed questionnaires and debriefing sessions with personnel returning from field assignments. Lack of response to mailed questionnaires and limited quantities of information obtained from returning personnel restricts the timeliness and overall usefullness of such information. The result is failure to recognize field requirements for training and technical advancements on procedures and techniques used in the field. This survey can provide current information on total field requirements for training so that a better graduate can be produced through improved instructions. It must be recognized that some field requirements for training cannot be met until such time as doctrine and/or regulations are modified to authorize the required training (e.g., a valid requirement to train MOSC 55B20 in MHE operations cannot be effected until AR 611-201 is changed to require this type of training).

3.7.1.1. Summary.

The quality of ammunition career field training requires improvement in that technical training must be reduced and action taken to insure that technical training is addressed only to the level at which personnel are required to function. Officer and NCO personnel require management and administrative training to perform effectively. Additionally, quality of training should be improved through the use of new training techniques designed to improve information retention of graduate personnel.

3.7.2. <u>MOSC 55B30 Ammunition Storage Specialist</u>.

Training of MOSC 55B20 personnel requires increased emphasis in the areas of fire fighting, blocking and bracing of cargo, inventory procedures, handling safety and hazards of ammunition, and decreased emphasis on the technical characteristics. Training of personnel must include an orientation of the systems and organizations presently in the field to which they may be assigned. Communications training to include communications security and operation of TOE equipment is required as personnel must operate this equipment as part of normal duties.

Training on operation of MHE (primary forklifts) is required to include operational maintenance and licensing of personnel. Normal utilization of 55B20 personnel in the field includes operation of MHE which is not presently recognized in job descriptions listed in AR 611-201.

An area of major concern is the lack of training in special weapons as personnel presently receive no training in this area. Job description listed in AR 611-201 require 55B personnel to work with special weapons and numerous personnel are presently assigned to 55B positions in special weapons organizations. Orientation training, as a minimum, should be presented with the limiting factor being security clearances of personnel.

3.7.2.1. Summary.

Review of POI 645-55B20 is required and above recommendations incorporated into POI to provide improved training.

3.7.3. MOS 55B30 Ammunition Operations Specialist.

Training of MOSC 55B30 personnel requires increased emphasis in the areas of inventory procedure, movement control documents, MILSTRIP documents and WARS (AR 700-22 Worldwide Ammunition Reporting System) preparation and use. Training must be established to familiarize personnel with the systems and organizations presently in the field to which they will be assigned. Communications training is required to include communications security and operation of TOE equipment as personnel are required to operate this equipment as part of normal duties. Additionally, training in operation of keypunch and reading of keypunch documents is required.

3.7.3.2. Summary.

Review of POI 645-55B30 is required and above recommendations incorporated into POI to provide improved training.

3.7.4. MOS 411A Ammunition Technician.

Presently available, but used infrequently for warrant officers, is the 4E-4514/411A Ammunition Officers and Ammunition Technician Course. Inputs into this course are primarily commissioned officers who are just entering military service. The course is designed to provide a working knowledge of the ammunition field and does not provide the degree of technical training required by a ammunition warrant officer.

The requirement exists for a technical course for training warrant officers prior to, or upon, appointment to warrant status and should be mandatory for all personnel receiving the 411A MOS. Presently, the overall training level of warrant officers in the ammunition career field is poor, and will remain so until mandatory training requirements are established.

Additionally, warrant officer personnel should periodically be returned for refresher training in order to retain technical proficiency. Training would include problem areas in the field and new items of ammunition in the field or under development.

3.7.4.1. Summary.

Warrant officer technical and refresher training courses should be established.

3.7.5. MOS 4514 Ammunition Officer.

Training MOS 4514 personnel requires increased emphasis in the areas of physical security, shipment planning, ADP and stock control procedures, and less emphasis in the area of technical characteristics. More training is required in area of management and administration. Training must also be established in the areas of NATO type storage procedures and staff training for possible assignment to battalion or higher level staff. Training in procedures for requisitioning publications is required to alleviate the worldwide problem of shortage of ammunition publications in the field. Training of personnel include an orientation of the systems and organizations presently in the field to which they may be assigned.

3.7.5.1. Summary.

Review of POI 4F-4514 is required and above recommendation incorporated into POI to provide improved training.

4. SPECIAL AMMUNITION

INDEX FOR SPECIAL AMMUNITION REPORTS

4.1. General.

This portion of the MAME-71 final report contains the data that was collected, collated, and analyzed by the MAME-71 evaluators on special ammunition team (D-1), and the conclusions and recommendations are based upon a survey of special ammunition units in CONUS, Europe and Korea. This data collection encompassed the period: April 1971 through August 1971. The command structure for overseas units are depicted in inclosures 6-1, 6-2, 6-4 and 6-5. Units visited in CONUS were at Ft. Bragg and Ft. Sill.

4.1.1. Special Ammunition TOE.

The Special Ammunition (Special Weapons) Companies/Activities are organized under the following basic documents:

TOE 9-47 (5 companies) Direct Support

TOE 9-48 (3 companies) General/Direct Support

TOE 9-87 (10 companies) General Support

TOE 9-377 (5 companies) Depot Support

4.1.2. Special Ammunition Units Visited.

The following types of units were visited during the MAME-71 exercise:

TDA Nuclear Weapons Support Section (2 Units CONUS)

TOE 9-47 (2 companies overseas, 1 company at Ft. Bragg)

TOE 9-48 (2 companies overseas, 1 company at Ft. Sill)

TOE 9-87 (3 companies overseas)

TOE 9-377 (5 companies overseas)

4.1.3. Special Considerations.

All of the overseas companies visited are organized under MTOE which are modifications of the basic TOE. These modifications are based on the following:

a. Geographical location.

b. Assignment (support US Units or supporting NATO Units).

c. Assigned mission.

d. Performing post, camp and station functions.

e. NATO host nations furnishing all motor vehicle support.

4.1.4. Special Ammunition Units Not Considered.

Special ammunition support in the two geographical areas not covered in this report are as follows:

a. Alaska - The Special Ammunition Maintenance Personnel are a part of the Ordnance Company (GM-GS/DS) Nike.

b. Hawaii - The Special Ammunition Support is furnished by the Special Weapons Branch of the Maintenance Center.

4.1.5. Special Ammunition Companies USAREUR.

4.1.5.1. Advanced Weapons Support Command.

The Ordnance Special Ammunition Companies assigned to the Advanced Weapons Support Command (AWSCOM) are all organized under TOE 9-377D as modified by either MTOE 9-377DE701 or MTOE 9-377DE702. A comparison of the officer and warrant officer personnel of these MTOE with the basic special ammunition depot and general support TOE are as follows:

	TOE 9-48G	TOE 9-87E	TOE 9-377D	MTOE 9-377 DE 701	MTOE 9-377 DE 702
Major			1-1723 (4517)	1-4515	1-4514
Captain	1-4515	1-1723 (4517)	2-1723 (4517)	2-1723 (4517)	
			1-4513 (4515)	1-4515	1-4514
			1-4514	1-4515	
					2-4517

	TOE 9-48G	TOE 9-87E	TOE 9-377D	MTOE 9-377 DE 701	MTOE 9-377 DE 702
LT	4-1723 (4517)	5-1723 (4517)	2-1723 (4517)	2-1723 (4517)	
	1-4514	2-4514	1-4514	1-4200	
			1-4514	1-4516	
			3-1542 (Inf)	1-4815	
					1-4517
WO	3-261	2-261		7-261	5-261
	2-262	2-262		2-262	2-262
	2-411	1-411		1-411	
	1-441		1-631	1-631	

These Ordnance Special Ammunition Companies, MTOE 9-377DE701 and 702, are not assigned to an Ordnance Battalion as indicated in the assignment paragraph of the basic TOE.

4.1.5.2. Special Ammunition Support Command.

The Ordnance Special Ammunition Companies assigned to the Special Ammunition Support Command (SASCOM) are all organized under TOE 9-87E as modified by MTOE 9-87EE702. A comparison of the officer and warrant officer personnel of this MTOE with the basic special ammunition general support TOE are as follows:

	TOE 9-48	TOE 9-87	MTOE 9-87EE702
Major			1-4515
Captain	1-4515	1-1723 (4517)	1-4517
LT	4-1723 (4517)	5-1723 (4517)	1-4200
	1-4514	2-4514	4-4517
WO	3-261	2-261	5-261

	TOE 9-48	TOE 9-87	MTOE 9-87EE702
WO	2-262	2-261	2-262
	2-411	1-411	
	1-441		

These Ordnance Units are assigned to Artillery Group/Battalion. Some of these Artillery Group/Battalion are assigned to Artillery Group/Group. The next higher headquarters is SASCOM. These Ordnance Special Ammunition Companies are not assigned to an Ordnance Battalion as indicated in the assignment paragraph of TOE 9-48 or TOE 9-87.

These Ordnance Special Ammunition Companies assigned to SASCOM are dependent on the host nation for vehicular support. Consequently, all vehicles, vehicle support equipment and mechanics/drivers have been eliminated by MTOE 9-87EE702.

4.1.5.3. Southern European Task Force.

The Special Ammunition Company assigned to the Southern European Task Force (SETAF) is organized under TOE 9-87E as modified by MTOE 9-87EE701. A comparison of the officer and warrant officer personnel of this MTOE with the basic special ammunition general support TOE are as follows:

	TOE 9-48	TOE 9-87	MTOE 9-87EE701
Major			1-4515
Captain	1-4515	1-1723 (4517)	1-4517
LT	4-1723 (4517)	5-1723 (4517)	2-4514
LT	1-4514	2-4514	4-4517
LT			1-9307 (Inf)
WO	3-261	2-261	4-261
	2-262	2-262	2-262
	2-411	1-411	1-761

	TOE 9-48	TOE 9-87	MTOE 9-87EE701
WO	1-441		

This unit is assigned to an artillery group, not an Ordnance Battalion as indicated in the assignment paragraph of TOE 9-48 or TOE 9-87.

4.1.5.4. 7Th US Army.

The Special Ammunition Direct Support Companies assigned to the 7Th Army are organized under TOE 9-47E as modified by MTOE 9-47EE701. A comparison of the officer and warrant officer personnel of the MTOE with the basic special ammunition direct support TOE are as follows:

	TOE 9-47G	MTOE 9-47EE701
Major		
Captain	1-4514	1-4517
LT	4-1723 (4517)	2-4514
		1-4515
		1-4517
		2-1542 (Inf)
WO	1-261	3-261
	1-262	1-262
		1-631

The units organized under MTOE 9-47EE701 in 7Th Army are attached to Ordnance Battalions. However, during FTX, CPX and in wartime these companies furnish technical personnel to Corps Headquarters to operate a Nuclear Weapons Logistics Element, (NWLE).

4.1.5.5. Continental Army Command.

4.1.5.5.1. The Special Ammunition General Support Company (17th) assigned to Continental Army Command (CONARC) is organized under

TOE 9-48G and modified based on their assigned mission.

4.1.5.5.2. The Special Ammunition Direct Support Company (26th) assigned to Continental Army Command is organized under TOE 9-47 and modified based on their assigned mission.

4.1.5.5.3. The Nuclear Weapons Support Sections assigned to Continental Army Command are organized under TDA.

4.2. Doctrine.

4.2.1. Organization.

4.2.1.1. TO&E 9-377D Ordnance Special Weapons and Missile Depot Company.

4.2.1.1.1. Mission.

The mission is to provide depot supply support for guided missiles and large rockets (including associated warheads), atomic artillery shells (including propellants), atomic demolition munitions and related items to include all atomic ordnance material. They also provide depot level assembly, repair, maintenance and modification for special weapons, special weapons material, and guided missiles and large rockets.

4.2.1.1.2. Capabilities.

The capabilities at full strength of this unit are as follows:

a. Nuclear Weapons Assembly. (This information is classified SECRET and published separately.)

b. Nuclear Weapons Surveillance QA/AC. (This information is classified SECRET and published separately.)

c. Nuclear Weapons Conversion. (This information is classified SECRET and published separately.)

d. Provides field maintenance for nuclear weapons test and handling equipment.

e. Provides technical assistance to supported units, to include in-storage monitoring of nuclear weapons. This assistance is made available through the medium of liaison visits.

f. Provides maintenance calibration services.

g. Provides facilities for maintenance of guided missiles and large rockets.

4.2.1.1.3. Mobility.

The unit is fifty percent mobile.

4.2.1.1.4. Discussion.

The five units visited in the US Army Advanced Weapon Support Command are organized under this TOE as modified by MTOE. (See Inclosure 4-1.) Additionally, three of these units are charged with the responsibility for installation functions. All units are located at fixed sites with permanent maintenance and storage facilities.

4.2.1.2. TOE 9-87E Ordnance Special Ammunition General Support Company.

4.2.1.2.1. Mission.

a. To provide general or depot supply support for complete missile rounds, large rockets, nuclear artillery and atomic demolition munitions (including replacement components), and repair parts except missile peculiar electronic assemblies and mechanical components.

b. Provide direct and general support maintenance of nuclear weapons, to include repair of test equipment, limited assembly surveillance, modification and conversion of weapons configuration.

c. To provide depot maintenance support of mission items in the communication zone, including surveillance, component replacement, modification, repair, disassembly, and assembly of all items except missile peculiar electronic assemblies and mechanical components. This will include approximately twenty percent of general support maintenance passed back from the combat zone.

d. To provide for evacuation of unserviceable missile peculiar electronic assemblies and mechanical components to an Ordnance Guided Missile General Support Company, TOE 9-227.

e. To provide for demilitarization and destruction of unrepairable missiles and large rockets which contain no economically repairable components or assemblies.

f. To provide for evacuation of unrepairable missiles and large rockets containing economically repairable components or assemblies to designated CONUS facilities.

4.2.1.2.2. Capabilities.

At full strength this unit provides:

a. Receipt, storage, issue and surveillance of reference mission material.

b. Nuclear Weapon Assembly. (This information is classified SECRET and is published in FM 9-2A, Ordnance Corps Logistical Data, and FM 101-10-3. Distribution of this information is limited to those agencies and individuals whose duties require it.)

c. Maintenance of mission items, including renovation, component replacement, modification, disassembly of all components, except missile peculiar electronic and mechanical.

d. Evacuation of unserviceable missile peculiar electronic and mechanical components to an Ordnance Guided Missile General Support Company, TOE 9-227.

4.2.1.2.3. Mobility.

One hundred percent mobile for personnel, organic equipment and supplies.

4.2.1.2.4. Discussion.

The two Special Ammunition Support Command Units and the one Southern European Task Force Unit visited were organized under this TOE as modified by MTOE. These units were modified to eliminate the equipment and support functions (vehicles, drivers, mechanics, etc.) provided by the host nation.

4.2.1.3. TOE 9-48G Ordnance Special Ammunition Company General Support/Direct Support (See inclosure 4-2).

a. The mission is to provide special ammunition general support to ammunition direct support units and special ammunition direct support to firing organizations as required.

b. To provide complete round direct and general supply support for low-density missiles (Nuclear and CB Warheads), large rockets (Nuclear and CB Warheads), nuclear projectiles, atomic demolition munitions, chemical lethal and incapacitating artillery shells, land mines, bulk chemical agents and direct supply support of repair parts peculiar to special ammunition.

c. To provide direct and general maintenance support for special ammunition and associated test and handling equipment, to include maintenance calibration and repair, assembly/disassembly, testing and modification of Nuclear Weapons, components, and training material.

d. To provide for evacuation of unit stocks of repairable, unserviceable missile-peculiar electronic and mechanical assemblies, and components, to a Guided Missile Maintenance Company, General Support, TOE 9-59 or to designated CONUS facilities.

e. To provide for evacuation, demilitarization, salvage and assistance in destruction of unrepairable missiles, large rockets and other special ammunition material.

f. To provide technical surveillance of chemical, biological and nuclear ammunition during movement between supply installations using specially trained surveillance personnel.

4.2.1.3.2. Capabilities.

At level 1 this unit can provide:

a. For the receipt, storage, issue, and surveillance of special ammunition.

b. Specially trained ammunition service personnel for the technical surveillance of chemical, biological, and nuclear ammunition during movement of such ammunition.

c. For maintenance of mission items, including component replacement, modification, and disassembly and assembly of all components except missile-peculiar electronic, mechanical, and test equipment.

d. Nuclear Weapons Assembly. (This information is classified SECRET and is published in FM 9-2A, Ordnance Corps Logistical Data, and FM 101-10-3. Distribution of this information is limited to those agencies and individuals whose duties require it.)

e. Performs organizational maintenance on organic equipment.

f. For evacuation of unserviceable missile-peculiar electronic and mechanical components to a guided missile maintenance company, general support, TOE 9-59.

4.2.1.3.3. Mobility.

One hundred percent mobile for personnel, organic equipment and supplies, excluding special ammuntion stocks.

4.2.1.3.4. Discussion.

There are three units currently operating under TOE 9-48G. Two of these units are overseas and one unit is in CONUS. The units have been modified by MTOE to best suit their assigned mission. The units have a heavy mission responsibility for missiles, large rockets and conventional ammuntion in addition to the special ammunition responsibility.

4.2.1.4. Analysis.

TOE 9-48G has essentially the same basic mission as TOE 9-87E and TOE 9-377D. However, TOE 9-48G does not have the same capabilities. The following are a list of capabilities that must be added to 9-48G.

4.2.1.4.1. Technical Assistance to Supported Units.

Technical assistance visits (TAV) to supported units are required on a quarterly basis by command regulation. In addition, TAV are required when requested by the units such as prior to TPI, major manual changes, etc. The technical assistance teams normally consist of one warrant officer, one or two nuclear weapons technicians, one nuclear weapons electronics technician, and a technical supply specialist. These personnel are drawn from the resources within the company. TOE 9-48G does not indicate a technical assistance responsibility in the mission or capability statement.

4.2.1.4.2. Quality Assurance/Quality Control Section.

All maintenance operations on nuclear weapons must be accomplished under the observation of QA/QC personnel. TOE 9-48G does not provide for QA/QC in the mission or capability statement and does not provide a QA/QC Section to accomplish this function.

4.2.1.4.3. Nuclear Weapons Maintenance Teams.

TOE 9-48G provides for only two nuclear weapons maintenance teams. With the peacetime mission of this unit being maximum maintenance, and the added requirement of providing technical personnel for technical assistance visits and technical escort, four maintenance teams are required as provided by TOE 9-377D.

4.2.1.4.4. Maintenance of Missile Class VII and IX Items.

The mission and capability statement of TOE 9-48G indicates that unserviceable, missile-peculiar, electronic components are evacuated to a guided missile maintenance company, general support, TOE 9-59; guided missile general support maintenance is provided by companies other than TOE 9-59.

4.2.1.5. TOE 9-47 - Ordnance Special Ammunition Direct Support Company.

All units visited that are activated under this TOE have modifications by MTOE to suit their assigned mission. The organization structure has not been changed from the basic TOE.

4.2.1.6. TDA Nuclear Weapons Support Section.

4.2.1.6.1. Background.

Two nuclear weapons support sections (NWSS) visited are organized under TDA and located at Ft. Bragg, North Carolina, and Ft. Sill, Oklahoma. These units have a nuclear weapons support mission.

4.2.1.6.2. Analysis.

These nuclear weapons support sections are organized under TDA and have the following personnel:

Ft. Bragg - NWSS - TDA WOVJAA-03

	GRADE	MOS	AUTH	ON HAND
Military	WO	261A	1	1
	E-7	55G40	1	0
	E-5	55G20	3	3
	E-5	35F20	2	1
	E-4	55G20	1	1

Ft Bragg - NWSS - TDA WOVJAA-03

	GRADE	MOS	AUTH	ON HAND
Civilian	WL-11	06601	1	1
	WG-11	06601	2	2

Ft. Sill - NWSS - TDA 4A-WOVGAA-04

	GRADE	MOS	AUTH	ON HAND
Military	WO	261A	1	1
	WO	262A	1	2
	E-7	55G40	1	1
	E-6	55G40	1	1
	E-5	35F20	1	0
	E-5	55G20	2	1
	E-4	55G20	2	0
Civilian	GS-4	318	1	1
	WG-12	2617	6	6

These two units are located at installations where a special ammunition company is located. The 26th Special Ammunition Company is located at Ft. Bragg and the 17th Special Ammunition Company at Ft. Sill. There is a NWSS located at Ft. Riley and also located at Ft. Riley is the 823rd Special Ammunition Company. All other NWSS are located at posts, camps or stations throughout CONUS, and there are no special ammunition companies collocated. The NWSS has a variance of systems they support. Some support a war reserve and training mission, while others support a pure training mission. NWSS are located in permanent facilities on their installation.

The special weapons workload at present and in the foreseeable future at Ft. Bragg, Ft. Sill and Ft. Riley is not of sufficient magnitude to require two units for support of the mission. Therefore, these NWSS Units, located on the same installation as a TOE special ammunition company, are not required. The TOE company can provide all special weapons support. This would provide for a continuous proficient peacetime operation for the TOE Unit, and in effect, provide the training base for the combat capability of the unit. In conformance with the austerity program and cutback in the Army, these TDA Units, if deactivated, would result in a significant savings in funds and equipment. The military personnel may be used to help fill the critical shortage of special weapons duty positions that were found in the TOE Units worldwide.

4.2.2. MOS Structure.

4.2.2.1. Warrant Officer MOS 261A and 262A.

During the MAME 71 visit to units a question was posed to Warrant Officers MOS 261A and 262A as to their feeling on the Department of Army study to combine the two MOS into MOS 260. The majority of the Warrants felt that this was a satisfactory approach since the state of the art has changed considerably since the early days in nuclear weapons. Although agreeable to combining the two MOS, most warrants felt very strongly that prior to awarding MOS 260 that they all be given the opportunity to attend a transition course. Their comments have been submitted to the DA Project Officer, Captain David Y. Wise, Office of Personnel Operations, PMDO, Department of the Army, Washington, D. C., 20310.

4.2.2.2. Officer MOS 4517 vs 4514.

4.2.2.2.1. Background.

In order to determine the most suitable MOS to command the Storage and Issue Platoon, a question was asked of all units: "Given two MOS, 4517 or 4514 for the S&I Platoon, which is considered the most qualified to perform the duties?"

4.2.2.2.2. Analysis.

It was generally agreed that MOS 4517, because of having received some 7 weeks of schooling on special weapons, was the most qualified. The assignment to the S&I Platoon requires an officer familiar with disarm procedures, surety, safety, quantity distance, load limits, nomenclature and characteristics as well as storage and issue of the stocks. In addition, he must also serve as courier officer for convoys of nuclear weapons. Since the MOS 4514 receives only one week of nuclear weapons schooling, this is not considered adequate to become familiar in all areas of nuclear weapons operations.

4.2.2.3. Warrant Officer Assignments.

4.2.2.3.1. Background.

Presently Warrant Officers are assigned to Command, Operations and Inspection positions without regard to seniority or grade.

4.2.2.3.2. Analysis.

Some W2 were found to be in command supervision, operations or inspection positions and were responsible for providing direction(s) to Warrants of higher grade. It was the majority opinion that these types of assignments should be reviewed and TOE be changed to authorize Warrant Officers by grade, i.e., in the Command and Operations positions the W4 Warrants should be designated. Grade structure of this type is recommended throughout the Army for assignment purposes.

4.2.2.4. MOS 76M20 vs MOS 55G20 In The Control Section

4.2.2.4.1. Background.

The ammunition records clerk in the control section is required to prepare numerous reports requiring a thorough technical knowledge of nuclear weapons, nomenclature, characteristics and models.

4.2.2.4.2. Analysis.

The MOS 76M20 does not receive this training prior to assignment to a special ammunition unit. In addition, the MOS 76M20 is delayed pending security clearance and then on-the-job training. This frequently requires as long as six months. The MOS 55G20 has the technical knowledge and security clearance required when assigned to the special ammunition unit. Therefore, he can be utilized immediately.

4.2.3 Personnel Authorization.

4.2.3.1. Special Ammunition Company Commanders.

4.2.3.1.1. Background.

TOE 9-377D and TOE 9-87E authorizes a Major as Company Commander. These authorizations have been perpetuated by the MTOE under which the special ammunition units are operating. TOE 9-48G and TOE 9-47E and G authorize Captains as Unit Commanders.

4.2.3.1.2. Analysis.

A grade authorization of Major is needed in special ammunition companies because of the required experience, judgment, stability, technical skills, management skills and stature to command a company whose mission is high dollar and internationally sensitive nuclear weapons and materials. Some of these units are located in geographical areas that require the additional duties of the post, camp or station which increases the magnitude of their responsibilities. Some of these units are not assigned to an Ordnance Battalion as indicated on the TOE.

4.2.3.2. Special Ammunition Company Executive Officer.

4.2.3.2.1. Background.

TOE 9-377D authorizes an executive officer to assist the unit commander in company administration. TOE 9-87E, and TOE 9-48G do not provide for an executive officer. Most unit commanders recommended the authorization of an executive officer.

4.2.3.2.2. Analysis.

All of the units visited that were organized under MTOE 9-377 operated at remote locations. Some had the responsibility for installation functions as well as mission responsibilities. All had the security responsibility for their installation. The executive officer relieves the company commander of the administrative details of running the company in order for him to devote more time to mission functions.

4.2.3.3. Special Ammunition Company Operations Officer (Control Section).

4.2.3.3.1. Background.

TOE 9-377D authorizes a Captain, MOS 4517, as Operations Officer. All units organized under MTOE 9-87 were also authorized a Captain in this position. TOE 9-48G and TOE 9-47E and G authorize a LT MOS 4517, in the control section which is equivalant to the operations officer.

4.2.3.3.1. Analysis.

The operation officer supervises and coordinates the major mission elements of the company and controls the stock control activity of the company. He controls the unit stocks as directed by theater inventory control or as required for unit consumption. He makes reconnaissance for site locations and keeps abreast of tactical requirements and other matters affecting the unit support mission. He is charged with supervising the military and technical training of the company. He advises the commander on matters pertaining to the company mission. He normally acts as classified documents control officer and assures that classified information is adequately controlled and disseminated. He also serves as executive officer in the direct support company and commands the company when the company commander is absent.

4.2.3.4. Storage and Issue Platoon Leader.

4.2.3.4.1. Background.

TOE 9-377D authorizes a Captain as storage and issue platoon leader. TOE 9-87E, TOE 48G and TOE 9-47G authorize a Lieutenant as storage and issue platoon leader. All units visited recommended that this position be a Captain MOS 4517.

4.2.3.4.2. Analysis.

The platoon leader provides the necessary command, control and supervision over all activities of the storage and issue platoon. He is responsible for the planning and coordination of transportation, surety and security requirements for shipment and receipt of nuclear weapons, guided missile large rockets, missile, and other material. He maintains liaison with the transportation officer designated to support the company. He is responsible for storage of special weapons, missile, guided missile large rocket and other material.

4.2.3.5. Maintenance Platoon Leader.

4.2.3.5.1. Background.

TOE 9-377D authorizes a Captain as maintenance platoon leader - TOE 9-87E and TOE 9-48G authorize a Lieutenant in this position. All units visited recommended that this position be a Captain MOS 4517.

4.2.3.5.2. Analysis.

The maintenance platoon leader supervises the technical and clerical personnel of the platoon headquarters. He directs and coordinates the activities of the electrical, mechanical, nuclear, calibration and technical repair. He is responsible for the performance of maintenance on nuclear weapons, test and handling equipment and components. The modification and retrofit of special weapons. The assembly and disassembly of special weapons. He advises the operations officer on technical matters pertaining to the maintenance and assembly mission of the unit. He is responsible for the technical training requirements of the maintenance platoon personnel.

4.2.3.6. Maintenance Teams.

4.2.3.6.1. Background.

MTOE 9-377D authorizes four nuclear weapons maintenance teams consisting of one Warrant Officer, MOS 261A, and six enlisted personnel, MOS 55G, MTOE 9-87E also authorizes four maintenance teams when the unit is operating a depot. TOE 9-48G authorizes two maintenance teams similar to the ones in the TOE 9-377 company. All general support units visited indicated that four maintenance teams are required.

4.2.3.6.2. Analysis.

The maintenance teams perform scheduled and unscheduled maintenance and modifications on the special weapons, perform technical assistance visits and provide technical escort. An analysis of the work load of every unit visited supports the requirement for four maintenance teams.

4.2.3.7. Quality Assurance/Quality Control Section.

4.2.3.7.1. Background.

MTOE 9-377D authorizes a Quality Assurance/Quality Control section consisting of two warrant officers (one MOS 261A and one 262A) and seven enlisted personnel, five MOS 55G, one MOS 35F and one MOS 71B. TOE 9-87E and TOE 9-48G do not provide for a QA/QC Section.

4.2.3.7.2. Analysis.

Regulations require that every maintenance operation on special weapons be performed under the observation of QA/QC personnel and each operation certified by the QA/QC Section. This section is responsible to the unit commander only. Every special ammunition unit performing maintenance on special weapons must have a QA/QC Section.

4.2.3.8. Technical Supply Officer.

4.2.3.8.1. Background.

All depot and general support units visited had a repair parts supply mission. Units organized under MTOE 9-377D were authorized a technical supply officer, 4530. TOE 9-87E and TOE 9-48G do not authorize a tech supply officer. All units visited indicated that the tech supply officer is essential.

4.2.3.8.2. Analysis.

Technical supply sections have an ASL of 250 to 500 line items with 80 to 200 supply transactions per month. Units whose mission includes all weapons systems have up to 1300 transactions per month. Supported units carry a PLL of 15 to 25 line items. Due to the criticality and security classification of the items in tech supply, officer supervision of this section is essential.

4.2.3.9. MOS 71L20 Documents Clerk.

4.2.3.9.1. Background.

TOE 9-48E & G authorize only one documents clerk. The units organized under MTOE 9-47 recommended that they be authorized three MOS 71L20.

4.2.3.9.2. Analysis.

Military Intelligence has recommended that these units be authorized three documents clerks in order that classified documents can be adequately controlled. The mission stocks of this unit are classified, most of the technical documents and many of the reports are classified. All general support special ammunition units are authorized three documents clerks. Due to the volume of classified documents in the direct support companies, there should be three documents clerks authorized.

4.2.4. Equipment Authorization.

4.2.4.1. Communication Equipment (Radio) For Convoy Control.

4.2.4.1.1. Background.

The Ordnance companies are required to deliver and pick up special weapons at various locations. There is a requirement that the convoy to be in continuous radio contact with the company so that in case of a breakdown, accident or incident, assistance can be immediately dispatched. Communication equipment (radio) authorized by the various TOE is listed on inclosure 4-3.

4.2.4.1.2. Analysis.

4.2.4.1.2.1. TOE 9-377.

The minimum communication equipment (radio) for the control of a convoy in a unit organized under TOE 9-377:

a. One AN/GRC-122 in 1 1/4 ton truck with convoy for contact with home station and unit to which they are delivering or picking up.

b. One AN/VRC-47 in the AN/GRC-122 for contact with convoy commander and contact with other radios in the convoy.

c. One AN/GRC-122 in 1 1/4 ton truck at the company for contact with the convoy.

d. Four AN/VRC-46 for intra-convoy control. These would be in the wrecker and escort vehicles.

Although the MTOE authorizes the equipment required, the units are issued the AN/GRC-26D in lieu of the AN/GRC-122 in 1 1/4 ton trucks. The AN/GRC-26D have not proven satisfactory for convoy control.

4.2.4.1.2.2. TOE 9-87.

The communication equipment (radio) for convoy control in SASCOM units is mounted in the host nation vehicles. The radios authorized in the MTOE are adequate for convoy control. However, AN/GRC-26D radios are issued in lieu of the AN/GRC-142.

4.2.4.1.2.3. TOE 9-47.

This type unit is required to maintain the following simultaneous communications NET during wartime.

a. One NET between CO HQ and higher HQ.

b. Two additional NETS between CO HQ and the two SASP.

c. Two additional NETS between the two SASP and convoys run by the SASP.

d. Two NETS within the two convoys (justification for the AN/VRC-46 in 1/4 ton truck).

4.2.4.2. Special Weapon Tool Set, SC 5180-95-CL-A09.

4.2.4.2.1. Background.

This special weapons tool set was originally prepared for a depot company capable of supporting all systems. The deletions and additions to the tool set have not kept pace with the weapon changes. Also, the tools were authorized as one set and did not make any allowances for more than one maintenance team.

4.2.4.2.2. Analysis.

All of the units visited that were organized under MTOE 9-377 and MTOE 9-87 used this tool set. Each of these companies had three to five maintenance and calibration teams, therefore, they require an additional authorization of selected tools to equip each team.

4.2.4.3. Special Weapon Tool Set SC 5180-95-CL-A11.

4.2.4.3.1. Background.

This special weapons tool set was prepared for a direct support company capable of supporting all systems. The deletions and additions to the tool set have not kept pace with the weapon changes.

Also, the tools were authorized as one set and did not make allowances for more than one maintenance team.

4.2.4.3.2. Analysis.

The units visited were organized under MTOE 9-47 and used this tool set. These companies have more than one maintenance team, therefore, they require an additional authorization of selected tools to equip each team.

4.2.4.4. Special Weapon Tool Set SC 5180-95-CL-A10.

4.2.4.4.1. Background.

This tool set was prepared for a TOE Ordnance Company in the field capable of supporting all weapon systems.

4.2.4.4.2. Analysis.

The Nuclear Weapons Support Sections (NWSS) visited were organized under TDA and were authorized this tool set. These units are located in CONUS. The units have a variety of systems they support. However, the Nike Hercules system is one of the predominate systems. All NWSS are located in permanent facilities on a post, camp or station. Consequently, the NWSS are authorized common tools that they do not need, because they do not support all systems and much of their equipment is already available as installed equipment.

4.2.4.5. Roller Conveyors.

4.2.4.5.1. Background.

A large percentage of special weapons are moved from one special weapons unit to another by helicopter. Roller conveyors are required to move the container in and out of the helicopter. Since the special ammunition units are not authorized these roller conveyors, they must be provided by the aviation unit or from some other source. Frequent delays in movements are experienced due to non-availability of the rollers.

4.2.4.5.2. Analysis.

Movement of special weapons by helicopter could be expedited if the roller conveyors were authorized at each special weapons unit.

4.2.4.6. Transportation Vehicles.

4.2.4.6.1. Background.

TM 9-1300-206 requires that each vehicle transporting Class A or B ammunition will be inspected before loading for compliance with safety regulations prescribed by transportation regulatory bodies and the Department of Defense. DD Form 626 (Inspection Report) prepared in accordance with the provisions of AR 55-355 will be used for inspection of commercial carrier and military owned and operated vehicles.

4.2.4.6.1. Analysis.

The transportation corps vehicles furnished by supporting transportation units are frequently old and fail to pass the required inspections required by AR 55-355. This results in a delay of movement of the ammunition items.

4.2.4.7. Universal Tie-Down Kits.

4.2.4.7.1. Background.

Technical Bulletin 9-2300-280-30 authorizes the installation of universal tie-down rings on tactical transport vehicles. These tie-down rings are authorized to facilitate stabilizing the cargo in transit.

4.2.4.7.2. Analysis.

Sufficient transport vehicles have not been modified with the universal tie-down rings to meet the demands of special weapons transportation. Special ammunition units must resort to extensive blocking and bracing and the use of steel strapping when loading special weapons on the unmodified vehicles. This results in greater expense in cost of material and a loss of time in transportation.

4.2.4.8. Sand Blasting Equipment.

4.2.4.8.1. Background.

The units organized under TOE 9-377 and TOE 9-87 have a major maintenance problem with the many special weapons containers that are in the field. Many of these containers have been in existance for 15 years and the maintenance requirement increases with each passing day. These containers must be maintained in excellent condition.

4.2.4.8.2. Analysis.

These units have a variety of special weapons systems they support and some support all systems. The major maintenance is the removal of loose paint and rust. The most economical and practical method would be to sand blast these containers, which will save many manhours of work.

4.2.4.9. Special Weapons Maintenance Vans.

4.2.4.9.1. Background.

Special ammunition depot and general support units are authorized semitrailer maintenance vans for special weapons. These vans were designed and manufactured in early 1950 to support the weapons fielded at that time. The vans have not been updated to support the special weapons currently in the field. They are not being adequately maintained and parts are almost non-existent.

4.2.4.9.2. Analysis.

All of the special ammunition depot and general support units are operating in permanent facilities. When these units are required to move out of these facilities for tactical reasons, emphasis is on supply operations and not on maintenance. Under present operating conditions, the maintenance vans are of no value to the units.

4.2.4.10. Transport Vehicles for TOE 9-47G.

4.2.4.10.1. Background.

TOE 9-47G authorizes 22 each five ton cargo trucks and 2 each 25 ton low bed semitrailers for transportation of mission load stocks. The special ammunition direct support units organized under MTOE 9-47 have been authorized 48 each 12 ton semitrailers to transport the mission stocks.

4.2.4.10.2. Analysis.

The doctrine for the operation of a special ammunition direct support company is one hundred percent mobility of mission stocks in a tactical situation. It is expected that this unit will move every 24 to 48 hours in order to provide passive defensive protection. The transport vehicles authorized by TOE 9-47C has a rated capacity of 160 tons. The rated capacity for the direct support units organized under MTOE 9-47 is 476 tons. This appears to represent a standard load for a special ammunition direct support unit.

4.2.4.11. Material Handling Equipment.

4.2.4.11.1. Background.

Special Ammunition TOE authorize rough terrain forklifts for operations off road and in a tactical situation. The units visited indicated that MHE authorized is adequate and required. Their day to day work, however, is in a depot type operations. The RT MHE is difficult to maneuver in this type of operation and is impossible to operate inside igloos.

4.2.4.11.2. Analysis.

Standard, off-the-shelf-type forklifts are more suitable for igloo operations. These forklifts can work inside the igloos and on hardstand where RT forklifts are not suitable.

4.2.5. Technical Operations.

4.2.5.1. Maintenance Operations.

4.2.5.1.1. Discussion.

In a peacetime situation, the emphasis of the special ammunition units is on maintenance of mission stocks as well as on supply. This effort consist of periodic inspections, storage monitoring, scheduled and unscheduled maintenance and modifications, etc.

4.2.5.1.2. Analysis.

Problems that existed within the maintenance area are primarily related to personnel shortages and training. There was a projected fifty percent shortage of maintenance technicians, MOS 55G by August 1971.

4.2.5.2. Technical Assistance Visits.

4.2.5.2.1. Background.

Technical Assistance Visits (TAV) are normally made to all supported units on a regular scheduled basis and at such other times as required. These TAV are performed by maintenance personnel.

4.2.5.2.2. Analysis.

At the time of the evaluation, the technical assistance visits were being seriously curtailed and in some cases eliminated due to a shortage of qualified technicians. The units could not accomplish this mission and perform their normal maintenance function also.

4.2.6. Publications.

4.2.6.1. Special Ammunition Unit Operations - FM 9-47.

4.2.6.1.1. Background.

FM 9-47 provides guidance for unit operations for special ammunition direct and general support units. This manual was published in October 1970.

4.2.6.1.2. Analysis.

Units indicated that this manual should be more comprehensive. Specifically cited as desirable inclusions were detailed job descriptions of key positions, and function description of organizational sections.

4.2.6.2. Supply Information Procedures Letter.

4.2.6.2.1. Background.

The Supply Information Procedures Letter is published by the Munitions Command quarterly and contains supply and maintenance information on all ammunition. Distribution is made to all ammunition units.

4.2.6.2.1. Analysis.

Most units visited indicated that they did not receive this publication on a regular basis. Since all units are on distribution from MUCOM, there appears to be a distribution problem within the ammunition units.

4.3. MATERIEL

4.3.1. Principal Item Supply.

All units visited stated there are no problems being encountered with principle items of supply.

4.3.2. Repair Parts Supply.

4.3.2.1. Background.

The technical supply section in TOE 9-377 and TOE 9-87 have a high percentage of rejection/cancellation (approximately thirty percent of their requisitions). In many cases, after the requisition has been cancelled, the requested part will arrive at the unit. In the meantime another requisition has been submitted. The requisitions are submitted through MATCOM. MATCOM is fully automated. The units do not have automated facilities. Requisitions have been rejected by MATCOM for incorrect technical manual data, i.e., wrong page number, incorrect change number or incorrect TM date. This is caused in many cases by MATCOM receiving late TM editions and/or changes. However, this can cause a delay of 30 days up to six months for receipt of the requested item.

4.3.2.2. Analysis.

Many of the problems are in-house and could be alleviated with a better customer relationship between MATCOM and the units. Personnel that are assigned are not sufficiently trained in technical supply and in most cases do not have the required security clearance upon arrival at the unit. The technical supply officer is assigned to the technical supply as an additional duty and is not supply oriented or trained in most cases. This presents a serious problem for the supply clerks in that they receive little or no guidance in the performance of their duties, with the exception of the volumes of Army regulations and Command implementations that apply.

4.3.3. Maintenance.

4.3.3.1. Operational Change Report (OCR).

4.3.3.1.1. Background.

The Operational Change Report is required by JCS Pub VI for special weapons warhead sections, adaption kits, warheads and Permissive Action Link (PAL).

4.3.3.1.2. Analysis.

Problems are being encountered in the submission. Personnel stated that the complexity, errors in transmittal, the many steps from draft to final submission, lack of trained personnel and the lack of sufficient data in some cases as to site location codes hinder the submission of the reports.

4.3.3.2. Modification Work Orders.

4.3.3.2.1. Background.

Some of the modification work orders require local purchase of materials.

4.3.3.2.2. Analysis.

When a modification work order requires the unit to local purchase materials, it is very difficult for a unit overseas to locate and then purchase the required item(s). This many times causes long delays for application and also realignment of workloads.

4.3.3.3. Technical Manuals.

4.3.3.3.1. Background.

Some of the technical manuals require application of expendables in accordance with manufacturer instructions.

4.3.3.3.2. Analysis.

When a technical manual requires application in accordance with manufacturer instructions, it usually causes overseas units problems because many times no instructions are furnished with the material and the unit does not have an easy way of obtaining the required information. This also delays the maintenance of the item and requires rescheduling of the unit's workload.

4.3.3.4. Shortage of Personnel.

4.3.3.4.1. Background.

MOS 55G, Nuclear Weapons Maintenance Specialist, personnel are in critical short supply worldwide. Just about every unit visited was at sixty percent strength or less with no known replacements.

4.3.3.2. Analysis.

Due to this critical shortage of MOS 55G personnel, many of the units were not performing technical assistance to the supported units as required. They were behind on required maintenance of the nuclear weapons items. Many of the units were using personnel to perform maintenance on nuclear weapons that were not school trained MOS 55G personnel. In some cases, the personnel working in the nuclear weapons area were being worked ten hours a day, six days a week, trying to keep up with the LLC exchange program.

4.3.4. Calibration.

No significant difficulties were encountered in regard to calibration activities. The direct support units are to receive an increased calibration workload and they felt that they can perform the increased workload with their present authorized calibration personnel.

4.3.5. Readiness.

The only significant problem relative to material readiness is the shortage of qualified personnel to maintain the stocks in a serviceable condition.

4.3.6. Publications.

4.3.6.1. Critical Nuclear Weapon Design Infomation (CNWDI) Markings.

It was found that CNWDI marking of publications is having no effect on the unit's operations.

4.3.6.2. Technical Manuals.

The elimination of detailed descriptive information from nuclear weapons publications is having no adverse effect on the unit to perform its assigned mission.

4.3.6.3. MOS Testing.

4.3.6.3.1. Background.

Units were asked if required nuclear weapons publications are available for MOS testing.

4.3.6.3.2. Analysis.

Nuclear weapons publications are available for those systems assigned to a unit. Only one or two units visited have a mission for all systems. Therefore, many of the required publications are not avaialble. In some cases a technician may have two successive assignments to units having only three of four systems and, therefore, not have available all the system manuals for a period of one to five years.

4.4. TRAINING

4.4.1. General Information.

Nuclear weapon units visited throughout indicated a dissatisfaction with the overall MOS training of personnel assigned to certain functional areas. Personnel assigned to these type units must be proficient in these MOS and able to assume duties almost immediately upon assignment. A basic principle which should and must be considered is the fact that units of this type, although having a combat mission, are principally concerned with a continuous proficient peacetime operation, which is in effect, the training base for the combat capability.

4.4.2. 2nd Generation Training.

4.4.2.1. Background.

Second Generation training is provided by CONUS warhead teams in accordance with AR 700-65 to provide Limited Life Component (LLC) maintenance and retrofit training.

4.4.2.2. Analysis.

The second generation training is scheduled every six months and will be conducted by MUCOM anytime upon request from theaters. USARPAC personnel indicated they do not have any problem keeping sufficient personnel trained (approximately eighty percent at all times). USAREUR personnel indicated that they were having a major problem keeping personnel trained. This is in part caused by not sending enough personnel to the training course when the CONUS team is in the theater conducting this training. Also, if a requirement exists for training when the CONUS team is in the theater performing special maintenance and/or retrofit, this team can conduct the required training courses.

4.4.3. MOS 55B Ammunition Storage and Operations Specialist.

4.4.3.1. Background.

The MOS personnel are assigned to the storage and issue platoon of a special weapons unit to perform that mission.

4.4.3.2. Analysis.

These MOS personnel are not adequately school trained and in most cases are completely lacking in knowledge on movement, storage, tie-down procedures, safety requirements, physical security requirements, emergency destruct and nuclear accident incident control plan for nuclear weapons.

4.4.4. MOS 55G Nuclear Weapons Maintenance Specialist.

4.4.4.1. Background.

These MOS personnel must be school trained to be awarded the MOS. They are assigned to the maintenance platoon and other key positions in the unit as well as staff positions at higher headquarters.

4.4.4.2. Analysis.

These MOS personnel require more school instruction and practical exercise on emergency destruction, Nuclear Emergency Teams (NET), convoy operations, shop and bay operations, technical assistance visits, general shop skills and record and reports (these should include but not be limited to Operational Change Reports (OCR), DD 1348, DA 1296, DA 444, DA 2409, DA 2407, and DA 2029).

4.4.5. MOS 35F Nuclear Weapons Electronic Specialist.

4.4.5.1. Background.

These MOS personnel are generally assigned to the calibration and technical repair section of the maintenance platoon.

4.4.5.2. Analysis.

These personnel require more instructions and practical exercise on load testing, torque wrenches, emergency destruction, Nuclear Emergency Teams (NET), convoy operations, technical assistance visits, publications to include but not limited to TB 9-1100-803-15, TM 38-750, TB 750-236, TM 39-0-1A, DA PAM 310-4 and parts manuals for test equipment. Records and reports related to repair and maintenance calibration of test equipment also are required to be included in this instruction.

4.4.6. MOS 4517 Nuclear Weapons Officer.

4.4.6.1. Background.

These MOS officers are assigned as storage and issue platoon leaders, maintenance platoon leaders, shop officers, and operations officers in a special weapons unit.

4.4.6.2. Analysis.

These MOS officers require more instructions and practical management experience in transportation planning (air and ground), emergency evacuation, storage procedures and records and reports associated with operations, shop, and storage and maintenance platoons.

4.4.7. MOS 76P Stock Control and Accounting Specialist.

4.4.7.1. Background.

These MOS personnel are assigned to tech supply in a special weapons unit. Personnel in this unit must have a security clearance because of the manuals they are required to use and the parts (some parts classified) are usually warehoused in a classified access area.

4.4.7.2. Analysis.

All units were very emphatic concerning the trained tech supply personnel, in most every case these personnel required extensive on-the-job training before they could be effectively utilized. When interviewed most personnel felt the school did not cover Army Regulations, records and reports on supply requisitioning, stocking, inventorying, warehousing, etc., adequately to perform their assigned mission.

4.4.8. Senior MOS 55G Transition Course.

4.4.8.1. Background.

MOS 55G personnel in grade E-5 and above were asked to comment on a transition course for senior 55G personnel.

4.4.8.2. Analysis.

All personnel in grade E-5 and above stated there is a definite requirement for a transition course for senior 55G personnel to include the duties of an Operations SGT, Shop SGT, administrative duties, management, etc.

4.4.9. MP As Security Guards.

4.4.9.1. Background.

The Commander and/or the Operations Officer of the Military Police Company were asked to comment on the using of MP as Security Guards for Special Weapons Companies.

4.4.9.2. Analysis.

All the comments were essentially the same. The major observation that was made is the lack of motivation and low morale in physical security units. The main reason is that for nine weeks in Military Police Advanced Individual Training the personnel are trained to be white hat Military Policemen. They are assigned to a physical security unit, instead of riding around in a patrol car in big cities, they are sent to isolated depots and put to work as tower guards. Almost without exception, the only time an EM reenlists in a security company is to get out of the company and into a white hat job. The fact that at some future time he may find himself reassigned to a security company probably stops many from reenlisting. A Military Policeman from Advanced Individual Training receives only seven hours of instructions about physical security at Fort Gordon. It would help the security companies if an individual were trained for his job and his security clearance initiated while in school (meet the requirements of AR 611-15).

4.5. Analysis.

The present doctrine does not take into account that two different mission requirements exist for TOE 9-37 and TOE 9-87 special weapons units: one for wartime and one for peacetime, and this has caused modification of the organization for use in the field. It is realized that doctrine, organization and reference materials are developed for support of combat operations which may be the minimum case for which the units are utilized. To compensate for this, the TOE are modified to provide effective operations and support during peacetime as well as wartime. Under peacetime conditions they have maximum maintenance capability with their normal receipt, storage and issue capability. Under wartime they have a minimum maintenance capability and a maximum receipt, storage and issue capability. The special weapons field is unique in respect to the peacetime versus wartime situation. The basic commodity involved as well as the support and services rendered remain the same. The inability of the present system to provide for the flexibility of special weapons organizations to meet mission requirements without extensive modifications results in reduced efficiency. Doctrine at best is only guidance to the Commander in the field who by necessity will modify doctrine and supporting organizations to meet mission requirements. Doctrine should be planned with combat support as the primary consideration, but peacetime conditions should also be considered. With effective planning, the amount of modification required can be kept to a minimum.

5. REDEYE MISSILE SYSTEM

INDEX FOR REDEYE MISSILE SYSTEM

5.1. GENERAL.

The REDEYE Weapon System was evaluated in depth by Team B-3. Since REDEYE is a medium-cost, high density system, considerably more time was spent interviewing user personnel than support personnel. As a general rule, the same General Support and Direct Support organizations which support LCSS, SHILLELAGH and TOW also support REDEYE. Therefore, the observations made by Team B-2 will not be repeated and comments will be restricted to those operations peculiar to REDEYE. Team B-3 visited Ft. Riley, Ft. Carson, Ft. Sill, Ft. Hood, Ft. Lewis and Ft. Bragg in CONUS, units in USAREUR, and USARAL. The REDEYE is issued to each combat maneuver battalion size unit to include Infantry, Armor, Armored Cavalry and Field Artillery. Since it would be far too costly to visit every unit armed with REDEYE, a random sample was selected. Whenever possible, one Field Artillery, one Armored, one Cavalry, an Infantry and a Division-Artillery Battalion in each division, and one or more battalions in each non-divisional organization, to include Corps Artillery, were interviewed.

5.2. COMMAND AND CONTROL.

5.2.1. Command and control of REDEYE firing teams follow the normal chain of command within a combat organization. Each Battalion Air Defense Section is composed of a section headquarters consisting of a Lieutenant, Section Leader, who also acts as an Air Defense Advisor to the Battalion Commander, a Sergeant E-6, Section Sergeant, and a Radio-Telephone Operator and from 3 to 6 firing teams. Each team is composed of a Sergeant E-5, Team Chief, and an SP-4, Gunner. The section headquarters is usually assigned to the S3 and the teams are deployed to provide air defense to the entire battalion. Normally, the teams are controlled by the Section Headquarters, by means of an organic REDEYE communications network, but are occasionally attached to each line company under the direct control of the company commander. They are administratively assigned to Headquarters and Headquarters Company under the present "E" Series TOE and to the Combat Support Company under the newer "H" Series TOE.

5.2.2. Command and control of support units varies widely from theater to theater. In CONUS and USARAL the support mission is assigned to TDA garrison support units with the exception of Ft. Hood, which is supported by the 159th Ordnance Detachment, a TOE Unit of the 13th Maintenance Brigade, III Corps. Ft. Bragg is a further exception. Here the mission belongs to station support, however, the necessary equipment and mission are "farmed out" to the 763d Ordnance Detachment of the 782d Maintenance Battalion, 82d Airborne Infantry Division. In USAREUR, general support is provided by the 563d Ordnance Company, a unit of Advanced Weapons Support Command (AWSCOM) which is an element of Theater Army Support Command (TASCOM). Direct support is provided by the 223d Ordnance Detachment of the 8th Maintenance Battalion, V Corps Support Command in the V Corps area and by the 116th Ordnance Detachment of the 303d Maintenance Battalion, VII Corps Support Command in the VII Corps area. Weapons are handled as Class V items from Miesau Army Depot (AWSCOM) for surveillance and Materiel Command (MATCOM) for issue (both elements of TASCOM), thru the 101st Ammunition Battalion in VII Corps and 15th Ammunition Battalion in V Corps.

5.3. The following units were visited and interviewed:

2d Bn 34th Armor

2d Bn 63d Armor

4th Bn 68th Armor

1st Bn 32d Armor

1st Bn 33d Armor

3d Bn 35th Armor

3d Bn 63d Armor

1st Bn 68th Armor

1st Bn 3d Field Artillery

6th Bn 20th Field Artillery

1st Bn 5th Field Artillery

1st Bn 7th Field Artillery

8th Bn 6th Field Artillery

6th Bn 40th Field Artillery

1st Bn 22d Field Artillery

2d Bn 41st Field Artillery

5th Bn 83d Field Artillery

2d Bn 75th Field Artillery

4th Bn 46th Infantry

3d Bn 11th Infantry

2d Bn 46th Infantry

3d Bn 585th Infantry

2d Bn 46th Infantry (redesignated from 3d Bn, 51st Inf)

1st Bn, 30th Infantry

1st Bn 13th Infantry

3d Squardon 1st Armored Cavalry

1st Squarson 17th Armored Cavalry

3d Squadron 8th Armored Cavalry

2d Squadron 2d Armored Calvary Regiment

3d Squadron 2d Armored Cavalry Regiment

2d Squadron 14th Armored Cavalry Regiment

3d Squadron 14th Armored Cavalry Regiment

1st Squadron 3d Armored Cavalry Regiment

4th Bn 61st Air Defense (CHAPARRAL/VULCAN)

6th Bn 67th Air Defense (CHAPARRAL/VULCAN)

171st Infantry Brigade

172d Infantry Brigade

563d Ordnance Company

223d Ordnance Detachment

116th Ordnance Detachment

179th Ordnance Detachment

763d Ordnance Detachment

Ft. Riley Garrison Support

Ft. Carson Garrison Support

Ft. Wainwright Garrison Support

Ft. Richardson Garrison Support

HQ, USAREUR, DCSLOG, Missiles and Munitions Division

HQ, TASCOM

HQ, MATCOM

Miesau Army Depot (Surveillance)

HQ, 84th Ordnance Battalion (AMMO)

5.4. REDEYE PROBLEM AREAS - DOCTRINE

5.4.1. Malassignment of REDEYE - Enlisted Personnel.

5.4.1.1. Background.

Present doctrine restricts REDEYE enlisted personnel to certain basic MOS. Generally speaking, these are combat MOS in Infantry, Field Artillery, Air Defense Artillery, Armor/Cavalry, and Combat Engineers. Specific MOS prescribed by AR 611-201 are 11B, 11D, 11E, 12A, 12B, 13A, 13B, 16P and 16R. AR 611-201 also prescribes the Additional Skill Identifier (ASI), R6, to identify REDEYE qualification. Thus, an example of a REDEYE MOS would be 11B20R6.

The United States Army Air Defense School, Ft. Bliss, Texas, awards the R6 ASI upon successful completion of 3 weeks formal training in operation and safety of the weapon, handling, and tactics. In addition, the Section SGT receives an additional week of controller training.

A recent change to AR 611-201 now allows the R6 designator to be awarded in the field based on OJT and Army Subject Schedule 23-17.

5.4.1.2. Analysis.

Ideally, classification and assignment activities would select and identify those replacement personnel who have the R6 ASI and assign them to units deficient in trained REDEYE personnel. However, in practice, some organizations have a large excess of trained personnel and others have very few. Authorizations vary by type of battalion but will average 1 SGT E-6, 4 SGT E-5, and 4 SP-4 trained in REDEYE. A prime example is a cavalry squadron which had approximately 30 school trained gunners with the R6 ASI excess to their REDEYE requirements. These men were utilized in their basic MOS, i.e., 11D, or 11E. However, an armored battalion physically located just across the street had only 1 trained REDEYE man. This apparent disregard for the R6 ASI also results in unauthorized MOS being used as REDEYE gunners. Some examples detected in the limited random sampling of units are: 11C, 11H, 16F, 17K, 36K, 25B, 55B, 63B, 63C, 64B, 67B, 67N, 76Y, 81A, 82C, 91B, and 94B.

5.4.1.3. Summary.

School trained REDEYE gunners are being malassigned to the extent that some units have excesses and others have deficiencies in qualified gunners. The shortages lead to use of unauthorized MOS in violation of AR 611-201. The apparent cause of this problem is inattention to the R6 ASI affixed to the basic combat MOS. A better means to identify and assign REDEYE qualified gunners where they are needed is required.

5.4.2. Branch Oriented Section Leaders.

5.4.2.1. Background.

Each combat maneuver battalion-size unit has an officer assigned to the Air Defense Headquarters Section to function as the Section Leader. This officer is authorized in the grade of Lieutenant with an MOS commensurate with that particular combat arm, i.e., 1542 Infantry, 1203 Tank Unit, 1204 Armored Recon, or 1193 Field Artillery. In addition to his branch qualification, he must be specially trained at the U. S. Army Air Defense School, Ft. Bliss, Texas, in air defense tactics and operations. He must also function as the Air Defense Advisor to the S3 and Battalion Commander and is responsible for all air defense operations within the battalion.

5.4.2.2. Analysis.

In theory a school trained REDEYE qualified officer would be assigned as the Battalion Air Defense Section Leader until he reaches the grade of Captain. At that time he would be replaced by the next REDEYE trained Lieutenant assigned to the battalion. In practice, in many cases, a new Second Lieutenant is assigned to the REDEYE Section until another arrives to replace him. In other words, each new officer inherits the REDEYE Section without respect to school training. One apparent cause is the lack of any MOS identifier to indicate whether or not the officer is REDEYE trained. Another cause is the battalions commanders' failure to recognize the possibility of an air threat.

A unique approach to this problem is in the experimental stage within the 1st Infantry Division at Ft. Riley, Kansas. Here the Air Defense Section Leader in each maneuver battalion is an Air Defense Branch Officer MOS 1174 assigned to the Division Air Defense CHAPARRAL/VULCAN Battalion and detailed to the Infantry, Armor, Cavalry and Field Artillery Battalions on a rotational basis. This method provides each battalion with an officer well-grounded in Air Defense tactics, capabilities and threats.

5.4.2.3. Summary.

The Section Leader in many battalions is assigned without regard to formal Air Defense training. An untrained Junior Second Lieutenant is assigned the responsibility for Air Defense while a trained officer is present somewhere within the battalion, possibly as the Executive Officer of a line company, Assistant S2 or other non-related position. The 1st Division approach appears to have considerable merit except for the rotational aspects. An Air Defense Branch officer assigned in lieu of Infantry, Armor, etc., would be highly desirable.

5.4.3. Career Progression Program.

5.4.3.1. Background.

As outlined in paragraph 5.4.1.1 REDEYE enlisted personnel have a basic combat MOS and are awarded an ASI (R6) to indicate REDEYE qualification. Thus, the normal career progression is established by their basic MOS. This includes promotion allocations, proficiency pay, and the normal increase in skill level.

When a career program is established, it is assumed an individual will gradually acquire more skill at his craft until he is promoted to the next higher skill level. His skill would continue to increase till the next higher skill level is reached and so on. This concept applies equally to the REDEYE Gunner. However, the increase in proficiency evolves around Air Defense tactics, maneuvers, techniques, aircraft identification, rules of engagement and weapon capabilities, not the basic infantry, armor, or artillery skills.

5.4.3.2. Analysis.

As outlined above the REDEYE gunner becomes better at his job. In this case his job is to defend his assigned sector against air attack using a small portable but sophisticated guided missile. A morale factor emerges when a man learns more and more about air defense and less and less about driving a tank when his proficiency (for pro-pay as well as promotions) is measured in terms of tank driving. By the same token promotion allocations are based on the number of a particular MOS in the battalion as a whole. Many REDEYE Sections have no NCO or a serious shortage of NCO when there are SP4 eligible for promotion. This situation results from an excess of NCO with the same basic MOS within the battalion. The excess NCO cannot (or should not) be assigned to the REDEYE Section because of the specialized training required. An untrained NCO supervising guided missile gunners becomes a liability rather than an asset, especially in those organizations where the responsible officer (the Section Leader) is also untrained. It can become a headless monster.

On the other end of the scale, the particular skills of the base MOS are lost over a period of years. If a gunner does progress from E-4 thru E-6, he has been divorced from his basic MOS for several years. His next promotion takes him out of REDEYE and back to a Tank Commander or Platoon Sergeant, a job he is totally unequipped to handle because of lack of experience.

5.4.3.3. Summary.

Although REDEYE gunners follow the career pattern of their basic MOS, they "lose touch" with the necessary skills required in their MOS. They do acquire skills associated with air defense operations and guided missile gunnery. Their actual duties and responsibilities are more consistent with those of a Light Air Defense Artillery Crewman MOS, 16F, than the present MOS they are assigned. Career progression along the 16 series MOS patterns would be more equitable than the present 11 or 13 series.

5.4.4. Field Manual 44-1.

5.4.4.1. Background.

Each combat division has a staff office to coordinate and provide liaison for air defense within the division. One element of this staff office is the Airspace Control Element (ACE). FM 44-1 provides general doctrinal guidance for Air Defense Operations.

5.4.4.2. Analysis.

Although very few ACE personnel were interviewed, those that were indicated a requirement for more ACE doctrinal guidance in FM 44-1.

5.4.4.3. Summary.

FM 44-1 does not contain enough doctrinal guidance for Airspace Control Element functions and operations.

5.4.5. TOE Authorizations.

5.4.5.1. Background.

At the time of the survey, combat maneuver battalions were organized under the "E" and "G" series MTOE. Personnel authorizations in both series are essentially the same. Each has an Air Defense HQ Section and from 3 to 5 firing teams under the HQ and HQ Company (battery, squadron). The Section HQ has a LT Section Leader, SGT E-6 Section SGT and a Radio-Telephone Operator (RTO) who doubles as light vehicle driver. In addition to individual arms and equipment, they are equipped with a 1/4 ton truck with communications equipment and a 1/4 ton trailer.

5.4.5.2. Analysis.

The primary mission of the Section Headquarters is to function as the Air Defense Staff at the command post and to direct and control the firing teams who are deployed within the battalion area. In reality, the Section Headquarters must also monitor the Air Defense Network of other elements in the area and resupply the firing teams with weapons. Since the communication equipment is mounted in the only 1/4 ton truck and only one RTO/driver is provided, it is next to impossible to man the situation overlay, monitor Air Defense Nets, direct and control teams and resupply weapons during an engagement. In addition, all units will be reorganized under the "H" series TOE by the end of CY-71. The "H" series also eliminates the RTO in most TOE, further compounding the problem. Most units interviewed feel that the Headquarters Section should have 2 each 1/4 ton trucks and 2 each RTO. This would allow the Section Leader and Section SGT to separate and perform different functions simultaneously.

5.4.5.3. Summary.

The present Headquarters Section has too many functions which must be performed simultaneously with only one RTO and one 1/4 ton truck. The authorization for RTO and 1/4 ton truck in the Headquarters Section should be increased to two each, rather than the planned deletion of the RTO in the "H" series TOE.

5.4.6. REDEYE Support Operations.

5.4.6.1. Background.

REDEYE support is provided by two elements of TOE 9-550 and the equivalent TDA organizations. The two elements are the EF Team consisting of three MOS 27G and the EI Team consisting of two MOS 27G. The EF Team is identified as a shop team and is authorized on the basis of one per Corps slice in the DS role. The EI Team is identified as a contact team and is authorized on the basis of one per 70 firing teams supported in the GS role and one per 40 firirg teams in the DS role. A a result of MTOE reductions, a typical DS Unit in support of a Corps will have one EF and four EI Teams.

The EI Contact Team's primary mission is to perform operational readiness inspections on the user's basic load of weapons. The REDEYE Guided Missile System is unique in that it is complete, self-contained and combat expendable. Consequently, only very minor corrective maintenance is required or authorized below depot level. With the exception of replacing a sling swivel, rubber dust cover, eye shield, etc., maintenance is only a "go-nogo" check using the AN/TSM-82 Guided Missile Test Set.

The EF or Shop Team's primary mission is to test and repair the user's M76 training set, maintenance calibrate ("C" Level) and repair the AN/TSM-82 Test Set used in the shop, the 4 AN/TSM-82 Test Sets used by the EI Contact Teams, and to repair the test set test equipment (TSTE), TS-2554(XO-1) GSM used for calibration and repair of the AN/TSM-82.

5.4.6.2. Analysis.

In practice the EF and EI personnel are generally integrated for several reasons. The work load for the EF element will generally cycle every 90 days due to calibration requirements for the AN/TSM-82. The M76 training sets and the TS-2554 TSTE have very few catastrophic failures. The EI elements work load also tends to cycle due to the previously semiannual inspection of weapon rounds. (At the time of the survey, weapon round inspections using the lot-sample method were required semiannually. As of 1 July 1971, the time interval has been increased to annually.) Scheduling inspections to evenly distribute the work load is difficult since they must depend upon an ammunition battalion to provide the serial numbers, lot numbers, and organizations who own the weapons. In addition, if used exclusively on contact teams, the MOS 27G personnel tend to lose proficiency in the calibration and repair functions. The above adds up to too little work and is cyclic in nature.

A careful analysis of overall support operations reveals the following picture. There are only three user type items supported.

a. The M41 weapon round: - Annual inspection of a lot-sample, corrective maintenance limited to replacement of front and rear sight operations, pressure equalizing valve, sling swivels, and rubber boots, guards and cushions and boresight alignment; requires Test Set AN/TSM-82 and common tools.

b. Training Set M76: - Major assembly replacement and piece part replacement of mechanical type items authorized; requires special tools and equipment listed in TM 9-6920-428-34 and AN/TSM-82 Test Set for testing only; very few repairs required, the majority of repairs are "topping off" self-contained coolant supply.

c. Trainer M46A1 and M46A2: - Same as weapon except that it is a dummy; no testing required.

Of the three user items, only the M76 Training Set requires complex repair and they are few and far between. Except for the replacement of sight items which require a subsequent boresight alignment, all authorized repair of M41 weapon rounds and M46A1 and A2 trainers could be accomplished by organizational maintenance. Tools required are Allen type hex keys, screwdriver, punch, hammer, one inch open end wrench and a knife, all of which can be borrowed from any motor pool. These repairs are all extremely rare because the weapons are in storage except for testing. The sight items and subsequent boresight could be accomplished at the theater issue/stock point prior to issue.

In contrast to user type items, the greatest amount of complex work and costly equipment involves maintenance and calibration of the AN/TSM-82 Test Set.

The following is required:

a. Test Set Test Equipment TS-2554 (XO-1) GSM LIN Z83646 consisting of: Weapon Test Simulator, Encoder Assembly, Trihedral Set, Flow Meter, Pressure Gage Assembly, Thermocouple Assembly, all of which require "A" level calibration by an external calibration team; Test Adapter Box, Circuit Card Extender, Backlight Assembly, Special Tools and Test Cables and a Test Set Holding Fixture.

b. Supplemental Test Equipment LIN V62160 consisting of: 2 each Power Supplies (HP-6289AS05) which require "C" level calibration by MOS 27G; 2 each Signal Generators (HP-202C), Thermocouple Reference Junction (8035240), requiring "A" level calibration and a Shelter.

c. Separately listed TOE equipment consisting of: Electronic Counter (AN/USM-207) LIN F19198, Oscilloscope (AN/USM-117) LIN N30231, Multimeter (TS352B/U) LIN M80242 and Electronic Voltmeter (ME-202A/W) LIN V14937; all of which require "A" level calibration.

CONUS TDA support further illustrates the contrast between maintenance of user items and maintenance of support items, and the extent in which the work load evolves around the AN/TSM-82 Test Set. The two CONUS TDA type support shops visited were Ft. Riley, Kansas, supporting the 1st Infantry Division and Ft. Carson, Colorado, supporting the 4th Infantry Division. Basic load weapons are not issued in CONUS and therefore, are not stored locally. Since no periodic weapon round inspections are required, only one test set is provided for checkout of M76 trainers and weapons received for annual firing (8 per year).

Ft. Riley has one Artillery Repairman supporting REDEYE on a part time basis. Ft. Carson has two Radar Repairmen supporting REDEYE on a part time basis.

Considerably more time, equipment and repair parts are used for the AN/TSM-82 Test Set than for the user items supported. The AN/TSM-82 is much more complex than is necessary to accomplish the weapon round inspection and could be replaced with a small device designed to be positioned around the forward end of the weapon's launch tube to provide an infrared stimulus. A device of this type, called an "exerciser" was in use with an early model XM42 Trainer. Sensitivity parameters could be established for an uncooled weapon. Power would be provided by rechargeable batteries similar to the M76 batteries, which would be recharged by the M76 battery charger. Acquisition and tracking would be indicated by the audible sound produced by the weapon itself, in much the same way the gunner detects target acquisition.

The use of a device as described above would not only greatly reduce the cost of parts, manhours, and test equipment, but would allow the inspections to be performed by ammunition Class V type personnel such as the MOS 55C. MOS 55C personnel would be more logical than the present 27G since receipt and issue of weapon rounds is handled through Class V channels. Replacing the AN/TSM-82 and ancillary equipment with the simplified tester and transferring the inspection mission to the Ammunition TOE 9-38 would also eliminate the need for TOE 9-550 direct support of the REDEYE System. Those few repairs required on the M76 training set could be accomplished by a small number (3-5) MOS 27G at general support. Sufficient M76 floats are now available to provide for "DX" with using units. The existing special tools and equipment authorized for trainer repair would be adequate if a 40 volt power supply were added. This power supply could be retained from the equipment now required for test set maintenance.

Inclosure 5-1 is a very simplified diagram of the recommended support structure. With the exception of repair and return of M76 floats, Class V items are kept in Class V channels. With the reduction in shop equipment, Class VII major items would be minimal. Dashed lines would be deleted if the recommended realibility study justified eliminating weapon testing in the field.

5.4.6.3. Summary.

TOE 9-550T provides EF and EI teams for inspection of M41 weapon rounds, repair of M76 training sets and repair of the AN/TSM-82 Test Sets. Although they are identified as shop repair and contact teams, the work load necessitates integration of the two elements. An ammunition battalion must provide weapon serial numbers, lot numbers, and the owning organization. The workload is light, cyclic, and externally influenced. Very little actual maintenance (as opposed to inspection) is required or performed on user items supported. The vast majority of actual maintenance is spent on support equipment, primarily the AN/TSM-82 Test Set.

Since eliminating or simplifying weapon round testing in the field would eliminate the necessity for the majority of support equipment, calibration, repair parts and manhours. Direct support by TOE 9-550 could be eliminated and general support greatly reduced. MOS training for 27G could also be significantly reduced. Considerable savings in manpower and dollars would be realized.

5.5. REDEYE PROBLEM AREAS - TRAINING

5.5.1. Field Training.

5.5.1.1. Background.

The purpose of the REDEYE system is to provide an organic means of defense against air attack to each combat maneuver battalion.

REDEYE Missile System personnel receive individual training at the U. S. Army Air Defense School, Ft Bliss, Texas. The training consists of 3 weeks in REDEYE Missile System Gunner Course, 250-F4. In addition to the 250-F4 Course, the Section Leader attends 1 week of REDEYE Missile System Controller Course, 2E-F20, and the Section SGT attends 1 week of REDEYE Missile System Controller Course, 250-F2. Upon completion of the individual training, personnel are assigned to combat maneuver battalions where they receive their unit training through day to day field training as an integral part of the battalion. In addition, they must maintain proficiency with the weapon and aircraft identification as outlined in Army Subject Schedule 23-17.

5.5.1.2. Analysis.

The required training is not being provided in many battalions. The average time spent in REDEYE training varies from 0 to 100 percent with the majority between 10 percent to 20 percent. The remainder of their time is spent on "ash and trash" type details, various semipermanent type details, and utilization in their basic MOS for exercises such as tank gunnery tests. Fortunately, our combat leaders of today have not been faced with a real air threat. Enemy air power has not been a real factor since the early days of the Korean conflict.

Battalion Commanders, for the most part, apparently disregard the possibility of an air threat. Instead of utilizing the REDEYE teams for their primary mission during alerts, field problems, training exercises and other day to day tactical training, they are utilized for company clerks, gate guards, court-martial clerks, mail clerks, truck drivers, commanders' drivers, communication, maintenance, carpenters, other miscellaneous duties, and all guard and KP duties in the field in order to free tank drivers for exercises. Most of the above assignments are full-time except for the annual ATT at which time they are returned to the REDEYE Section to prepare for and take the test. Far too many units use them for a labor pool. They are together, they are handy and they have a senior NCO to supervise them.

The same situation applies to the five 1/4 ton trucks authorized to REDEYE teams. They are used as guard vehicles, courtesy patrol vehicles, loaned out to line companies, and used as replacements for deadlined vehicles within the battalion. In some cases, the personnel are assigned along with the vehicles as drivers.

The requirement to maintain proficiency in the use of the REDEYE system cannot be overstressed. Rules of engagement, aircraft identification, and communications are paramount. While it is true a gunner can be taught to successfully fire this weapon in one hour, he must continually drill on who, what, and when to engage. After all is said and done the final decision to fire or not to fire rests with the individual. There are no mechanical safeguards, and once fired there is no recourse.

The variations in available training time are not identifiable with a specific area, but will vary widely between battalions in the same brigade.

5.5.1.3. Summary.

After completion of individual training at the Air Defense School, it is absolutely essential that proficiency be maintained through continued training. The required field training in too many battalions is far below an acceptable level. Personnel are not available for training due to "ash and trash" and special semipermanent details. In addition, to being used as a labor pool, they are "farmed out" on a permanent basis for any job that happens to be vacant. The concept of organic air defense works fine in theory, but poorly in practice.

5.5.2. Training Aids.

5.5.2.1. Background.

Various training aids are provided to the field for use in maintaining gunner proficiency. Generally the U. S. Army Defense Center at Ft. Bliss, Texas, is the responsible agency to generate and update these training aids.

5.5.2.2. Analysis.

The most frequently used training aids are all concerned with aircraft identification. They are FM 44-30, slide kit, SL/ARK#1, and flash cards 44-2-1. The most prevalent comments on the above indicated they are not up to date and do not show modern aircraft. The SL/ARK#1 Kit is considered the most beneficial, and most up to date, but does not have wide enough distribution. It must be checked out from a central training aids facility and there is usually a long waiting list.

5.5.2.3. Summary.

Training aids now available to the field are either obsolete or do not have wide enough distribution.

5.5.3. MOS Training - 27G.

5.5.3.1. Background.

REDEYE System Repairman MOS 27G receives MOS training at the U. S. Army Missile and Munitions Center and School, Redstone Arsenal, Alabama. The Course, 121-27G20, is five weeks in length excluding any common subjects which may be required as prerequisites.

5.5.3.2. Analysis.

The majority of work required in the REDEYE system is "C" level calibration and maintenance of the Guided Missile Test Set AN/TSM-82. Most graduates have difficulty with the calibration in the field due to the difference between test equipment used in the school and the actual TOE test equipment. As an example, they understand that a certain knob on a certain model electronic counter will produce a given result. However, given a different model electronic counter, they are lost as to which knob to turn to obtain the same desired result.

Graduate repairmen also have varying degrees of difficulty using and understanding technical manuals, parts manuals, forms and records normally found in a support facility. Increased emphasis on weapon round checkout and ammunition safety is required.

5.5.3.3. Summary.

Graduate repairmen in MOS 27G require extensive OJT on the use of commercial type test equipment authorized by TOE, technical manuals, parts manuals, forms and records.

5.6. REDEYE PROBLEM AREAS - MATERIEL

5.6.1 Communications Radios.

5.6.1.1. Background.

The Battalion Air Defense Section is provided with communication radios for the REDEYE control network. The particular type radio varies according to the units TOE.

5.6.1.2. Analysis.

Radios found in the various TOE are: AN/PRC-25, AN/VRC-47, AN/GRC-125, and AN/GRC-160. Units in the field indicate that the present radios do not have sufficient range to maintain reliable communications when deployed throughout battalion area.

5.6.1.3. Summary.

The radios presently authorized by TOE do not have sufficient range for reliable communications.

5.6.2. Coolant Supply For Test Set AN/TSM-82.

5.6.2.1. Background.

The REDEYE weapon is a highly reliable weapon. To insure the reliability, there is a requirement to perform an annual operational readiness check on both the basic load and theater stock weapons using the lot sample method. The Guided Missile Test Set AN/TSM-82 is provided for this purpose. Since the weapon must be super-cooled for maximum sensitivity, the test set must supply the weapon with the same precise mixture of coolant gas used for firing. The coolant gas is provided in a replaceable 2 lb bottle (cylinder) as an intergral part of the test set. The bottles must be replaced when the coolant pressure falls below the acceptable level, and subsequently refilled. Because of the extremely stringent requirements for mixture control and purity, the U. S. Army Missile Command (MICOM) has established a refill point at Tooele Depot, Utah, where refill can be accomplished in a closely controlled, absolutely clean environment. The special equipment provided for this requirement includes a cleaning station where the empty bottles are thoroughly cleaned, a mixing station to closely control the coolant mixture, and a highly efficient filtering station to preclude the remotest possibility of any contaminants being introduced during the refill. Tooele Army Depot is the only authorized refill point for coolant bottles.

5.6.2.2. Analysis.

Present policy requires the empty coolant bottle to be replaced with a spare bottle from stock and the empty turned in as serviceable, condition code "E" (empty) and a new bottle requisitioned through normal supply channels. To facilitate the exchange, MICOM has added the bottle to the automatic returns list which eliminates the requirement to secure disposition instructions from the NICP prior to shipment. At the time of the survey, USAREUR was not following the prescribed procedure. Miesau Army Depot (Surveillance Section) and the 563rd Ordnance Company (GS) were refilling bottles using locally procured coolant in 80 lb cylinders and obsolete equipment originally intended for use with a Block III interim trainer. Both units are refilling bottles for the DSU on a direct exchange (DX) basis. This equipment basically consists of a pumping unit and a filter unit. The quality and mixture accuracy of the locally procured coolant is not known, however, the filter and filling environment are definitely inadequate for the required purity and no facilities for cleaning bottles prior to filling are available. This practice could and possibly has led to contamination of weapon rounds during readiness testing.

The units cite three reasons for deviation from the prescribed policy. First, they lack confidence in the avaiability of replacement bottles. Second, they believe the supply line is too long and they would not be able to acquire refills on a timely basis. Third, the bottles are stock funded and the quantities required would be extremely expensive.

5.6.2.3. Summary.

The REDEYE weapon round must be cooled during operational readiness inspections to properly evaluate its sensitivity. The AN/TSM-82 Test Set provides coolant to the weapon from a replaceable 2 lb gas coolant bottle or cylinder. The coolant mixture and purity requirements necessitated the establishment of a precision refill point at the CONUS depot. Present policy requires replacement bottles to be requisitioned from Tooele Depot and the empties turned in to the supply system.

USAREUR is using obsolete equipment and locally procured coolant to locally refill bottles in violation of the prescribed policy. They believe the availability is questionable, the supply line is too long for timely receipts and the requisition - turn-in method is too costly.

6. MAME-71 CONCLUSIONS

6.1. AIR DEFENSE MISSILE SYSTEMS CONCLUSIONS

6.1.7.1. Direct Support/General Support Operations.

This combined DS/GS support concept prevalent in three out of five field theaters has considerable merit in terms of support responsiveness and effectiveness of the command and control structure. This concept has utility in certain field applications and should be integrated into future doctrine. (See Discussion Item No. 1.7.1.)

6.1.7.2. Consolidated Support For Missile Guidance Packages.

Present support concepts for the repair of inherently sensitive missile guidance packages may be inadequate. A combined maintenance support facility with a controlled environment would largely overcome existing problems. (See Discussion Item No. 1.7.2.)

6.1.7.3. Doctrine For Class V Missile Maintenance of High Cost, Low Density Systems.

There is a void in current doctrine pertaining to the conduct of Class V missile maintenance for High Cost, Low Density Missile Systems. A need exists for a well defined and standardized Class V missile support system. (See Discussion Item No. 1.7.3.)

6.1.7.4. Theater Missile Supply Support.

Units in the field are being organized under a supply structure that is dedicated to one or more missile systems. Current doctrine does not fulfill the requirements for such a highly effective and responsive system. (See Discussion Item No. 1.7.4.)

6.1.7.5. Reduction in Mobility of DS and GS Units.

The mobility currently imposed by doctrine on Air Defense Missile Support Units is unrealistic in view of actual requirements, and this condition results in significant problems with vehicle maintenance and unit effectiveness. A reduction in support unit mobility would alleviate these problems without compromising unit effectiveness. (See Discussion Item No. 1.7.5.)

6.1.7.6. Technical Assistance Service.

Technical assistance is not being effectively rendered in any theater surveyed, primarily due to lack of sufficient training, motivation and inadequate coverage in appropriate field manuals. (See Discussion Item No. 1.7.6.)

6.1.7.7. Maintenance Allocation Charts (MAC).

Evaluation of Maintenance Allocation Charts utility reveals that in their present form the MAC for Air Defense Missile Systems are not adequate, and if retained, these publications need to be revised to comply with realistic field practices and parts authorizations.

6.1.7.8. Doctrinal Guidance On Theater Maintenance Float Management.

Adequate doctrinal guidance and procedures for the control and management of Operational Readiness Float (ORF) assets are not available to the intermediate field commanders and staff officers. (See Discussion Item No. 1.7.8.)

6.1.7.9. Production Control Reconciliation.

Current publications do not provide the units in the field with a reconciliation system for the management and utilization of production control records. A reconciliation system is necessary for assuring accurate portrayal of production status, but such a system is very difficult to develop under field conditions. (See Discussion Item No. 1.7.9.)

6.1.7.10. Consolidation of MOS 23Q And MOS 23S.

The current MOS structure for the HAWK Missile System, which fragments responsibilities for pulse radar repair (23S) and fire control system repair (23Q) is not compatible with field requirements. (See Discussion Item No. 1.7.10.)

6.1.8.1. Uniform Implementation of "G" Series TOE.

A significant number of MTOE actions in the field are an attempt to align the obsolete TOE, under which many units are organized, to conform with recent doctrinal, policy or equipment changes. Uniform implementation of the most recent series TOE (current "G" series) on a worldwide basis would alleviate many problems and facilitate timely revision by proponent CDC elements. (See Discussion Item No. 1.8.1.)

6.1.8.2. Positioning of The Direct Support Element.

The positioning of the DS element, as an organic part of the Artillery Battalion it supports, results in a compromise of maintenance doctrine and degrades the effectiveness of support services rendered. (See Discussion Item No. 1.8.2.)

6.1.8.3. Personnel Provisioning For A Support Unit Shop Office.

Current Air Defense Support Units are not authorized, by TOE, adequate duty positions for certain shop administrative functions. This results in large scale malassignment of skilled personnel. (See Discussion Item No. 1.8.3.)

6.1.8.4. TOE Designation of A Quality Control Element.

Current DA approved TOE are deficient in providing adequate organizational structure and personnel authorizations for the conduct of quality assurance/quality control in the Air Defense Support Units. (See Discussion Item No. 1.8.4.)

6.1.8.5. Personnel Provisioning For Units With Operational Readiness Float Mission.

Current doctrine (TOE and FM) is not definitive in correlating the personnel authorizations with actual requirements to support the operational readiness float. (See Discussion Item No. 1.8.5.)

6.1.8.6. Requirement For An Organic Signal Support Capability.

The lack of provisioning in current support unit TOE of personnel, equipment and the mission for the support of test and measuring equipment is degrading the Air Defense mission. (See Discussion Item No. 1.8.6.)

6.1.7. Requirement For An Organic Loader Transporter Support Capability.

The current system for the support of the HAWK Loader Transporter is not responsive to Air Defense requirements. (See Discussion Item No. 1.8.7.)

6.1.8.8. Grade Level of The DS Platoon Sergeant.

Current doctrine (i.e., TOE authorizations) is inconsistent in providing a grade level for the senior ranking NCO in support units. The field survey findings indicate that the grade of E-8 NCO is justifiable in DS and GS Support Units. (See Discussion Item No. 1.8.8.)

6.1.8.9. Grade Level of Tech Supply Personnel.

Current doctrine (i.e., TOE authorization) is inconsistent in providing an adequate grade level for the senior ranking NCO in the DS Unit Technical Supply Section, and does not provide an appropriate grade level for the Section Chief. (See Discussion Item No. 1.8.9.)

6.1.8.10. Conversion of Power Generation Equipment Operators to Repairmen.

Field experience demonstrates that the Power Generator Mechanics (MOS 52B30) can be more productively utilized as Power Generator Equipment Repairmen (MOS 52D20). (See Discussion Item No. 1.8.10.)

6.1.8.11. Proportion of Test Equipment Operators at General Support.

The current authorizations of enlisted repairmen MOS are not adequate at GS to the extent that a greater proportion of the unit strength should be in the test equipment operators/repairmen specialties. (See Discussion Item No. 1.8.11.)

6.1.8.12. Materiel Handling Equipment Requirements.

Current DA approved TOE are deficient in providing materiel handling equipment consistent with the Air Defense Support Unit requirements (See Discussion Item No. 1.8.12.)

6.1.9.1. Missile Maintenance Officer Training.

There are a significant number of deficiencies in the resident training of Missile Maintenance Officers (MOS 4516) and Missile and Munitions Officers (MOS 4515) in providing them with the skills that are consistent with job requirements. (See Discussion Item No. 1.9.1.)

6.1.9.2. Air Defense Warrant Officer Training.

Warrant Officers (MOS 251B and 251C) who are currently in the field have not been adequately trained in the techniques of logistics management and principles of supervision. (See Discussion Item No. 1.9.2.)

6.1.9.3. Requirement For Resident Training of "Capper MOS."

The top level NCO (grade E-7 and above) in Air Defense specialties (MOS 23V and 23W) are not adequately trained to proficiently execute the requirements of field assignments. (See Discussion Item No. 1.9.3.)

6.1.9.4. Training Improvements - Nike Hercules Ordnance Enlisted MOS Courses.

Personnel in the field with Nike Hercules Ordnance Enlisted MOS are not adequately trained in the performance of contact team tasks, pertinent shop operations functions, and selected technical areas. (See Discussion Item No. 1.9.4.)

6.1.9.5. Training Improvements - HAWK Ordnance Enlisted MOS Courses.

Personnel in the field with HAWK Ordnance Enlisted MOS are not adequately trained in the performance of contact team tasks, pertinent shop operations functions, and selected technical areas. (See Discussion Item No. 1.9.5.)

6.1.9.6. Adequacy of Nonresident Training Programs.

There is an identified requirement for the development of new correspondence courses and improvement of selected existing courses to meet the needs of field personnel. (See Discussion Item No. 1.9.6.)

6.1.9.7. Shop Safety Training.

There are certain areas of shop safety that require greater coverage in Ordnance training programs. Field personnel are experiencing considerable difficulty in securing electrical type safety shoes through supply channels. (See Discussion Item No. 1.9.7.)

6.1.10.1. Retention and Revision of The Missile System Stockage List (MSSL).

Current versions of the MSSL for Air Defense Missile Systems are quantitatively excessive; however, it is imperative that a revised version of the MSSL be retained at forward locations in the field. (See Discussion Item No. 1.10.1.)

6.1.10.2. The Equipment Improvement Program - Equipment Improvement Recommendations (EIR).

The current EIR program is not fulfilling its intended purpose of soliciting equipment improvement suggestions and conveying appropriate corrective actions in return. The use of the EIR Digest to convey mandatory equipment changes is causing significant problems for fielded units. (See Discussion Item No. 1.10.2.)

6.1.10.3. Missile Maintenance Technician (MMT) Program.

The Missile Maintenance Technicians (MMT) are required at the missile support unit levels; however, significant changes are needed in the areas of provisioning, screening and training of personnel and certain program restrictions. (See Discussion Item No. 1.10.3.)

6.1.10.4. Deficiencies in Air Defense Equipment Authorizations.

There are a significant number of equipment deficiencies in Air Defense Support Units, some of which are due to provisioning and others due to inadequate TOE authorizations. (See Discussion Item No. 1.10.4.)

6.1.10.5. Provisioning of Advanced Electronic Repair Equipment.

The current equipment authorized for performing precision repairs of sensitive electronics equipment at the DS and GS levels is inadequate. (See Discussion Item No. 1.10.5.)

6.1.10.6. Provisioning of NCR 500 For Stock Accounting.

It has been determined that the NCR 500 is an acceptable and preferred stock accounting system which has been adopted by most Air Defense Units; however, necessary personnel and equipment authorizations are not contained in current TOE. (See Discussion Item No. 1.10.6.)

6.1.10.7. Materiel Problems For Further Evaluation.

There were some materiel related problems accumulated during the field survey which were obtained from a limited number of units or for which a solution is not readily apparent. These are prepared for the purpose of closer scrutiny by materiel experts. (See Discussion Item No. 1.10.7.)

6.1.10.8. Technical Manual Improvements.

Current TM could be significantly enhanced through selected additions and deletions, and improvement in format and binding. (See Discussion Item No. 1.10.8.)

6.1.10.9. Adequacy of The Repair Parts Special Tool Lists.

The Repair Parts Special Tool Lists formats and content are adequate and should be retained; however, there is a need to expand the item description portion of the TM to facilitate cross-referencing for compatible substitute items. (See Discussion Item No. 1.10.9.)

6.1.10.10. Evaluation of "X" Source Coded Items In Equipment Manuals.

The current practice of identifying "X" source coded items in technical manuals is desirable; however, many items currently listed are unrealistic. (See Discussion Item No. 1.10.10.)

6.1.10.11. Nike Hercules Shop #3 Card Reader.

Nike Hercules Shop #3 Card Readers currently in the field are in unsatisfactory condition; this situation is adversely impacting the support for the Nike Hercules System. (See Discussion Item No. 1.10.11.)

6.2. LAND COMBAT MISSILE SYSTEMS CONCLUSIONS

6.2.7.1. Consolidation of DS & GS Units.

Due to the similar capabilities of DS and GS units supporting new systems it does not appear cost effective to field separate direct and general support units. (See Discussion Item No. 2.7.1.)

6.2.7.2. Organic Direct Support.

The concept of organic direct support platoons has succeeded in providing responsive direct support while sacrificing the principles of sound maintenance practices and impacting severely on the retention rates of highly trained missile repairman. (See Discussion Item No. 2.7.2.)

6.2.7.3. The Detachment Concept.

The detachment concept used in TOE 9-550 has proved a failure in the field due to the fact that there are apparently no TOE company sized units in existance which can absorb the tremendous workload caused by the attachment of a large TOE 9-550 detachment. (See Discussion Item No. 2.7.3.)

6.2.7.4. Reduced Mobility for DSU.

The requirement for 100% mobility for DS units has created an enormous workload in the area of automotive maintenance. This workload would seriously impact on the support mission if the automotive maintenance were performed as required. (See Discussion Item No. 2.7.4.)

6.2.7.5. System Peculiar Supply Depots.

The missile peculiar supply system currently used in the field has proved highly responsive to the needs of missile user and support units. The present system, with slight modification, is the type system that is required if responsive support is to be provided. (See Discussion Item No. 2.7.5.)

6.2.7.6. Standards of Grade Authorization for Unit Commanders.

Present methods for determining the grade of the Commanding Officer of a missile support unit are inadequate. The lack of an appropriate grade structure has severely limited the capabilities of missile support units. (See Discussion Item No. 2.7.6.)

6.2.7.7. Executive Officers for Combat Service Support Companies.

The lack of an authorized executive officer position in missile support units has seriously impacted on the support mission. An executive officer position is required in all missile support units. (See Discussion Item No. 2.7.7.)

6.2.7.8. TOE Rationale Required by Field Units.

Unit Commanders in the field require detailed written guidance concerning the organization and functions of each section authorized by the TOE. Guidance presently available in the form of field manuals is totally inadequate. (See Discussion Item No. 2.7.8.)

6.2.7.9. Implementation of Current Series TOE in the Field.

Units in the field do not benefit from refined TOE which provide current doctrine, organization and equipment required to provide responsive support to using units because current series TOE are not being implemented. Much time and money is being wasted in developing doctrine, organization and equipment which is not used. (See Discussion Item No. 2.7.9.)

6.2.7.10. Problems of Multiple Source Maintenance.

The principle of "one stop service support" is not in existance in the area of missile support in the field. Multiple sources for maintenance (e.g., signal, engineer, missile) cause great confusion to the missile users as well as missile support units. (See Discussion Item No. 2.7.10.)

6.2.8.1. Provisioning of Sergeant Missile Personnel.

The availability of trained Sergeant repairmen has reached critically low levels in field units and is seriously undermining the capability of DS and GS units to perform their mission. (See Discussion Item No. 2.8.1.)

6.2.8.2. Misutilization of Personnel.

Highly trained missile repairmen are being utilized to a great extent to perform a large variety of non-mission related duties on a full time basis. This is a contributing factor to the relatively low retention rate of missile repairmen. (See Discussion Item No. 2.8.2.)

6.2.8.3. Work Planning Required in Missile Support Operations.

Very little work planning is being accomplished on a daily basis in direct support unit shops and has resulted in a extravagant waste of available manpower. (See Discussion Item No. 2.8.3.)

6.2.8.4. Missile System MACRIT.

The factor of 2500 available manhours per year used in determining MACRIT is not applicable in the development of missile system MACRIT for units operating under a peacetime condition. (See Discussion Item No. 2.8.4.)

6.2.8.5. Organization of Quality Control (QC) Sections.

Quality Control in most units is rated as a luxury item and is generally not implemented at all at DSU and implemented with varying degrees of success at GSU and consequently the quality of missile system repairs has been a variable factor in the field. (See Discussion Item No. 2.8.5.)

6.2.8.6. Requirements for Drivers.

The lack of assigned drivers in technical supply sections of missile support unit TOE has resulted in a degraded capability of the section and has placed an enormous workload on the few personnel normally authorized these sections. This additional workload has noticeably reduced the effectiveness of the section. (See Discussion Item No. 2.8.6.)

6.2.8.7. Requirements for Administrative Personnel.

The large administrative workload coupled with the few clerical positions authorized in TOE has resulted in support units using highly qualified missile repairmen as orderly room clerks to the detriment of the support mission. (See Discussion Item No. 2.8.7.)

6.2.8.8. Requirements for Missile Staff Sections.

The missile Staff Officer in the Artillery battalion staff requires a full time clerk driver as well as a vehicle and radio in order to properly perform his duties. (See Discussion Item No. 2.8.8.)

6.2.8.9. Requirements for the "40" Skill Level in the 27 Series MOS.

The lack of a "40" skill level in the 27 series MOS will, in the near future, reduce the effectiveness of units organized under TOE 9-550. The end result will be supervisory personnel in the grade of NCO E7 who progressed thru the ranks as a Specialist and never had the opportunity to learn supervisory and administrative skills required of an NCO E7 Platoon Sergeant. (See Discussion Item No. 2.8.9.)

6.2.8.10. Lack of Supervisory Personnel in TOE 9-550.

There are an insufficient number of E6 supervisory personnel authorized in TOE 9-550 and as a result field units find it extremely difficult to properly supervise maintenance actions. (See Discussion Item No. 2.8.10.)

6.2.8.11. 55 Series MOS in the Pershing Battalion.

The 55 series MOS may be required in the ammunition platoons of Artillery units equipped with large missile systems such as SERGEANT and PERSHING. (See Discussion Item No. 2.8.11.)

6.2.8.12. SHILLELAGH Contact Team.

One two man SHILLELAGH contact team cannot properly support 27 systems in wartime when the systems are installed on the Sheridan vehicle and assigned to three separate troops of an Armored Cavalry Squadron. (See Discussion Item No. 2.8.12.)

6.2.8.13. Missile Staff Officers Manual.

The duties of a Missile Staff Officer are not clearly defined in a Department of the Army publication and the failure to provide sufficient guidance has resulted in improper utilization, allocation, and attachment of missile support units. (See Discussion Item No. 2.8.13.)

6.2.8.14. Standards of Grade Authorization for Career Group 46.

The SGA for Career Group 46 do not meet the requirements of field units and have caused TOE writers to design sections of TOE which provide totally inadequate supervisory personnel and mechanical maintenance personnel. In addition, the progression pattern from grade to grade is nonexistent in certain TOE. (See Discussion Item No. 2.8.14.)

6.2.8.15. Combination of 21L and 21M MOS.

Due to the introduction of the P1A system which utilizes a newly designed computer, the two separate MOS are no longer required and can easily be combined into one MOS. (See Discussion Item No. 2.8.15.)

6.2.8.16. Creation of a Chaparral/Vulcan Warrant Officer MOS.

MOS 271A personnel are very much in favor of creating a new warrant officer MOS for Chaparral/Vulcan. Sufficient justification for this action exists to warrant a feasibility study. (See Discussion Item No. 2.8.16.)

6.2.8.17. Staffing of Technical Supply.

Units are complaining that personnel authorizations in tech supply are inadequate. At the present time, no correlation exists between tech supply personnel authorizations and actual workload in the direct support units visited. Incorporation of AR 570-2 manpower authorization criteria into MTOE would result in increases in tech supply authorizations. However, units cannot obtain personnel increases without providing trade-off spaces. Each tech supply should have at lease an E6, 76R40 authorized, and preferably an E7, 76Z50. A warrant officer MOS for tech supply should be created. The remainder of tech supply personnel authorizations should be based on a combination of functional and workload requirements. Additional training in tech supply management and procedures should be incorporated into Missile Maintenance Warrant Officer courses. (See Discussion Item No. 2.8.17.)

6.2.9.1. Training Improvements - PERSHING Enlisted MOS Courses.

Formal on-the-job training programs are nonexistent in the field and further that the school system is not training repairmen who are capable of being productive repairman immediately upon arrival in the field and further that there are training deficiencies in each group of courses which require corrective action. (See Discussion Item No. 2.9.1.)

6.2.9.2. Training Improvements - SERGEANT Enlisted MOS Courses.

Formal on-the-job training programs are nonexistent in the field and further that the school system is not training repairmen who are capable of being productive repairman immediately upon arrival in the field and further that there are training deficiencies in each group of courses which require corrective action. (See Discussion Item No. 2.9.2.)

6.2.9.3. Training Improvement - LCSS Enlisted MOS Courses.

Formal on-the-job training programs are nonexistent in the field and further that the school system is not training repairmen who are capable of being productive repairman immediately upon arrival in the field and further that there are training deficiencies in each group of courses which require corrective action. (See Discussion Item No. 2.9.3.)

6.2.9.4. Printed Circuit Card Repairman.

Field opinion is favorably inclined toward the creation of a MOS to repair printed circuit cards at general support level. More sophisticated equipment, such as PACE, is required to accomplish this repair. However, there is no present requirement for such an MOS because missile maintenance units are not repairing printed circuit cards. The opinion of field personnel is based upon the desire that such repair be performed at general support level. (See Discussion Item No. 2.9.4.)

6.2.9.5. Malassignment of Missile Maintenance Personnel.

Malassignment of lower grade missile maintenance personnel is occurring, particularly in USAREUR. As a result, many units are experiencing shortages in certain MOS which may be balanced or show overages Army-wide. (See Discussion Item No. 2.9.5.)

6.2.9.6. Quality of Tech Supply Personnel.

Units are not receiving MOS 76R Missile Repair Parts Specialists. (See Discussion Item No. 2.9.6.)

6.2.10.1. Theater Missile Supply Support.

Current doctrine for supply support of missile system peculiar repair parts has not been implemented. Overseas theaters are now in the process of separating the flow of missile peculiar repair parts from that of other Class IX items and establishing either system dedicated depots or theater depots for stockage of all missile repair parts. These depots are organic to missile general support maintenance companies as provided for by current PERSHING doctrine. Reaction from field personnel indicates that this trend will result in far more responsive supply support for missile systems. (See Discussion Item No. 2.10.1.)

6.2.10.2. USAREUR Program for Direct Exchange of PEMA Secondary Items.

USAREUR has established an extensive program for direct exchange of PEMA Secondary Items which has proven to be responsive to the needs of the using unit. This program has resulted in a net decrease in the volume of paperwork passed between echelons of supply and maintenance. The success of the program has been limited only when repair parts are not available to repair and return DX items to stock. (See Discussion Item No. 2.10.2.)

6.2.10.3. Impact of the Army Stock Fund at DS/GS Level.

Stock funding of repair parts is adversely affecting the capability of missile maintenance units to perform their mission. Accounting procedures are not uniform between comparable levels of command, nor are they standardized at unit level. Fund shortages are preventing the requisitioning of true stock replenishment requirements. Consequently, units are experiencing shortages of critical repair parts which increases the time required to repair items of equipment. (See Discussion Item No. 2.10.3.)

6.2.10.4. Mechanization of the DSU Tech Supply in USAREUR.

The USAREUR approach to mechanization of missile DSU tech supply operations is to be commended. Satelliting tech supply's on other units authorized NCR 500's is logical and results in simplified stock control procedures at the unit level, while requiring no additional NCR 500 machines. It enables the NCR 500 capabilities to be most fully utilized. The net result is a savings in time and money. However, there was no apparent effort being made to document NCR 500 MOS requirements on unit MTOE. (See Discussion Item No. 2.10.4.)

6.2.10.5. The Army Master Data File.

The microfilm AMDF is a valuable tool for tech supply activities and should be made available to all units having a tech supply. (See Discussion Item No. 2.10.5.)

6.2.10.6. Demand Criteria for Missile System Peculiar Repair Parts.

Application of demand criteria to Land Combat Missile System peculiar repair parts is unrealistic in view of the limited usage of these systems in the field. Existing mandatory stockage lists are inadequate and do not meet the actual requirements of missile maintenance units. (See Discussion Item No. 2.10.6.)

6.2.10.7. Cannibalization as a Source for PERSHING Repair Parts.

The density of the PERSHING 1A Missile System is too small to permit establishment of a cannibalization point. All repair parts now identified as X_2 in PERSHING repair parts manuals should be stocked in sufficient quantities to support field requirements. (See Discussion Item No. 2.10.7.)

6.2.10.8. Repair Parts Shortages.

The list of repair parts shortages was compiled from comments by maintenance personnel in units visited and contains those items which they were having considerable difficulty in obtaining. (See Discussion Item No. 2.10.8.)

6.2.10.9. Commercial Vehicles for Direct Support Units.

Direct support units in USAREUR should be issued at least one commercial vehicle in the 1 1/2 ton class for use in making daily supply and maintenance trips. (See Discussion Item No. 2.10.9.)

6.2.10.10. Deficiencies in Land Combat Equipment Authorizations.

Equipment authorizations for various TOE require modification by either deletion, addition, or substitution of equipment. Current TOE require changes based on the field utilization of currently authorized equipment. (See Discussion Item No. 2.10.10.)

6.2.10.11. Individual Tool Sets.

Current TOE authorize too many tool sets which contain many items which are seldom if ever used by the repairman. More well designed individual tool sets with a greatly reduced number of tools per set is required. In addition, the number of individual tool sets authorized by TOE must be reduced. (See Discussion Item No. 2.10.11.)

6.2.10.12. Equipment Failures.

A compilation of the most frequent equipment failures as reported by maintenance personnel, is provided in the discussion. (See Discussion Item No. 2.10.12.)

6.2.10.13. Air Conditioner Maintenance.

Air conditioner maintenance is a significant problem area due to: (1) lack of maintenance capability; (2) inadequate organizational maintenance; (3) shortage of repair parts; and (4) the variety of makes and models in the field. (See Discussion Item No. 2.10.13.)

6.2.10.14. Generator Problems.

Current 45 KW, 400 Hz generators are not suitable for field use. Generator capabilities need to be more closely aligned with power requirements. Maintenance sections require dummy loads. (See Discussion Item No. 2.10.14.)

6.2.10.15. Commercial Power in Garrison.

Missile maintenance units require 400 Hz commercial power for garrison shop facilities. (See Discussion Item No. 2.10.15.)

6.2.10.16. PERSHING Theodolite Maintenance Problems.

Shortages of qualified 41B topographic instrument repairman are adversely affecting the theodolite maintenance efforts of USAREUR PERSHING direct support platoons. (See Discussion Item No. 2.10.16.)

6.2.10.17. Equipment Serviceability for the Sheridan Vehicle.

The present ESC criteria has resulted in a degraded effectiveness of the Sheridan System which is caused by a lack of urgency in the repair of the SHILLELAGH Missile System. Other priorities have caused the user to perform only a minimum of maintenance on the missile system because of the fact that the Sheridan system is rated only amber for a non-operational missile system. (See Discussion Item No. 2.10.17.)

6.2.10.18. SHILLELAGH Guided Missile System Test Set, AN/MSM-93.

Current fault isolation and operational verification techniques for the GMSTS fault locator are inadequate. (See Discussion Item No. 2.10.18.)

6.2.10.19. Typical TOE 9-550 DSU Workload.

Workload figures indicate that extensive use is made of contact teams in USAREUR. (See Discussion Item No. 2.10.19.)

6.2.10.20. Maintenance Allocation Charts (MAC).

The maintenance allocation charts are being used daily by DS and CS units in the field to define the responsibilities of each level of repair and are required to insure that repair is conducted in an orderly fashion in the field. (See Discussion Item No. 2.10.20.)

6.2.10.21. Technical Assistance in the Field.

Support unit commanders are not spending sufficient time visiting supported units and as a result they are not intimately aware of the problems being experienced by these units. (See Discussion Item No. 2.10.22.)

6.3. CONVENTIONAL AMMUNITION CONCLUSIONS

6.3.5.1.1. Physical Security Element.

The requirement exists for a physical security element for each ammunition company which has the mission of ammunition storage. To provide for the physical security element, doctrinal guidance must be developed and TOE modified to provide required physical security personnel and equipment. (See Discussion Item No. 3.5.1.1.)

6.3.5.1.2. Organization and Employment of Conventional Ammunition Companies.

Development and review of TOE has not kept pace with field requirements and action is required to correct this situation. The continued use of obsolete TOE by commanders in the field is creating problems that could be resolved by the use of the newest series TOE. To provide for TOE flexibility, equipment and personnel strength levels must be modified to enable units to meet mission requirements without extensive MTOE documentation. (See Discussion Item No. 3.5.1.2.)

6.3.5.1.3. Direct Support Ammunition Supply.

A requirement exists for a small direct support ammunition organization which is self sufficient and capable of operating one ASP. Requirement for this type mission cannot be satisfied by present TOE organizations without considerable modification or establishing a TDA organization. (See Discussion Item No. 3.5.1.3.)

6.3.5.1.4. Maintenance of Conventional Ammunition.

Currently, TOE 9-500D Ammunition Maintenance Detachments are not performing general support level maintenance. Hence, there is no training base for personnel and no justification for retention of present TOE units on active duty. Review of contengency plans is required to determine if the requirement for the performance of GS level maintenance in the field exists. Provided the requirement exist, this type unit should be actively employed in performance of GS maintenance to provide a training base, and assist in development of future TOE. In the conventional ammunition company DS/GS, direct support maintenance requires identification as a separate function and a separate element should be established to provide for more effective and efficient performance of maintenance operations. (See Discussion Item No. 3.5.1.4.)

6.3.5.1.5. Non-Availability of Transportation for Conventional Ammunition.

Shortage of transportation for conventional ammunition is a problem which jointly affects transportation and ammunition assets management. The problem is compounded when vehicles are rejected for loading after inspection at the ASP or depot by ammunition personnel. (See Discussion Item No. 3.5.1.5.)

6.3.5.2.1. MOSC 55A10 Ammunition Helper.

Retention of MOSC 55A10 Ammunition Helper is of no benefit to the training or career management of ammunition personnel and the MOS should be eliminated. (See Discussion Item No. 3.5.2.1.)

6.3.5.2.2. MOS 55B Series Ammunition Storage Specialist.

MOS 55B Series Ammunition Storage Specialist personnel are required to know how to operate a forklift as part of duties because of the increased use of palletization and containerization for ammunition shipments. (See Discussion Item No. 3.5.2.2.)

6.3.5.2.3. Requirement for Career Education for Ammunition Career Field MOS.

The education level of ammunition enlisted personnel is low and in particular affects the NCO ranks. Action is being taken in the form of the NCOES courses to improve the educational level of personnel but will have little overall effect if the situation is not prevented from recurring. A requirement for formal training must be established as a prerequisite prior to becoming a NCO in the ammunition career field. (See Discussion Item No. 3.5.2.3.)

6.3.5.2.4. Award of MOSC 55X40 Military Ammunition Inspector.

Presently a considerable number of personnel have been awarded MOSC 55X40 Military Ammunition Inspector without meeting the requirements of AR 611-201. Problems in personnel assignments will occur if the MOS is not withdrawn from unqualified personnel. (See Discussion Item No. 3.5.2.4.)

6.3.5.3.1. MOSC 55X40 Military Ammunition Inspector.

Many favorable comments were received on the MOSC 55X40 Military Ammunition Inspector program as the requirement for this type of individual could not previously be satisfied by military personnel. Additional positions are required to be established where a requirement exists for technical knowledge for inspection, supervision and/or technical assistance to organizations performing conventional ammunition functions. (See Discussion Item No. 3.5.3.1.)

6.3.5.3.2. Conversion of TOE Positions from Grade E2 to E3.

Current TOE E2 positions do not affect the assignment or promotion of personnel. TOE E2 should be eliminated and strength authorizations consolidated with TOE E3 positions. (See Discussion Item No. 3.5.3.2.)

6.3.5.3.3. Communications Chief Grade Authorization TOE 9-38G.

The grade of the Communications Chief position in TOE 9-38G should be upgraded due to the responsibility placed on this individual. (See Discussion Item No. 3.5.3.3.)

6.3.6.1. Equipment Authorizations.

Problem areas requiring changes or modifications in equipment authorizations have been identified by this survey and require action to include these recommendations in future changes to TOE. (See Discussion Item No. 3.6.1.)

6.3.6.2.1. Portable Ramp for Use With MIL VAN Trailers.

MIL VAN containerized trailers cannot be efficiently loaded and unloaded with palletized conventional ammunition unless a small forklift can go into the container. The container is received in the form of a trailer which requires a ramp or dock to enable a forklift to enter the container. In a field situation a portable ramp would be required as construction of permanent ramps or docks would not be practical. (See Discussion Item No. 3.6.2.1.)

6.3.6.2.2. Requirement for Small Forklift.

Development of a small rough terrian forklift is required to satisfy field requirements and to standardize the type of small forklifts now in use in the field. (See Discussion Item No. 3.6.2.2.)

6.3.6.2.3. Requirement for a Small Crane.

Ammunition lift capacity can be increased through the use of a small fast operating crane. The size of containers and pallets is limited in conventional ammunition and material handling capacity is measured in how much is moved per hour not how much can be picked up at one time. A small fast operating crane could handle more ammunition per hour than a forklift in loading and unloading cargo vehicles when open pad or modular type storage is used. (See Discussion Item No. 3.6.2.3.)

6.3.6.2.4. Mobile Ammunition Maintenance Equipment.

On-site maintenance of conventional ammunition is the most desireable approach when supported by economic considerations. Mobile maintenance equipment should be developed and supplied to the field to meet this need. (See Discussion Item No. 3.6.2.4.)

6.3.6.2.5. Design of Cargo Vehicles and Containerized Equipment.

Design of cargo vehicles and containerized equipment currently in use impedes the use of material handling equipment. Design of future equipment should permit ready excess to cargo by MHE to expedite handling. (See Discussion Item No. 3.6.2.5.)

6.3.6.2.6. Lead Wire Seals.

The requirement to seal conventional ammunition containers could be better satisfied with a self sealing clip type seal. (See Discussion Item No. 3.6.2.6.)

6.3.6.3.1. Maintenance of Forklifts.

High deadline rate of forklifts is a worldwide problem. A large contributing factor in the cause of maintenance problems is that equipment is operated by OJT trained personnel. Equipment is abused and not maintained properly due to poor training of operators. Once a forklift becomes unserviceable, it remains so for long periods of time due to the lack of repair parts. This compounds the problem as remaining equipment in turn is used more heavily to compensate for deadlined equipment. (See Discussion Item No. 3.6.3.1.)

6.3.6.4.1. Use of DA Form 2765-1 for Requesting Conventional Ammunition.

The use of DA Form 2765-1 did satisfy the requirement for forms for the requesting of conventional ammunition by using units. However, the requirement could be better met by the use of DA Form 581, as it was more versatile and less effort was required to process it. (See Discussion Item No. 3.6.4.1.)

6.3.6.4.2. Use of Nonstandard Forms in the Ammunition Supply System.

Considerable use is being made of locally generated forms in the conventional ammunition supply system. This would indicate that the format of existing standard forms is inadequate or commands are not practicing forms management. In either case it is negating CONUS training and the use of DA Forms. The Standard Army Ammunition Systems (SAAS) development study now in progress should include a review of this area to assure interface between manual and automated supply systems. (See Discussion Item No. 3.6.4.2.)

6.3.6.5.1. Ammunition Reference Publications.

The format of ammunition supply reference publications and the method of supplying changes are not practical and should be changed. (See Discussion Item No. 3.6.5.1.)

6.3.6.5.2. Informal Reference Publications.

A requirement exists for increased dissemination of information to the field on safety, storage and maintenance of conventional ammunition using an informal format. (See Discussion Item No. 6.3.6.5.2.)

6.3.7.1. General Training Comments.

Training courses presently conduct training to a technical level greater than is required for use in the field. Officers and NCO's should receive additional management and administrate type training to improve efficiency. (See Discussion Item No. 3.7.1.)

6.3.7.2. MOSC 55B20 Ammunition Storage Specialist.

The training course for MOSC 55B20 requires increased emphasis or additional training in certain problem areas which have been identified by the survey. (See Discussion Item No. 3.7.2.)

6.3.7.3. MOSC 55B30 Ammunition Operational Specialist.

The training course for MOSC 55B30 requires increased emphasis or additional training in certain problem areas which have been identified by this survey. (See Discussion Item No. 3.7.3.)

6.3.7.4. MOS 411A Ammunition Technician.

A separate training course is required to provide technical proficiency to personnel prior to appointment as a Warrant Officer MOS 411A Ammunition Technician. Additionally, personnel should be returned periodically for refresher type training to retain proficiency and be updated on latest technical developments. (See Discussion Item No. 3.7.4.)

6.3.7.5. MOS 4514 Ammunition Officer.

The training course for MOS 4514 requires increased emphasis or additional training in certain problem areas which have been identified by this survey. (See Discussion Item No. 3.7.5.)

6.4. SPECIAL AMMUNITION CONCLUSIONS

6.4.1. Technical Assistance to Supported Units.

Technical assistance to supported units is not in the capability statement of TOE 9-48G. (See Discussion Item No. 4.2.1. and 4.2.1.4.1.)

6.4.2. Quality Assurance/Quality Control Section.

TOE 9-48G does not provide for a QA/QC mission or capability. (See Discussion Item No. 4.2.1.4. and 4.2.1.4.2.)

6.4.3. Nuclear Weapons Maintenance Team.

TOE 9-48G does not provide for an adequate number of nuclear weapons maintenance teams. (See Discussion Item No. 4.2.1.4. and 4.2.1.4.3.)

6.4.4. Maintenance of Missile Class VII and IX Items.

Guided missile general support maintenance is provided by TOE 9-59 and other companies as well. (See Discussion Item No. 4.2.1.4.4.)

6.4.5. TDA Nuclear Weapons Support Section.

Special ammunition support missions at Ft. Bragg, Ft. Sill and Ft. Riley definitely can be performed by the TOE special ammunition company located at those installations. (See Discussion Item No. 4.2.1.6.)

6.4.6. Officer MOS 4517 vs 4514.

The schooling received by MOS 4517 best qualified this officer for the storage and issue platoon in a special weapons company. (See Discussion Item No. 4.2.2.2.)

6.4.7. Warrant Officer Assignments.

A definite need exists to assign warrant officers by grade in TOE and TDA. (See Discussion Item No. 4.2.2.3.)

6.4.8. MOS 76M20 vs 55G20 In The Control Section.

The schooling received by MOS 55G best qualifies the specialist for the position. (See Discussion Item No. 4.2.2.4.)

6.4.9. Special Ammunition Company Commanders.

There is a definite requirement for a Major to command a special ammunition company. (See Discussion Item No. 4.2.3.1.)

6.4.10. Special Ammunition Company Executive Officer.

There is a definite requirement for an executive officer in special ammunition companies. (See Discussion Item No. 4.2.3.2.)

6.4.11. Special Ammunition Company Operations Officer (Control Section).

A Captain MOS 4517 is definitely required as the operations officer in special ammunition companies. (See Discussion Item No. 4.2.3.3.)

6.4.12. Storage and Issue Platoon Leader.

A Captain MOS 4517 is definitely required as the storage and issue platoon leader(s) in special ammunition companies. (See Discussion Item No. 4.2.3.4.)

6.4.13. Maintenance Platoon Leader.

A Captain MOS 4517 is definitely required as the maintenance platoon leader in special ammunition companies. (See Discussion Item No. 4.2.3.5.)

6.4.14. Maintenance Teams.

TOE 9-48G does not authorize enough maintenance personnel to perform the maintenance mission of a depot or general support company. (See Discussion Item No. 4.2.3.6.)

6.4.15. Quality Assurance/Quality Control Section.

TOE 9-48G does not authorize enough personnel to perform the QA/QC mission of a depot or general support company. (See Discussion Item No. 4.2.3.7.)

6.4.16. Technical Supply Officer.

A tech supply officer is definitely required in special ammunition companies. (See Discussion Item No. 4.2.3.8.)

6.4.17. MOS 71L20 Documents Clerk.

TOE 9-47E and 9-48G do not authorize enough documents clerks. (See Discussion Item No. 4.2.3.9.)

6.4.18. Communication Equipment - (Radio) For Convoy Control.

The equipment authorized in the MTOE 9-377 is adequate. (See Discussion Item No. 4.2.4.1. and 4.2.4.1.2.1.)

6.4.19. Communication Equipment - (Radio) For Convoy Control.

The equipment authorized in the MTOE 9-87 is adequate. (See Discussion Item No. 4.2.1. and 4.2.4.1.2.2.)

6.4.20. Communication Equipment - (Radio) For Convoy Control.

The equipment as authorized in TOE 9-47G is not adeuqate. (See Discussion Item No. 4.2.4.1. and 4.2.4.1.2.3.)

6.4.21. Special Weapon Tool Set, SC 5180-95-CL-A09.

This tool set is not adequate for the maintenance platoon of a special ammunition depot or general support company. (See Discussion Item No. 4.2.4.2.)

6.4.22. Special Weapon Tool Set, SC 5180-95-CL-A11.

This tool set is not adequate for a direct support company. (See Discussion Item No. 4.2.4.3.)

6.4.23. Special Weapon Tool Set, SC 5180-95-CL-A10.

This tool set was not designed for a nuclear weapon support section. (See Discussion Item No. 4.2.4.4.)

6.4.24. Roller Conveyors.

The roller conveyors are required for special ammunition companies. (See Discussion Item No. 4.2.4.5.)

6.4.25. Transportation Vehicles.

The vehicles furnished to special ammunition companies are old and not in good repair. (See Discussion Item No. 4.2.4.6.)

6.4.26. Universal Tie-Down Kits.

The vehicles being used for transporting special ammunition are not modified. (See Discussion Item No. 4.2.4.7.)

6.4.27. Sand Blasting Equipment.

The special ammunition companies have a definite requirement for this equipment. (See Discussion Item No. 4.2.4.8.)

6.4.28. Special Weapons Maintenance Vans.

The special weapons maintenance vans are not required in special ammunition depot and general support companies. (See Discussion Item No. 4.2.4.9.)

6.4.29. Transport Vehicles For TOE 9-47G.

TOE 9-47G does not authorize enough cargo trucks and semi-trailers to transport mission stocks. (See Discussion Item No. 4.2.4.10.)

6.4.30. Material Handling Equipment.

A requirement exists for additional MHE that can be better utilized in a permanent storage area. (See Discussion Item No. 4.2.4.11.)

6.4.31. Maintenance Operations.

Problems in the maintenance operations are directly related to the shortage of MOS 55G personnel. (See Discussion Item No. 4.2.5.1.)

6.4.32. Technical Assistance Visits.

Because of the shortage of MOS 55G personnel, technical assistance visits are not being conducted as required.

6.4.33. Repair Parts Supply.

Problems exist with the requisitioning of special weapons repair parts in USAREUR. (See Discussion Item No. 4.3.2.)

6.4.34. Special Ammunition Unit Operations - FM 9-47.

FM 9-47 should be more comprehensive. (See Discussion Item No. 4.2.6.1.)

6.4.35. Supply Information Procedures Letter.

There is a distribution problem with supply information procedures letter. (See Discussion Item No. 4.2.6.2.)

6.4.36. Operational Change Report.

JCS Pub VI is too complex for field level use. (See Discussion Item No. 4.3.3.1.)

6.4.37. Modification Work Orders.

Modification work orders for field level use should not require local purchase. (See Discussion Item No. 4.3.3.2.)

6.4.38. Technical Manuals.

Technical manuals for field level use should not require application in accordance with manufacturer instructions. (See Discussion Item No. 4.3.3.3.)

6.4.39. Shortage of Personnel.

More personnel should be trained as MOS 55G Nuclear Weapons Maintenance Specialist. (See Discussion Item No. 4.3.3.4.)

6.4.40. MOS Training.

Present special weapons MOS testing is inequitable. (See Discussion Item No. 4.3.6.3.)

6.4.41. Second Generation Training.

Second generation training is a problem in USAREUR. (See Discussion Item No. 4.4.2.)

6.4.42. MOS 55B Ammunition Storage and Operations Specialist.

MOS 55B personnel are not properly schooled in special weapons. (See Discussion Item No. 4.4.3.)

6.4.43. MOS 55G Nuclear Weapons Maintenance Specialist.

POI for MOS 55G does not adequately cover all areas of special weapons. (See Discussion Item No. 4.4.4.)

6.4.44. MOS 35F Nuclear Weapons Electronic Specialist.

POI for MOS 35F does not adequately cover all areas of special weapons. (See Discussion Item No. 4.4.5.)

6.4.45. MOS 4517 Nuclear Weapons Officer.

POI for MOS 4517 does not adequately cover all areas of special weapons. (See Discussion Item No. 4.4.6.)

6.4.46. MOS 76P Stock Control and Accounting Specialist.

MOS 76P personnel are not properly schooled in Tech Supply. (See Discussion Item No. 4.4.7.)

6.4.47. Senior MOS 55G Transition Course.

Senior MOS 55G technicians need administrative and management training. (See Discussion Item No. 4.4.8.)

6.4.48. MP As Security Guards.

A definite requirement exists for security type guards at a special weapons unit. (See Discussion Item No. 4.4.9.)

6.5. REDEYE MISSILE SYSTEM CONCLUSIONS

6.5.4.1. Malassignment of REDEYE Enlisted Personnel.

School trained REDEYE Gunners are being assigned in their basic MOS without regard to the R6 ASI creating excesses in some battalions and shortages in others. Unauthorized MOS are being used for REDEYE Gunners in violation of AR 611-201. (See Discussion Item No. 5.4.1.)

6.5.4.2. Branch Oriented Section Leaders.

Junior Officers are being assigned as REDEYE Section Leaders without regard to formal school training. Trained officers are reassigned within the battalion and replaced with Junior Second Lieutenants who are untrained. (See Discussion Item No. 5.4.2.)

6.5.4.3. Career Progression Program.

The actual duties, responsibilities, and necessary skills of a REDEYE Gunner are not consistent with their basic combat MOS. Skills acquired through progression as a REDEYE Gunner are lost after attaining grade E-6. Personnel aspects such as promotions, proficiency pay, reassignments, etc., are tied to the basic MOS resulting in morale problems. (See Discussion Item No. 5.4.3.)

6.5.4.4. Field Manual 44-1.

FM 44-1 does not contain enough doctrinal guidance for Air-space Control Element (ACE) functions and operations. (See Discussion Item No. 5.4.4.).

6.5.4.5. TOE Authorizations.

The actual functions of the Air Defense Section Headquarters require the addition of one Radio Telephone Operator and one 1/4 ton truck to the present "E" series TOE. (See Discussion Item No. 5.4.5.)

6.5.4.6. REDEYE Support Operations.

The work load of the REDEYE elements in TOE 9-550 is light, cyclic and externally influenced. Very little actual maintenance (as opposed to inspection) is required or performed on user items supported. The vast majority of actual maintenance is required on support equipment, primarily the AN/TSM-82 Test Set. Since the REDEYE Guided Missile is highly reliable, completely self-contained and combat expendable, the AN/TSM-82 Test Set is far too complex and requires far too much costly support equipment and time for the function it performs and the end results obtained. (See Discussion Item No. 5.4.6.).

6.5.5.1. Field Training.

The required field training in too many battalions is far below the acceptable level. Personnel are utilized for "ash and trash" details, labor pools, and permanent jobs not provided for in TOE. The concept of organic Air Defense is fine in theory, but works poorly in practice. (See Discussion Item No. 5.5.1.)

6.5.5.2. Training Aids.

FM 44-30 does not depict the latest aircraft, and slide kit SL/ARK#1 does not have wide enough distribution. (See Discussion Item No. 5.5.2.)

6.5.5.3. MOS Training - 27G.

Graduate repairmen in MOS 27G are not adequately familiar with the use of commercial type test equipment, technical manuals, parts manuals, forms, records, weapon round checkout procedures, and ammunition safety procedures. (See Discussion Item No. 5.5.3.)

6.5.6.1. Communications Radios.

The radios presently authorized by TOE do not have sufficient range for reliable communications. (See Discussion Item No. 5.6.1.)

6.5.6.2. Coolant Supply For Test Set AN/TSM-82.

USAREUR is not following the established policy for obtaining replacement 2 lb coolant bottles. The present practice of refilling bottles locally with inadequate, obsolete equipment is less costly, but could and possibly has led to contamination of weapon rounds during readiness testing. (See Discussion Item No. 5.6.2.)

7. MAME-71 RECOMMENDATIONS

7.1. AIR DEFENSE MISSILE SYSTEMS RECOMMENDATIONS

7.1.7.1. Direct Support/General Support Operations.

Recommend that the appropriate Combat Developments Command agency develop necessary doctrine to support the combined DS/GS support concept. (See Conclusion Item No. 6.1.7.1.)

7.1.7.2. Consolidated Support For Missile Guidance Packages.

Recommend that the appropriate Combat Developments Command agency, in coordination with the pertinent Army Materiel Command system manager, explore the feasibility of integrating the consolidated support concept for missile guidance packages into future doctrine and maintenance support plans. (See Conclusion Item No. 6.1.7.2.)

7.1.7.3. Doctrine For Class V Missile Maintenance of High Cost, Low Density System.

Recommend that the Combat Developments Command, Maintenance Agency, expand the Class V missile maintenance system being utilized in USAREUR for inclusion in FM 9-6; and develop a detachment TOE that is capable of providing Class V missile maintenance for High Cost, Low Density Missile Systems. (See Conclusion Item No. 6.1.7.3.)

7.1.7.4. Theater Missile Supply Support.

Recommend that the appropriate Combat Developments Command agency reassess missile supply support doctrine, and develop a missile supply system that is consistent with field requirements and practices. (See Conclusion Item No. 6.1.7.4.)

7.1.7.5. Reduction in Mobility of DA and GS Units.

Recommend that the appropriate Combat Developments Command agency take necessary action to reduce the mobility requirements (mission and equipment) for Air Defense DS and GS Units to a level consistent with that portrayed in the discussion of this problem. (See Conclusion Item No. 6.1.7.5.)

7.1.7.6. Technical Assistance Service.

Recommend that the Missile and Munitions Center and School and the Air Defense Artillery School modify existing officer, warrant officer, and enlisted courses to produce graduates who are knowledgeable and motivated in the conduct of technical assistance service. Recommend that the Combat Developments

Command Maintenance agency provide technical assistance doctrinal coverage in FM 29-20. (See Conclusion Item No. 6.1.7.6.)

7.1.7.7. Maintenance Allocation Charts (MAC).

Recommend that the appropriate Combat Developments Command agency and Army Materiel Command System Managers review the Maintenance Allocation Charts for Air Defense Missile Systems in order to align them with current field practices and repair parts authorizations. (See Conclusion Item No. 6.1.7.7.)

7.1.7.8. Doctrinal Guidance On Theater Maintenance Float Management.

Recommend that the proponent CONARC agency for FM 9-59 expand its coverage of operational readiness float (ORF) operations, and that the proponent CDC agency for FM 29-20 provide detailed guidance for ORF asset management of the staff officer level. (See Conclusion Item 6.1.7.8.)

7.1.7.9. Production Control Reconciliation.

Recommend that the Combat Developments Command, Maintenance Agency, develop a production control reconciliation system and that it be portrayed in all field manuals pertinent to shop operations and staff officers. (See Conclusion Item N. 6.1.7.9.)

7.1.7.10. Consolidation of MOS 23Q and MOS 23S.

Recommend that the US Army Missile and Munitions Center and School take necessary actions to consolidate the Pulse Radar Repairman (MOS 23S) and Fire Control Repairman (MOS 23Q) and subsequently combine the resident programs of instruction. (See Conclusion Item No. 6.1.7.10.)

7.1.8.1 Uniform Implementation of "G" Series TOE.

Recommend that the appropriate Department of Army activity, responsible for MTOE approval, adopt a policy of requiring that all MTOE submission be prepared against current, DA-approved TOE; recommend that all overseas theaters be required to uniformly adopt the "G" series TOE for missile systems. (See Conclusion Item No. 6.1.8.1.)

7.1.8.2. Positioning of The Direct Support Element.

Recommend that Combat Developments Command Maintenance Agency and Air Defense Agency coordinate and cooperate in developing alternate means of providing logistics support to Air Defense Missile Units using the data portrayed in discussion paragraphs 1.8.2. and 1.7.1. of this report. (See Conclusion Item No. 6.1.8.2.)

7.1.8.3. Personnel Provisioning For A Support Unit Shop Office.

Recommend that the Combat Developments Command, Air Defense Agency (DS Level), and Maintenance Agency (GS Level), authorize TOE personnel, in the appropriate grade and MOS, for the conduct of the essential technical/administrative tasks. (See Conclusion Item No. 6.1.8.3.)

7.1.8.4. TOE Designation of A Quality Control Element.

Recommend that the Combat Developments Command, Air Defense Agency (DS Level), and Maintenance Agency (GS Level), modify Air Defense TOE to provide adequate TOE personnel allocation (MOS, grade, skill level) for the conduct of quality control, and designate this function by a separate TOE paragraph. (See Conclusion Item No. 6.1.8.4.)

7.1.8.5. Personnel Provisioning For Units With Operational Readiness Float Mission.

Recommend that the appropriate Combat Developments Command agency provide specific criteria which can be used to develop personnel authorizations in support of Operational Readiness Float (ORF) assets, and that the criteria be portrayed in current doctrine (FM, TOE). (See Conclusion Item No. 6.1.8.5.)

7.1.8.6. Requirement For An Organic Signal Support Capability.

Recommend that the appropriate Combat Developments Command agency include signal support in the mission of Air Defense DS and GS Unit TOE (44-236, 44-256, 44-536, and 9-59), and that supporting personnel and equipment be authorized. (See Conclusion Item No. 6.1.8.6.)

7.1.8.7. Requirement For An Organic Loader Transporter Support Capability.

Recommend that the appropriate Combat Developments Command agency provide the missile direct support element with the mission and capability to conduct total direct support and load testing for the superstructure and limited support of the automotive portion of the HAWK Loader Transporter. (See Conclusion Item No. 6.1.8.7.)

7.1.8.8. Grade Level Of The DS Platoon Sergeant.

Recommend that the appropriate Combat Developments Command agency take action to modify TOE 44-236 and 44-536 to increase the grade of the Platoon Sergeant to E-8. (See Conclusion Item No. 6.1.8.8.)

7.1.8.9. Grade Level Of Tech Supply Personnel.

Recommend that the appropriate Combat Developments Command agency take action to modify TOE 44-536 to change the grade of the senior NCO in the Technical Supply Section from E-5 to E-6 NCO, and that all DS TOE be modified to authorize a warrant officer as Technical Supply Section Chief. (See Conclusion Item No. 6.1.8.9.)

7.1.8.10. Conversion of Power Generator Equipment Operators to Repairmen.

Recommend that the appropriate Combat Developments Command agency take action to correct presently authorized Power Generator Mechanics (MOS 52B30) to Power Generator Equipment Repairmen (MOS 52D20), and that these personnel be assigned to the Power Generator and Air Conditioning Equipment Support Section. (See Conclusion Item No. 6.1.8.10.)

7.1.8.11. Proportion Of Test Equipment Operators At General Support.

Recommend that the appropriate Combat Developments Command agency revise TOE 9-59 to authorize a greater number of test equipment operator/repairmen personnel (MOS 22L in Nike Hercules, and MOS 23T and 22K in HAWK) in the support platoon, and correspondingly reduce the number of battery equipment type repairmen. (See Conclusion Item No. 6.1.8.11.)

7.1.8.12. Materiel Handling Equipment Requirements.

Recommend that the appropriate Combat Developments Command agency take action to modify Air Defense DS and GS TOE to include a forklift and two "A" frames, and in addition, authorize Nike Hercules Direct Support Platoon a 5 ton wrecker. (See Conclusion Item No. 6.1.8.12.)

7.1.9.1. Missile Maintenance Officer Training.

Recommend that the US Army Missile and Munitions Center and School take necessary action to modify the resident training programs for MOS 4515 and 4516 to provide greater emphasis and coverage of the logistics management areas cited in Section 1.9.1. of this report. (See Conclusion Item No. 6.1.9.1)

7.1.9.2. Air Defense Warrant Officer Training.

Recommend that the US Army Missile and Munitions Center and School take necessary actions to insure that warrant officers with MOS 251B and 251C, who have not completed a corresponding course, be programmed to attend one of the approved Surface-to-Air Missile Systems Maintenance Intermediate Courses; and that appropriate restrictions be placed in AR 611-112 to make successful completion of school training a prerequisite for award of MOS. (See Conclusion Item No. 6.1.9.2.)

7.1.9.3. Requirement For Resident Training of "Capper MOS".

Recommend that the US Army Missile and Munitions Center and School take necessary action to modify the current NCOES Program to provide a course of instruction for personnel currently holding a "Capper MOS" (23V50 and 23W50), and to make this course a prerequisite in AR 611-201 for the award of the MOS. (See Conclusion Item No. 6.1.9.3.)

7.1.9.4. Training Improvements - Nike Hercules Ordnance Enlisted MOS Courses.

Recommend that the US Army Missile and Munitions Center and School take necessary action to proportionally increase instruction in the performance of contact team and shop operation functions, and improve training on selected technical areas identified in Section 1.9.4. if this report. (See Conclusion Item No. 6.1.9.4.)

7.1.9.5. Training Improvements - HAWK Ordnance Enlisted MOS Courses.

Recommend that the US Army Missile and Munitions Center and School take necessary action to proportionally increase instruction in the performance of contact team and shop operation functions, and improve training on selected technical areas identified in Section 1.9.5. of this report. (See Conclusion Item No. 6.1.9.5.)

7.1.9.6. Adequacy of Nonresident Training Program.

Recommend that the US Army Missile and Munitions Center and School take necessary action to develop additional correspondence courses and improve existing courses to conform with the field requirements identified in Section 1.9.6. of this report. (See Conclusion Item No. 6.1.9.6.)

7.1.9.7. Shop Safety Training.

Recommend that the US Army Missile and Munitions Center and School take necessary action to improve safety training on power generation equipment, materiel handling equipment and equipment utilizing high pressure air and hydraulics; and that the appropriate element of the Army Materiel Command take necessary action to insure the provisioning of electrical-type safety shoes in overseas supply units. (See Conclusion Item No. 6.1.9.7.)

7.1.10.1. Retention and Revision of The Missile System Stockage List (MSSL).

Recommend that the appropriate element of the US Army Missile Command take necessary actions to establish a worldwide review board (including qualified field personnel from user and support levels) to quantitatively revise the current MSSL for the Nike Hercules and HAWK Missile Systems. (See Conclusion Item No. 6.1.10.1.)

7.1.10.2. The Equipment Improvement Program - Equipment Improvement Recommendations (EIR).

Recommend that the appropriate element of the US Army Missile Command take necessary action to improve the methodology for researching and responding to EIR submitted by field units, and that the practice of directing mandatory equipment changes vis the EIR Digest be discontinued. (See Conclusion Item No. 6.1.10.2.)

7.1.10.3. Missile Maintenance Technician (MMT) Program.

Recommend that the appropriate element of the US Army Missile Command take necessary action to insure that MMT are provided at the support unit level on a timely basis, and that the program features pertaining to screening, training, and regulatory guidance discussed in Section 1.10.3. be implemented; recommend that the appropriate element of the US Army Materiel Command take necessary actions to provide adequate numbers of Engineer-type Maintenance Technicians in each overseas theater. (See Conclusion Item No. 6.1.10.3.)

7.1.10.4. Deficiencies In Air Defense Equipment Authorizations.

Recommend that the appropriate element of the US Army Missile Command take necessary actions to insure that equipment provisioning is consistent with field requirements cited in Section 1.10.4;

recommend that the appropriate Combat Developments Command agency take action to adjust TOE authorizations in accordance with those requirements cited in this report. (See Conclusion Item No. 6.1.10.4.)

7.1.10.5. Provisioning of Advanced Electronic Repair Equipment.

Recommend that the appropriate element of the US Army Missile Command take necessary action in the provisioning of two each Repair Control Centers at every missile GS unit, and substituting the latest types of soldering equipment and materials in lieu of items currently authorized in all missile support units. (See Conclusion Item No. 6.1.10.5.)

7.1.10.6. Provisioning of NCR 500 For Stock Accounting.

Recommend that the appropriate Combat Developments Command agency take necessary actions to integrate appropriate personnel and equipment authorizations for the NCR 500 into Air Defense Unit TOE. (See Conclusion Item No. 6.1.10.6.)

7.1.10.7. Materiel Problems For Further Evaluation.

Recommend that the appropriate element of the US Army Missile Command further investigate the alleged problems cited for the HAWK air conditioners and HPI Transmitter Test Procedures, and the Nike Hercules Launcher wedge locks. (See Conclusion Item No. 6.1.10.7.)

7.1.10.8. Technical Manual Improvements.

Recommend that the appropriate element of the US Army Missile Command take necessary action to improve TM format for the derivation of a FSN from an illustration call out, and that the additions, deletions and binding requirements depicted in Section 1.10.8. be accomplished. (See Conclusion Item No. 6.1.10.8.)

7.1.10.9. Adequacy of The Repair Parts Special Tool Lists.

Recommend that the appropriate element of the US Army Missile Command take appropriate action to improve the item description portion of the Repair Parts Special Tool Lists to facilitate cross-referencing for compatible substitute items. (See Conclusion Item No. 6.1.10.9.)

7.1.10.10. Evaluation of "X" Source Coded Items In Equipment Manuals.

Recommend that the appropriate element of the US Army Missile Command take action to perform a detailed review and revision of "X" source coded items and that "X" source coded items continue to be identified in Air Defense Equipment TM. (See Conclusion Item No. 6.1.10.10.)

7.1.10.11. Nike Hercules Shop #3 Card Reader.

Recommend that the appropriate element of the US Army Missile Command take necessary action in establishing a "turn around" rebuild program or theater refurbishment program for all Nike Hercules Shop 3 Card Readers. (See Conclusion Item No. 6.1.10.11.)

7.2. LAND COMBAT MISSILE SYSTEMS RECOMMENDATIONS

7.2.7.1. Consolidation of DS & GS Units.

Recommend that the appropriate Combat Developments Command agency take action to develop doctrine and organization for a DS/GS missile maintenance battalion capable of being assigned as a separate battalion under the Pershing Brigade. Further, that the appropriate agency develop doctrine for future missile systems which will take advantage of the combined DS/GS type organization. (See Conclusion Item No. 6.2.7.1.)

7.2.7.2. Organic Direct Support.

Recommend that the appropriate Combat Developments Command agency re-evaluate the organic support concept in light of the problems outlined in section 2.7.2. of this report. The re-evaluation must consider the impact the organic concept has on system maintenance and retention of highly skilled missile repairmen. (See Conclusion Item No. 6.2.7.2.)

7.2.7.3. The Detachment Concept.

Recommend that Combat Developments Command maintenance agency rewrite TOE 9-550 to include appropriate administrative and logistics personnel necessary to allow attachment to TOE units in the field without requiring additional teams from other TOE. (See Conclusion Item No. 6.2.7.3.)

7.2.7.4. Reduced Mobility for DSU.

Recommend the appropriate Combat Developments Command agency study the feasibility of reducing the mobility of direct support missile units within the following criteria: (1) contact teams - 100% mobile; (2) tech supply - 50% mobile; (3) maintenance shops - 50% mobile; (4) other sections - 50 to 100% mobile. (See Conclusion Item No. 6.2.7.4.)

7.2.7.5. System Peculiar Supply Depots.

Recommend the appropriate Combat Developments Command agency incorporate the system of the combined GSU and theater missile peculiar depot into current doctrine for missile support in the field. (See Conclusion Item No. 6.2.7.5.)

7.2.7.6. Standards of Grade Authorization for Unit Commands.

Recommend the appropriate Department of Army staff element take action to change AR 611-101 to establish the grade of a General Support Unit Commander as a Major and further, that the

AR allow TOE writers to authorize Unit Commander positions based on the complexity of the unit mission as well as the number of personnel authorized in the unit. (See Conclusion Item No. 6.2.7.6.)

7.2.7.7. Executive Officers for Combat Service Support Companies.

That the appropriate Department of Army staff element take action to change AR 570-2 to allow the authorization of an Executive Officer position in a combat service support company. (See Conclusion Item No. 6.2.7.7.)

7.2.7.8. TOE Rationale Required by Field Units.

That the appropriate Combat Developments Command agency take action to provide additional information to the field, preferably as a section in the TOE; to include a detailed discussion of the organization and functions of the TOE as well as loading plans, equipment justification and communications charts. (See Conclusion Item No. 6.2.7.8.)

7.2.7.9. Implementation of Current Series TOE in the Field.

That the appropriate Department of Army activity, responsible for TOE, take action to insure that current series TOE are implemented in a timely manner in the field. (See Conclusion Item 6.2.7.9. and Recommendation Item 7.1.8.1.)

7.2.7.10. Problems of Multiple Source Maintenance.

Recommend that the appropriate Combat Developments Command agency in coordination with the appropriate Army Materiel Command activity organize and equip missile maintenance units to allow them to provide total missile system maintenance support (to include generator, air conditioner, test equipment, communications equipment and peculiar automotive) to the user similar to support provided to PERSHING units. (See Conclusion Item No. 6.2.7.10.)

7.2.8.1. Provisioning of SERGEANT Personnel.

Recommend that the appropriate Department of the Army activity review the assignment and training of SERGEANT maintenance personnel to insure that sufficient qualified personnel are available in the field until the last SERGEANT unit is phased-out of the Active Army. (See Conclusion Item No. 6.2.8.1.)

7.2.8.2. Misutilization of Personnel.

That the appropriate Department of Army agency initiate an active program of checks and balances through reports and inspections to insure that unit commanders are not improperly utilizing highly trained personnel and further, that the appropriate Combat Developments Command agency study the possibility of incorporating a "duty" type MOS (57A10) of low skill level to perform the menial tasks required of every unit in the field. (See Conclusion Item No. 6.2.8.2.)

7.2.8.3. Work Planning Required in Missile Support Operations.

Recommend that the appropriate Department of Army activity devise a work "planning" program which would provide the Unit Commander and his superiors with data to clearly display the utilization made of each assigned individual in relation to the amount of work produced daily. (See Conclusion Item No. 6.2.8.3.)

7.2.8.4. Missile System MACRIT.

Recommend that the Department of Army activity responsible for AR 570-2 take action to reduce the base figure of 2,500 manhours available per year per man to a more realistic peacetime figure of 1840 manhours available per man and that the non-productive factors recommended in paragraph 2.8.4.2. be adopted. (See Conclusion Item No. 6.2.8.4.)

7.2.8.5. Organization of Quality Control (QC) Sections.

Recommend that the appropriate Combat Developments Command agency take action to change all applicable TOE to include a separate Quality Control section reporting directly to the maintenance unit commander and consisting of as a minimum one NCO E7 Chief, two Specialist E6 inspectors in each technical MOS assigned and one records clerk. (See Conclusion Item No. 6.2.8.5.)

7.2.8.6. Requirements for Vehicle Drivers.

Recommend that the appropriate Combat Developments Command agency take action to add one light vehicle driver position to technical supply sections in each missile direct and general support unit TOE and further study the need for the same requirement in shop operations element of these organizations. (See Conclusion Item No. 6.2.8.6.)

7.2.8.7. Requirements for Administrative Personnel.

Recommend that the appropriate Department of Army activity take action to change AR 570-2 such that the authorization for company/detachment clerks is based on the size of the company/detachment and not simply one clerk for all units as is the case now. (See Conclusion Item No. 6.2.8.7.)

7.2.8.8. Requirement for Missile Staff Sections.

Recommend that the appropriate Combat Developments Command agency take action to authorize a Reports Clerk (MOS 71B20), a 1/4 ton truck (LIN X60833) and a ANVRC-46 radio mounted in the truck (LIN Q53926) to all TOE which authorize a Missile Staff Officer (MOS 4515/4516) in the Artillery Battalion Headquarters. (See Conclusion Item No. 6.2.8.8.)

7.2.8.9. Requirements for the "40" Skill Level in the 27 Series MOS.

Recommend that the appropriate Department of the Army activity take action to change AR 611-201 such that the "40" skill level is added to each 27 series MOS. (See Conclusion Item No. 6.2.8.9.)

7.2.8.10. Lack of Supervisory Personnel in TOE 9-550.

Recommend that the Combat Developments Command Maintenance Agency take action to include a provision in TOE 9-550 which would authorize the addition of one E6 NCO supervisor of the appropriate MOS for each grouping of three or more like contact teams authorized. (See Conclusion Item No. 6.2.8.10.)

7.2.8.11. 55 Series MOS in the PERSHING MOS.

Recommend that the Combat Developments Command Field Artillery Agency investigate the possible utilization of the 55 series MOS in the ammunition platoon of SERGEANT and PERSHING Missile Battalions. (See Conclusion Item No. 6.2.8.1.1.)

7.2.8.12. SHILLELAGH Contact Team.

Recommend that the Combat Developments Command Maintenance Agency add a note to TOE 9-550 to indicate that in wartime two SHILLELAGH contact teams (team EH) are authorized to support 27 SHILLELAGH Systems. (See Conclusion Item No. 6.2.8.12.)

7.2.8.13. Missile Staff Officer's Manual.

Recommend that the Combat Developments Command Maintenance Agency publish a comprehensive missile staff officer's field manual covering, in great detail, those areas listed in paragraph 2.8.13. (See Conclusion Item No. 6.2.8.13.)

7.2.8.14. Standards of Grade Authorization for Career Group 46.

Recommend that the appropriate Department of Army activity take action to change AR 611-201 such that the SGA for Career Group 46 authorize appropriate E5 Specialist, E6 NCO supervisor and E7 NCO supervisor positions in missile support TOE. (See Conclusion Item No. 6.2.8.14.)

7.2.8.15. Combination of MOS 21L and 21M.

Recommend that the U. S. Army Missile and Munitions Center and School further study the feasibility of combining MOS 21L and 21M. (See Conclusion Item No. 6.2.8.15.)

7.2.8.16. Creation of a Chaparral/Vulcan Warrant Officer MOS.

Recommend that USAMMCS determine the feasibility of creating a Chaparral/Vulcan warrant officer MOS and that it be approved if sufficient justification exists. (See Conclusion Item No. 6.2.8.16.)

7.2.8.17. Staffing of Technical Supply.

Recommend:

1. That the appropriate Combat Developments Command and Department of the Army agencies revise AR 570-2 MACRIT for tech supply to incorporate functional as well as workload requirements.

2. That the appropriate Combat Developments Command agencies revise TOE to incorporate the new MACRIT.

3. That the minimum supervisor grade for each tech supply be an E6, "40" skill level without regard to the number of personnel supervised and that the Office of Personnel Operations revise AR 611-201 to reflect this change for MOS 76R40, Missile Repair Parts Specialist.

4. That the U. S. Army Quartermaster School provide the necessary documentation to establish a Tech Supply warrant

officer MOS and that Combat Developments Command revise all missile maintenance unit TOE to incorporate this MOS.

5. That the U. S. Army Missile and Munitions Center and School provide additional training in tech supply management and procedures in officer MOS 4516 and 4515 courses and further, that this training also be incorporated into missile maintenance warrant officer courses until such a time as tech supply warrant officers are authorized and assigned to missile maintenance units. (See Conclusion Item No. 6.2.8.17.)

7.2.9.1. Training Improvements - PERSHING Enlisted MOS Courses.

Recommend that the appropriate U. S. Army Schools recognize the severe limitations placed on OJT in the field and further review all subjects which are relegated to the role of OJT type training and further take action to reduce the amount of OJT necessary before a school trained individual can perform satisfactorily in the field and finally, review areas of deficiencies listed in paragraph 2.9.1. and take corrective action as appropriate. (See Conclusion Item No. 6.2.9.1.)

7.2.9.2. Training Improvements - SERGEANT Enlisted MOS Courses.

Recommend that the appropriate U. S. Army Schools recognize the severe limitations placed on OJT in the field and further review all subjects which are relegated to the role of OJT type training and further take action to reduce the amount of OJT necessary before a school trained individual can perform satisfactorily in the field and finally, review areas of deficiencies listed in paragraph 2.9.2. and take corrective action as appropriate. (See Conclusion Item No. 6.2.9.2.)

7.2.9.3. Training Improvements - LCSS Enlisted MOS Courses.

Recommend that the appropriate U. S. Army Schools recognize the severe limitations placed on OJT in the field and further review all subjects which are relegated to the role of OJT type training and further take action to reduce the amount of OJT necessary before a school trained individual can perform satisfactorily in the field and finally, review areas of deficiencies listed in paragraph 2.9.3. and take corrective action as appropriate. (See Conclusion Item No. 6.2.9.3.)

7.2.9.4. Printed Circuit Card Repairman.

Recommend that a separate MOS for printed circuit card repair be created only if quantitative requirements in commodity areas other than missiles are sufficient to justify this speciality. (See Conclusion Item No. 6.2.9.4.)

7.2.9.5. Malassignment of Missile Maintenance Personnel.

Recommend that the Office of Personnel Operations closely monitor the personnel vacancies by MOS in missile maintenance units and that Department of the Army initiate a policy of direct assignment to these units. Further recommend that overseas replacement stations be prohibited from changing PMOS of personnel passing through their facilities on the way to new assignments. (See Conclusion Item No. 6.2.9.5.)

7.2.9.6. Quality of Tech Supply Personnel.

Recommend that school quotas for MOS 76R be increased and that the Office of Personnel Operations monitor vacancies and assign 76R personnel on direct orders to missile maintenance units. (See Conclusion Item No. 6.2.9.6.)

7.2.10.1. Theater Missile Supply Support.

Recommend that the appropriate Combat Developments Command and Department of the Army agencies revise missile supply support doctrine to provide for missile system peculiar repair parts depots organic to missile general support maintenance companies, as in current PERSHING 1A doctrine. (See Conclusion Item No. 6.2.10.1.)

7.2.10.2. USAREUR Program for Direct Exchange of PEMA Secondary Items.

Recommend that the appropriate Combat Developments Command and Department of the Army agencies review the USAREUR program for direct exchange of PEMA Secondary Items and incorporate it into doctrine. Further recommend that the program be considered for worldwide implementation. (See Conclusion Item No. 6.2.10.2.)

7.2.10.3. Impact of the Army Stock Fund at DS/GS Level.

Recommend that stock funding of all missile system peculiar repair parts identified as "Mission Essential" (See Recommendation Item No. 7.2.10.6.) be terminated. (See Conclusion Item No. 6.2.10.3.)

7.2.10.4. Mechanization of the DSU Tech Supply in USAREUR.

Recommend that USAREUR insure that MTOE for units time-sharing NCR 500's are changed to reflect the requirement and authorization for school trained NCR 500 personnel and that the appropriate DA staff elements approve this personnel requirement even though these units are not authorized NCR 500 equipment. Further recommend that the USAREUR approach to automating the DSU tech supply be adopted by all major commands and CONUS installations when stockage levels at a specific unit do not justify authorization for an NCR 500. (See Conclusion Item No. 6.2.10.4.)

7.2.10.5. The Army Master Data File.

Recommend that the Basis of Issue (BOI) for AMDF microfilm readers be changed to include issue to all units authorized to maintain an ASL. Further recommend that the appropriate agencies of the Combat Developments Command change the TOE for missile maintenance units to add the AMDF microfilm reader. (See Conclusion Item No. 6.2.10.5.)

7.2.10.6. Demand Criteria for Missile System Peculiar Repair Parts.

Recommend:

1. That the U. S. Army Missile Command and other appropriate commodity commands of the Army Materiel Command identify mission essential repair parts for each missile system, the failure of which would prevent the missile user from accomplishing his primary mission of successfully engaging and destroying the enemy with his missile systems. The term "mission essential" applies to all repair parts authorized for replacement at DS and GS level, to include assemblies and their subassemblies, components, and piece parts, the lack of which would actually prevent the user from firing missiles.

2. That the U. S. Army Missile Command and other appropriate commodity commands of the Army Materiel Command establish a mandatory minimum stockage level for each repair part designated as mission essential and that all necessary action be taken to procure any additional quantities of repair parts that may be required.

3. That the appropriate Department of the Army agencies establish realistic demand criteria for increases in stockage levels for missile peculiar repair parts above that provided by mandatory minimum stockage levels. (See Conclusion Item No. 6.2.10.6.)

7.2.10.7. Cannibalization as a Source for PERSHING Repair Parts.

Recommend that the U. S. Army Missile Command procure and stock all repair parts now source coded X_2 in PERSHING 1A repair parts manuals. Further recommend that this action be taken for all missile systems. (See Conclusion Item No. 6.2.10.7.)

7.2.10.8. Repair Parts Shortages.

Recommend that USAREUR and the U. S. Army Missile Command review the list of repair parts shortages compiled in the discussion (See Discussion Item No. 2.10.8.) and take the necessary steps to assure that an adequate supply of these parts are made available to the field. (See Conclusion Item No. 6.2.10.8.)

7.2.10.9. Commercial Vehicles for Direct Support Units.

Recommend that USAREUR take action to furnish at least one commercial 1 1/2 ton truck to each missile maintenance direct support unit for use in making daily supply and maintenance runs. (See Conclusion Item No. 6.2.10.9.)

7.2.10.10. Deficiencies in Land Combat Equipment Authorizations.

Recommend that the appropriate Combat Developments Command agencies review the equipment recommendations in paragraph 2.10.10. and prepare change to appropriate TOE. (See Conclusion Item No. 6.2.10.10.)

7.2.10.11. Individual Tool Sets.

Recommend that the appropriate U. S. Army Materiel Command activity in coordination with the appropriate Combat Developments Command agency take immediate action to reduce the number of tools in individual tool sets and further reduce the number of individual tool sets per TOE. (See Conclusion Item No. 6.2.10.11.)

7.2.10.12. Equipment Failures.

Recommend that the U. S. Army Missile Command review the equipment failures compiled in paragraph 2.10.12. and take appropriate steps to correct the problems where necessary. (See Conclusion Item No. 6.2.10.12.)

7.2.10.13. Air Conditioner Maintenance.

Recommend that all missile direct support units not having an air conditioner maintenance capability be provided with replacement spares to insure that operational air conditioners are on each van at all times. Further recommend that Combat Developments Command add air conditioner repair sections to all TOE for missile maintenance general support companies and that major commands furnish the necessary trade-off spaces to add these sections to existing MTOE. (See Conclusion Item No. 6.2.10.13.)

7.2.10.14. 45 KW Generator Problems.

Recommend that the U. S. Army Materiel Command develop a more reliable family of 400 Hz generators. Recommend that the appropriate Combat Developments Command agencies revise TOE to provide adequate generator organizational maintenance personnel, to add dummy loads to generator maintenance sections and to more closely align the size of generators with actual power requirements. (See Conclusion Item No. 6.2.10.14.)

7.2.10.15. Commercial Power in Garrison.

Recommend that all major overseas commands and CONUS installations having missile maintenance units take the necessary steps to procure and install converters to furnish 400 Hz commercial power to missile maintenance shop facilities. Overseas commands should also furnish 60 Hz converters to units where appropriate. (See Conclusion Item No. 6.2.10.15.)

7.2.10.16. PERSHING Theodolite Maintenance Requirements.

Recommend that USAREUR and the Office of Personnel Operations take the necessary steps to furnish qualified 41B topographic instrument repairmen to PERSHING units. (See Conclusion Item No. 6.2.10.16.)

7.2.10.17. Equipment Serviceability Criteria for the Sheridan Vehicle.

Recommend that the appropriate U. S. Army Materiel Command agency change TM 9-2350-230-ESC such that a non-operational

SHILLELAGH Missile System would cause the Sheridan System to be rated "Red". (See Conclusion Item No. 6.2.10.17.)

7.2.10.18. SHILLELAGH Guided Missile System Test Set, AN/MSM-93.

Recommend that the U. S. Army Missile Command develop and field the necessary tapes and hardware to provide LCSS with the capability for automatic test and checkout of the GMSTS fault locator. (See Conclusion Item No. 6.2.10.18.)

7.2.10.19. Typical TOE 9-550 DSU Workload.

Recommend that appropriate agencies of the U. S. Army Missile Command and Combat Developments Command review the workload figures as a matter of interest. (See Conclusion Item No. 6.2.10.19.)

7.2.10.20. Maintenance Allocation Charts (MAC).

Recommend that the appropriate U. S. Army Missile Command agency take action to insure that Maintenance Allocation Charts are not deleted from technical manuals. (See Conclusion Item No. 6.2.10.20.)

7.2.10.21. Technical Assistance in the Field.

Recommend that the U. S. Army Missile and Munitions Center and School revise the 4F-4516 course to include an increased emphasis on the importance of the Unit Commander being intimately involved in the technical assistance program and that the appropriate Missile and Munitions Center and School agency change FM 9-59 to stress the role of the Commander in the execution of the Technical Assistance program. (See Conclusion Item No. 6.2.10.22.)

7.3. CONVENTIONAL AMMUNITION RECOMMENDATIONS

7.3.5.1. Physical Security Element.

Recommend that the apporpriate US Army Combat Developments Command agency take action to establish a physical security element in TOE of conventional ammunition companies. (See Conclusion Item No. 6.3.5.1.1.)

7.3.5.1.2. Organization and Employment of Conventional Ammunition Companies.

Recommend that the appropriate US Army Combat Developments Command agency take action to eliminate reference in TOE 9-38G for use of TOE 29-series Composite Service Organizations to augment conventional ammunition company; to review TOE 9-500D Ordnance Service Organization Detachment BB Ammunition Supply and to align it with TOE 9-17 series and TOE 9-38G and to modify equipment and personnel strength levels contained in current TOE. Further recommend that commanders in the field take action to insure use of the most recent TOE for unit authorization documentation. (See Conclusion Item No. 6.3.5.1.2.)

7.3.5.1.3. Direct Support Ammunition Supply.

Recommend that the appropriate US Army Combat Developments Command agency take action to develop a TOE or modify present TOE to provide for a scaled down direct support ammunition organization. (See Conclusion Item No. 6.3.5.1.3.)

7.3.5.1.4. Maintenance of Conventional Ammunition.

Recommend that the appropriate US Army Combat Developments Command agency take action to reevaluate the concept of general support maintenance by TOE organizations, and establish an organizational direct support maintenance element within the TOE for the conventional ammunition company. (See Conclusion Item No. 6.3.5.1.4.)

7.3.5.1.5. Non-Availability of Transportation for Conventional Ammunition.

Recommend that safety regulations concerning transport of explosives and hazardous items be enforced at, and made the responsibility of, the lowest transportation element providing support in order to be more in line with U. S. Army doctrine for support responsibility, i.e., supporting element to supported element. (See Conclusion Item 6.3.5.1.5.)

7.3.5.2.1. MOSC 55A10 Ammunition Helper.

Recommend that US Army Missile and Munitions Center and School take action to effect elimination of MOSC 55A10, Ammunition Helper and convert established positions to MOS 55B Ammunition Storage Specialist or MOSC 55C20 Ammunition Renovation Specialist where required. (See Conclusions Item No. 6.3.5.2.1.)

7.3.5.2.2. MOS 55B Series Ammunition Storage Specialist.

Recommend that US Army Missile and Munitions Center and School initiate action to effect revision of AR 611-201 to include operation of MHE (forklifts) in job description of assigned duties for MOS 55B series. (See Conclusion Item No. 6.3.5.2.2.)

7.3.5.2.3. Requirement for Career Education for Ammunition Career Field MOS.

Recommend that US Army Missile and Munitions Center and School take action to establish an educational prerequisite in AR 611-201 requiring successful completion of the appropriate service school course or a waiver from the Commandant, USAMMCS, prior to the award of MOSC 55B40 or 55C40. (See Conclusion Item No. 6.3.5.2.3.)

7.3.5.2.4. Award of MOSC 55X40 Military Ammunition Inspector.

Recommend that Office of Personnel Operations take action to require review of records of personnel awarded MOSC 55X40 and revoke award of this MOS in those instances where criteria for award were not met. (See Conclusion Item No. 6.3.5.2.4.)

7.3.5.3.1. MOSC 55X40 Military Ammunition Inspector.

Recommend that the appropriate US Army Combat Developments Command agency take action to establish a TOE position for MOSC 55X40 Military Ammunition Inspector in division ammunition offices, inspection teams, brigade or similar activities where this individual's skills are required to accomplish ammunition functions. (See Conclusion Item No. 6.3.5.3.1.)

7.3.5.3.2. Conversion of TOE Positions from Grade E-2 to E-3.

Recommend that the appropriate US Army Combat Developments Command agency take action to effect a change in manpower authorization criteria documents to require conversion of all TOE positions grade E-2 to grade E-3. (See Conclusions Item No. 6.3.5.3.2.)

7.3.5.3.3. Communications Chief Grade Authorization TOE 9-38G.

Recommend that the appropriate US Army Combat Developments Command agency take action to upgrade the Communications Chief Grade authorization in paragraph 02, line 05, TOE 9-38G from grade E-5 to E-6. (See Conclusions Item No. 6.3.5.3.3)

7.3.6.1. Equipment Authorizations.

Recommend that appropriate US Army Combat Developments Command agency take action to modify appropriate ammunition organization TOE to include equipment change recommendations identified in Section 3.6.1. of this report. (See Conclusion Item No. 6.3.6.1.)

7.3.6.2.1. Portable Ramp for Use with MILVAN Trailers.

Recommend that the appropriate US Army Materiel Command activity take action to develop a portable ramp for use with MILVAN containerized trailers. (See Conclusion Item No. 6.3.6.2.1.)

7.3.6.2.2. Requirement for a Small Forklift.

Recommend that the appropriate US Army Materiel Command activity take action to develop a low capacity rough terrain forklift for ammunition material handling. (See Conclusion Item No. 6.3.6.2.2.)

7.3.6.2.3. Requirement for a Small Crane.

Recommend that the appropriate US Army Materiel Command activity take action to develop or procure a small crane suitable for ammunition materiel handling. (See Conclusion Item No. 6.3.6.2.3.)

7.3.6.2.4. Mobile Ammunition Maintenance Equipment.

Recommend that the appropriate US Army Combat Developments Command agency take action to develop specifications for mobile ammunition maintenance equipment for the performance of on-site maintenance. (See Conclusion Item No. 6.3.6.2.4.)

7.3.6.2.5. Design of Cargo Vehicles and Containerized Equipment.

Recommend that the appropriate US Army Materiel Command activity take action to include a provision in the design of cargo vehicles and containerized equipment for the use of MHE such as forklifts and cranes in loading and unloading. (See Conclusion Item No. 6.3.6.2.5.)

7.3.6.2.6. Lead Wire Seals.

Recommend that the appropriate US Army Materiel Command activity take action to replace lead wire seals with self sealing clip type seals. (See Conclusion Item No. 6.3.6.2.6.)

7.3.6.3.1. Maintenance of Forklift.

Recommend that the appropriate US Continental Army Command activity, in conjunction with appropriate Army commands, initiate a training program on the operation and maintenance of forklifts for personnel utilized as forklift operators. Concurrently, recommend that Department of the Army, Deputy Chief of Logistics, take action to improve forklift repair part supply responsiveness. (See Conclusion Item No. 6.3.6.3.1.)

7.3.6.4.1. Use of DA Form 2765-1 for Requesting Conventional Ammunition.

Recommend that appropriate commands in the field take action to uniformly require the use of DA Form 581 instead of DA Form 2765-1 for submission of requests for conventional ammunition by using units. (See Conclusion Item No. 6.3.6.4.1.)

7.3.6.4.2. Use of Nonstandard Forms in the Ammunition Supply System.

Recommend that Department of the Army, Deputy Chief of Staff for Logistics take action to effect review of format of existing standard forms used in conventional ammunition supply in conjunction with the development of the Standard Army Ammunition System (SAAS) now in progress. (See Conclusion Item No. 6.3.6.4.2.)

7.3.6.5.1. Ammunition Reference Publications.

Recommend that appropriate US Army Materiel Command activity take action to effect consolidation of data in conventional ammunition supply reference publications and to provide changes to reference publications as a page for page exchange. (See Conclusion Item No. 6.3.6.5.1.)

7.3.6.5.2. Informal Reference Publications.

Recommend that the US Army Missile and Munitions Center and School and the Army Materiel Command take action to increase the use of PS Magazine, Missile and Munitions Materiel Digest or similar type publications, for the dissemination of information to the field on safety, storage and maintenance of conventional ammunition. (See Conclusion Item No. 6.3.6.5.2.)

7.3.7.1. General Training Recommendations.

Recommend that US Army Missile and Munitions Center and School take action to review Programs of Instructions for MOS 55B20, 55B30 and 4514 to reduce the general technical level training; and that increased emphasis be placed on management and administrative training for officers MOS 4514 and in courses designed to support NCOES program. (See Conclusion Item No. 6.3.7.1.)

7.3.7.2. MOSC 55B20 Ammunition Storage Specialist.

Recommend that US Army Missile and Munitions Center and School take action to improve training in the 55B20 course on the selected technical areas identified in Section 3.7.2. of this report. (See Conclusion Item No. 6.3.7.2.)

7.3.7.3. MOSC 55B30 Ammunition Operational Specialist.

Recommend that US Army Missile and Munitions Center and School take action to improve training in the 55B30 course on the selected technical areas identified in Section 3.7.3. of this report. (See Conclusion Item No. 6.3.7.3.)

7.3.7.4. MOS 411A Ammunition Technician.

Recommend that US Army Missile and Munitions Center and School take action to establish an educational prerequisite in AR 611-112 requiring successful completion of a formal MOS 411A qualification course prior to appointment as a Warrant Officer, MOS 411A, Ammunition Technician. Recommend that a separate technical training course be developed for MOS 411A to provide required technical proficiency. Additionally, recommend development of a course for periodic refresher training for MOS 411A personnel. (See Conclusion Item No. 6.3.7.4.)

7.3.7.5. MOS 4514 Ammunition Officer.

Recommend that US Army Missile and Munitions Center and School take action to improve training in the 4514 course on the selected technical areas identified in Section 3.7.5. of this report. (See Conclusion Item No. 6.3.7.5.)

7.4. SPECIAL AMMUNITION RECOMMENDATIONS

7.4.1. Technical Assistance to Support Units.

Recommend that the appropriate Combat Developments Command agency change TOE 9-48G to reflect a mission and capability for technical assistance to supported units. (See Conclusion Item No. 6.4.1.)

7.4.2. Quality Assurance/Quality Control Section.

Recommend that the appropriate Combat Developments Command agency change TOE 9-48G to reflect a quality Assurance/Quality Control (QA/QC) mission and capability. (See Conclusion Item No. 6.4.2.)

7.4.3. Nuclear Weapons Maintenance Team.

Recommend that the appropriate Combat Developments Command agency change TOE 9-48G to reflect four Nuclear Weapons Teams. (See Conclusion Item No. 6.4.3.)

7.4.4. Maintenance of Missile Class VII and IX Items.

Recommend that the appropriate Combat Developments Command agency delete exclusive reference to TOE 9-59 in the capability portion of TOE 9-48G. (See Conclusion Item No. 6.4.4.)

7.4.5. TDA Nuclear Weapons Support Section.

Recommend that CONARC deactivate the NWSS at Ft. Bragg, Ft. Sill and Ft. Riley and assign their support mission to the TOE Unit located at the respective installations. This would be a major savings in funds, personnel and equipment. (See Conclusion Item No. 6.4.5.)

7.4.6. Officer MOS 4517 vs 4514.

Recommend that major commands in the field change MTOE to reflect the authorization of MOS 4517 for the Storage and Issue Platoon. (See Conclusion Item No. 6.4.6.)

7.4.7. Warrant Officer Assignment.

Recommend that the appropriate Combat Developments Command agency and DA take action to authorize Warrant Officers by grade in TOE and TDA. (See Conclusion Item No. 6.4.7.)

7.4.8. MOS 76M20 vs 55G20 In The Control Section.

Recommend that the appropriate Combat Developments Command agency authorize MOS 55G20 in the Control Section. (See Conclusion Item No. 6.4.8.)

7.4.9. Special Ammunitions Company Commander.

Recommend that the appropriate Combat Developments Command agency change TOE 9-48G and TOE 9-47G to authorize a Major, MOS 4515, as Commander. (See Conclusion Item No. 6.4.9.)

7.4.10. Special Ammunition Company Executive Officer.

Recommend that the appropriate Combat Developments Command agency change TOE 9-48G and TOE 9-47G to authorize an Executive Officer. (See Conclusion Item No. 6.4.10.)

7.4.11. Special Ammunition Company Operations Officer (Control Section).

Recommend that the appropriate Combat Developments Command agency change TOE 9-48G and TOE 9-47G to authorize a Captain, MOS 4517, in the Control Section and Technical Support Section respectively. (See Conclusion Item No. 6.4.11.)

7.4.12. Storage and Issue Platoon Leader.

Recommend that the appropriate Combat Developments Command agency change TOE 9-48G and TOE 9-47G to authorize a Captain, MOS 4517, as the Storage and Issue Platoon Leader(s). (See Conclusion Item No. 6.4.12.)

7.4.13. Maintenance Platoon Leader.

Recommend that the appropriate Combat Developments Command agency change TOE 9-48G to authorize a Captain, MOS 4517, as Maintenance Platoon Leader. (See Conclusion Item No. 6.4.13.)

7.4.14. Maintenance Teams.

Recommend that the appropriate Combat Developments Command agency change TOE 9-48G to authorize sufficient maintenance personnel to operate four maintenance teams. (See Conclusion Item No. 6.4.14.)

7.4.15. Quality Assurance/Quality Control Section.

Recommend that the appropriate Combat Developments Command agency change TOE 9-48G to authorize a Quality Assurance/Quality Control Section. (See Conclusion Item No. 6.4.15.)

7.4.16. Technical Supply Officer.

Recommend that the appropriate Combat Developments Command agency change TOE 9-48G to authorize a Technical Supply Officer. (See Conclusion Item No. 7.4.16.)

7.4.17. MOS 71L20, Documents Clerk.

Recommend that the appropriate Combat Developments Command agency change TOE 9-47G to authorize additional MOS 71L20 Documents Clerks. (See Conclusion Item No. 6.4.17.)

7.4.18. Communication Equipment (Radio) For Convoy Control.

Recommend that USAREUR not issue and/or accept substitute communication equipment (Radio) for MTOE 9-377 Units. (See Conclusion Item No. 6.4.18.)

7.4.19. Communication Equipment (Radio) For Convoy Control.

Recommend that USAREUR not issue and/or accept substitute communication equipment (radio) for MTOE 9-87 Units. (See Conclusion Item No. 6.4.19.)

7.4.20. Communication Equipment (Radio) For Convoy Control.

Recommend that the appropriate Combat Developments Command agency change TOE 9-47G to authorize adequate communication equipment (radio). (See Conclusion Item No. 6.4.20.)

7.4.21. Special Weapons Tool Set, SC5180-95-CL-A09.

Recommend that US Army Munitions Command revise the special weapons tool set SC5180-95-CL-A09, to authorize required tools for the shop and each team. (See Conclusion Item No. 6.4.21.)

7.4.22. Special Weapons Tool Set, SC5180-95-CL-A11.

Recommend that US Army Munitions Command revise the special weapons tool set, SC5180-95-CL-A11, to authorize required tools for the shop and each team. (See Conclusion Item No. 6.4.22.)

7.4.23. <u>Special Weapons Tool Set, SC5180-95-CL-A10</u>.

Recommend that US Army Munitions Command and CONARC prepare a list of tools for authorization to NWSS based on facilities and weapon system they support; further recommend that US Army Munitions Command delete special weapons tool set, SC5180-95-CL-A10, when an appropriate tool list is authorized to NWSS. (See Conclusion Item No. 6.4.23.)

7.4.24. <u>Roller Conveyors</u>.

Recommend that the appropriate Combat Developments Command agency take action to authorize roller conveyors in TOE 9-48G and TOE 9-47G. (See Conclusion Item No. 6.4.24.)

7.4.25. <u>Transportation Vehicles</u>.

Recommend that the appropriate DA element conduct a study to determine what can be done about the inadequate vehicle support (old, poor repair, etc.), to special ammunition companies. (See Conclusion Item No. 6.4.25.)

7.4.26. <u>Universal Tie-Down Kits</u>.

Recommend that the appropriate element of US Army Materiel Command take action to insure vehicles, used for movement of special ammunition, are modified with universal tie-down kit. (See Conclusion Item No. 6.4.26.)

7.4.27. <u>Sand Blasting Equipment</u>.

Recommend that the appropriate Combat Developments Command agency take action to authorize sand blasting equipment to Ordnance Special Ammunition Companies. (See Conclusion Item No. 6.4.27.)

7.4.28. <u>Special Weapons Maintenance Vans</u>.

Recommend that the appropriate Combat Developments Command agency delete the special weapon maintenance vans from TOE 9-48G; further recommend that major commands in the field delete the special weapon maintenance vans from their MTOE. (See Conclusion Item No. 6.4.28.)

7.4.29. <u>Transport Vehicles For TOE 9-47G</u>.

Recommend that the appropriate Combat Developments Command agency authorize enough cargo trucks and semi-trailers to support mission stocks in TOE 9-47G. (See Conclusion Item No. 6.4.29.)

7.4.37. Modification Work Order.

Recommend that US Army Munitions Command investigate their requirements for local purchase of material in the special ammunition modification work orders and eliminate them where possible. (See Conclusion Item No. 6.4.37.)

7.4.38. Technical Manuals.

Recommend that US Army Munitions Command investigate their requirements for using manufacturer instructions for application of items in the technical manuals, and eliminate them where possible. (See Conclusion Item No. 6.4.38.)

7.4.39. Shortage of Personnel.

Recommend that DA DCSPER and CONARC authorize additional classes to be programmed for MOS 55G, Nuclear Weapons Maintenance Specialist. (See Conclusion Item No. 6.4.39.)

7.4.40. MOS Testing.

Recommend that the Enlisted Evaluation Center, MOS Testing Branch, at Ft. Benjamin Harrison, take necessary actions to insure that tests are prepared so they permit flexibility based on assigned weapon missions and availability of publications. (See Conclusion Item No. 6.4.40.)

7.4.41. Second Generation Training.

Recommend more accurate and timely coordination be made between USAREUR and US Army Munitions Command on training requirements for the theater. (See Conclusion Item No. 6.4.41.)

7.4.42. MOS 55B, Ammunition Storage and Operations Specialist.

Recommend US Army Missile and Munitions Center and School revise the program of instructions (POI) for MOS 55G to include special weapons training. (See Conclusion Item No. 6.4.42.)

7.4.43. MOS 55G, Nuclear Weapons Maintenance Specialist.

Recommend that US Army Missile and Munitions Center and School revise the POI for MOS 55G to include the additional required instruction. (See Conclusion Item No. 6.4.43.)

7.4.30. Material Handling Equipment.

Recommend that the major overseas commands consider additional MHE that can be better utilized in the storage areas of special ammunition companies. (See Conclusion Item No. 6.4.30.)

7.4.31. Maintenance Operations.

Recommend that the DA DCSPERS allocate more personnel to attend school for the MOS 55G Course in order to eliminate the critical shortage of MOS 55G personnel. (See Conclusion Item No. 6.4.31.)

7.4.32. Technical Assistance Visits.

Implementation of recommendations in Item No. 7.4.31. above will fulfill this requirement for technical assistance. (See Conclusion Item No. 6.4.32.)

7.4.33. Repair Parts Supply.

Recommend that the appropriate MATCOM element of USAREUR provide customer assistance to special ammunition companies to explain policies and procedures of technical supply. (See Conclusion Item No. 6.4.33.)

7.4.34. Special Ammunition Unit Operations - FM 9-47.

Recommend that US Army Missile and Munitions Center and School rewrite FM 9-47 to include detailed job description of key personnel and functional description of organizational sections of general support and direct support companies. (See Conclusion Item No. 6.4.34.)

7.4.35. Supply Information Procedures Letter.

Recommend that US Army Munitions Command review the address listing and add those Ordnance Special Ammunition Companies not on the address list. (See Conclusion Item No. 6.4.35.)

7.4.36. Operational Change Report.

Recommend that the DA DCSLOG continue to pursue refinement of JCS PUB VI to simplify peacetime reporting. (See Conclusion Item No. 6.4.36.)

7.4.44. MOS 35F, Nuclear Weapons Electronic Specialist.

Recommend that the US Army Missile and Munitions Center and School revise the POI for MOS 35F to include the additional required instruction. (See Conclusion Item No. 6.4.44.)

7.4.45. MOS 4517, Nuclear Weapons Officer.

Recommend that US Army Munitions Command revise the POI to include the additional required instruction. (See Conclusion Item No. 6.4.45.)

7.4.46. MOS 76P, Stock Control and Accounting Specialist.

Recommend that CONARC investigate the type schooling conducted and, if at all possible, include additional practical exercises using the records and reports required. (See Conclusion Item No. 6.4.46.)

7.4.47. Senior MOS 55G, Transition Course.

Recommend that CONARC investigate the possibility of developing a course for senior MOS 55G personnel. (See Conclusion Item No. 6.4.47.)

7.4.48. MP As Security Guard.

Recommend that CONARC consider establishment of a separate MOS and basic school for security guards. (See Conclusion Item No. 6.4.48.)

7.5. REDEYE MISSILE SYSTEM RECOMMENDATIONS

7.5.4.1. Malassignment of REDEYE Enlisted Personnel.

Recommend that the appropriate Combat Developments Command agency take action to establish a separate MOS in the 16 series for REDEYE enlisted personnel and integrate the new MOS into the 16 series career program. (See Conclusion Item No. 6.5.4.1.)

7.5.4.2. Branch Oriented Section Leaders.

Recommend that the appropriate Combat Developments Command agency take action to change the Air Defense Section Leader's MOS to Light Air Defense Artillery Officer, MOS 1174, in all Armor, Infantry, Cavalry, and Field Artillery Battalions. (See Conclusion Item No. 6.5.4.2.)

7.5.4.3. Career Progression Program.

Recommend that the appropriate Combat Developments Command agency take action to establish a separate MOS in the 16 series for REDEYE enlisted personnel and integrate the new MOS into the 16 series career program. (See Conclusion Item No. 6.5.4.3.)

7.5.4.4. Field Manual 44-1.

Recommend that the US Army Air Defense School revise FM 44-1 and include more doctrinal guidance for Airspace Control Element (ACE) functions and operations. (See Conclusion Item No. 6.5.4.4.)

7.5.4.5. TOE Authorizations.

Recommend that the appropriate Combat Developments Command agnecy take action to increase the authorization of Radio Telephone Operators and 1/4 ton trucks, LIN X60833, in the Air Defense Section Headquarters of all Armor, Infantry, Cavalry, and Field Artillery Battalion TOE to two each. (See Conclusion Item No. 6.5.4.5.)

7.5.4.6. REDEYE Support Operations.

Recommend that the Army Materiel Command and subordinate commands study the present reliability of the M41 REDEYE Weapon Round based on command demonstration/verification of stocks firings. To obtain true reliability figures, any weapons suspected of contamination from pre-fire testing must be excluded from the study. If adequate reliability can be ascertained, eliminate all weapon round readiness testing in the field. Further, if adequate reliability cannot be ascertained, recommend the following support concept and rationale outlined in Discussion Item No. 5.4.6. be studied in depth with a view toward reducing manpower, costly equipment, and repair parts consumption.

If this recommendation is implemented, problem area Discussion Item No. 5.6.2., Conclusion Item No. 6.5.6.2. and Recommendation Item No. 7.5.6.2. could be disregarded, and those comments relative to calibration of the AN/TSM-82 Test Set, weapon round checkout, and ammunition safety contained in Discussion Item No. 5.5.3., Conclusion Item No. 6.5.5.3. and Recommendation Item No. 7.7.5.5.3. can be disregarded. (See Conclusion Item No. 7.4.5.6.)

7.5.5.1. Field Training.

Recommend that the appropriate Combat Developments Command agency study the feasibility of removing the Air Defense (REDEYE) Section from all Infantry, Armor, Cavalry, and Field Artillery Battalions and reorganizing them as a separate unit. In a division the unit could in all probability be company size and an integral part of the Division Air Defense Artillery Battalion. In nondivisional brigades, regiments, etc., the unit could be platoon size and located with the respective headquarters unit.

This concept would also facilitate implementation of Recommendations No. 7.5.4.1., 7.5.4.3., and 7.5.4.5. and eliminate the necessity for Recommendations No. 7.5.4.2. and 7.5.5.2. (See Conclusion Item No. 6.5.5.1.)

7.5.5.2. Training Aids.

Recommend that the US Army Air Defense School take action to update FM 44-30, and that slide kit SL/ARK#1 be authorized down to brigade level as a minimum. (See Conclusion Item No. 6.5.5.2.)

7.5.5.3. MOS Training - 27G.

Recommend that the US Army Missile and Munitions Center and School take action to increase emphasis on the use of technical manuals, parts manuals, forms and records normally found in a support facility, weapon round checkout, and ammunition safety during Course 121-27G20. Further, recommend that only commercial type test equipment authorized by TOE 9-550 be utilized for Course 121-27G20. (See Conclusion Item No. 6.5.5.3.)

7.5.6.1. Communications Radios.

Recommend the appropriate Combat Developments Command agency, in conjunction with the appropriate Army Materiel Command agency, take necessary action to replace communications radios utilized by REDEYE Sections with radios capable of greater range. (See Conclusion Item No. 6.5.6.1.)

7.5.6.2. Coolant Supply For Test Set AN/TSM-82.

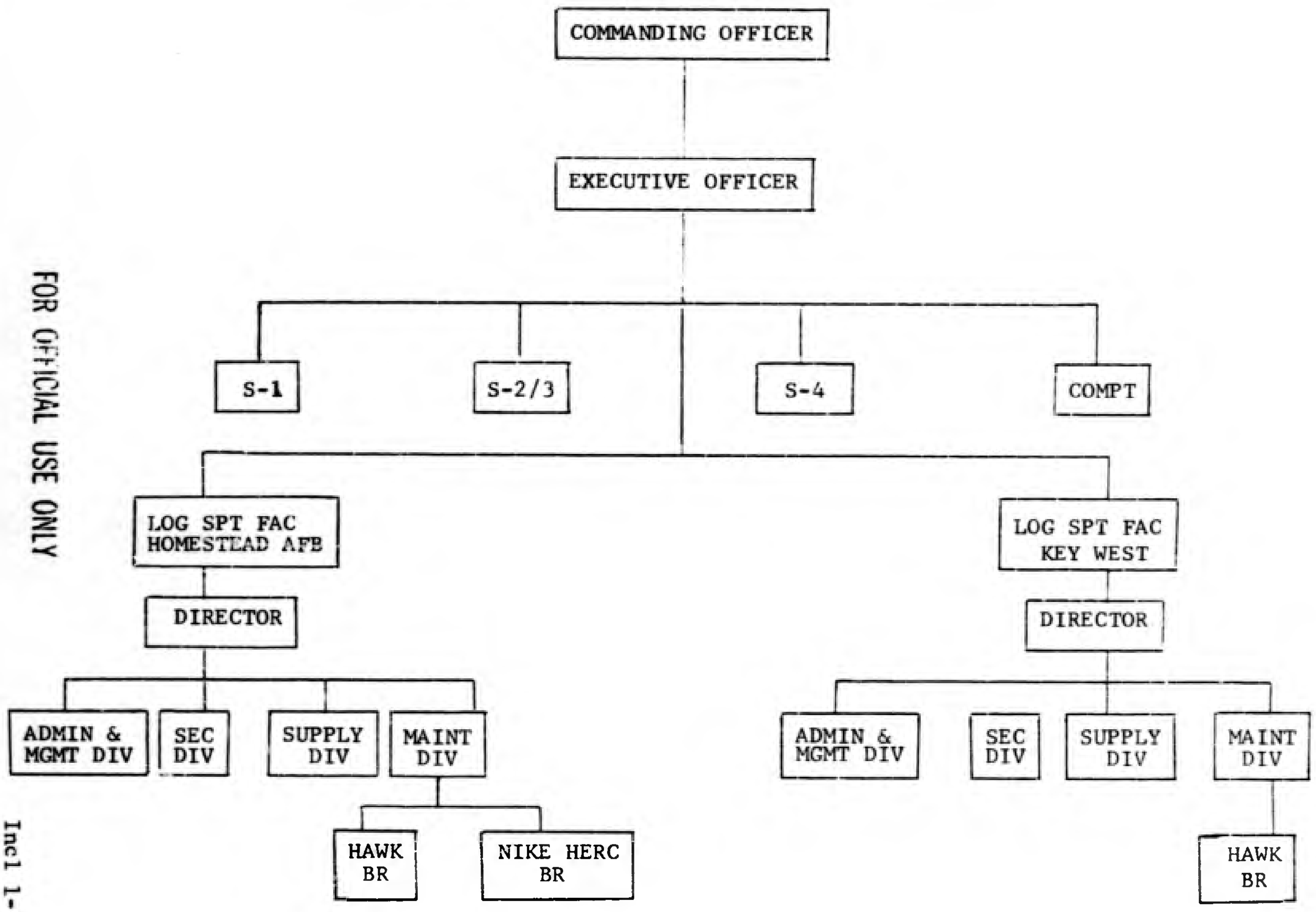
Recommend that USAREUR support organizations return all empty coolant bottles FSN 4935-930-3892 thru normal supply channels and requisition filled replacements in accordance with prescribed procedures. Further, recommend that all bottles refilled locally be discharged and returned as empties, and all obsolete equipment utilized for refilling bottles be disposed of in accordance with appropriate regulations.

If the necessity for in-theater refill can be justified, recommend that refilling facilities equivalent to those utilized at Tooele Army Depot be provided to the 563rd Ordnance Company (GS) and DX established for Direct Support Units. However, until the proper facilities are acquired, in-theater refill and use of locally refilled bottles must be discontinued. (See Conclusion Item No. 6.5.6.2.)

MAME-71 INCLOSURES

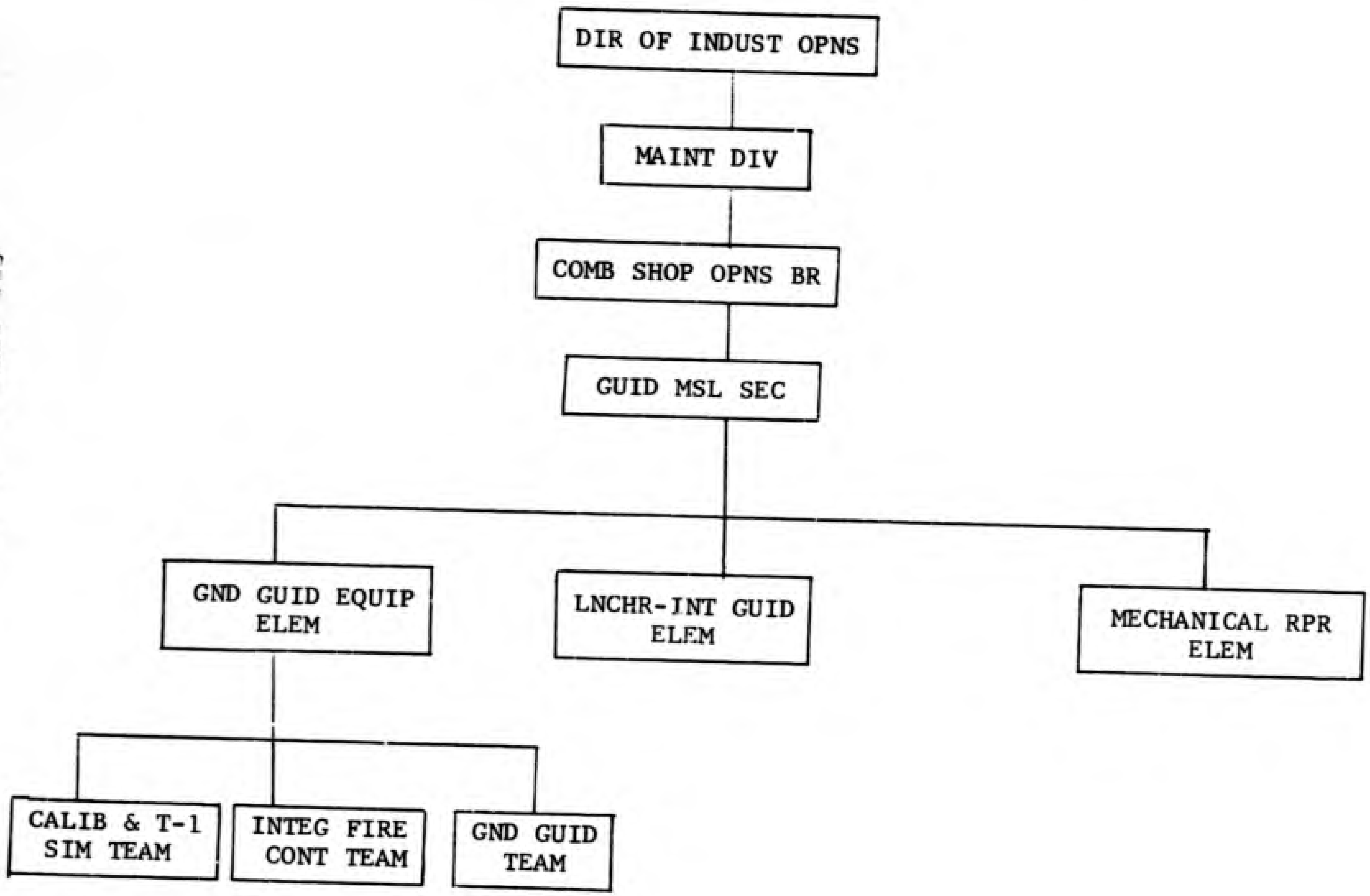
1 - Series AIR DEFENSE MISSILE SYSTEMS INCLOSURES

THIRD UNITED STATES ARMY SUPPORT GROUP (AIR DEFENSE)

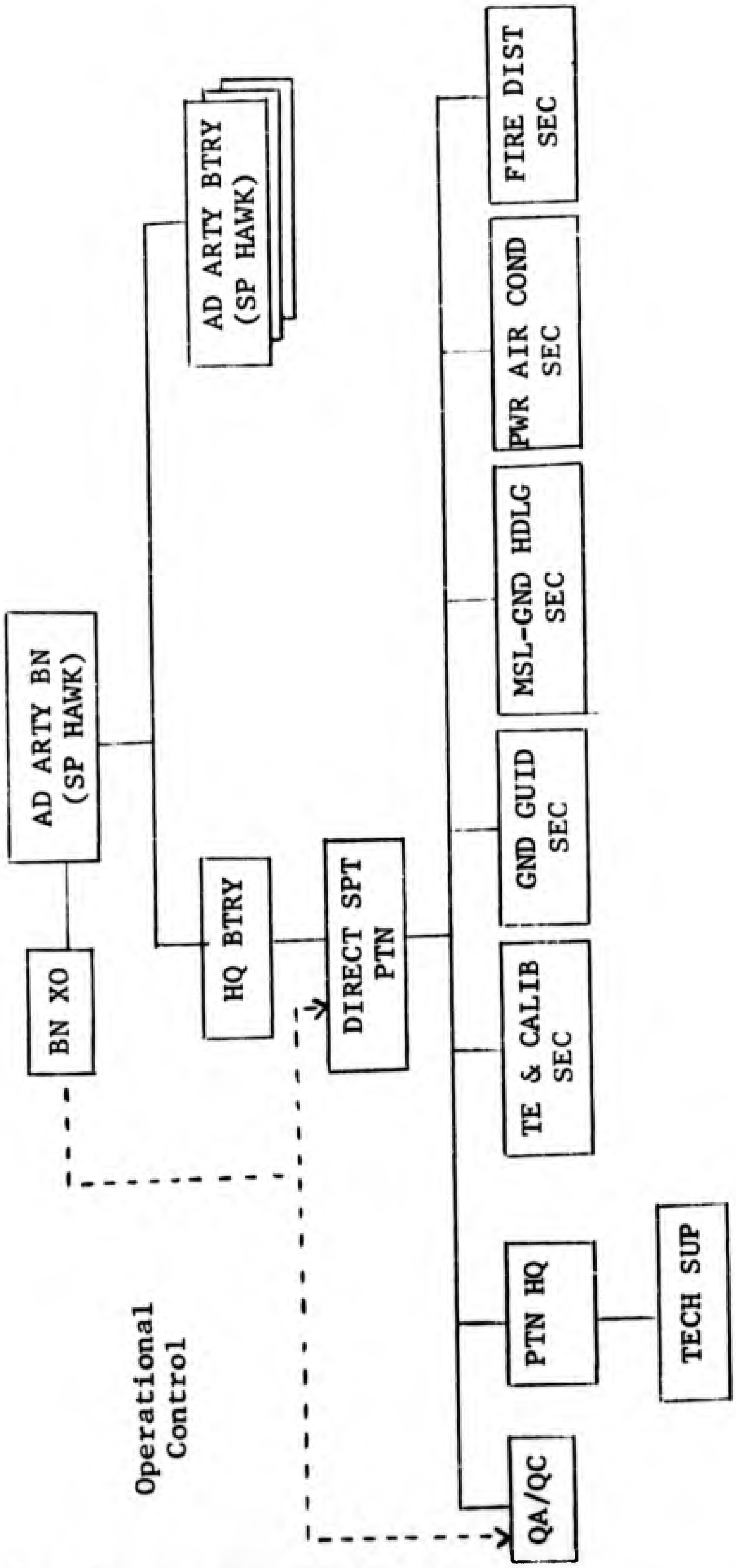


FOR OFFICIAL USE ONLY

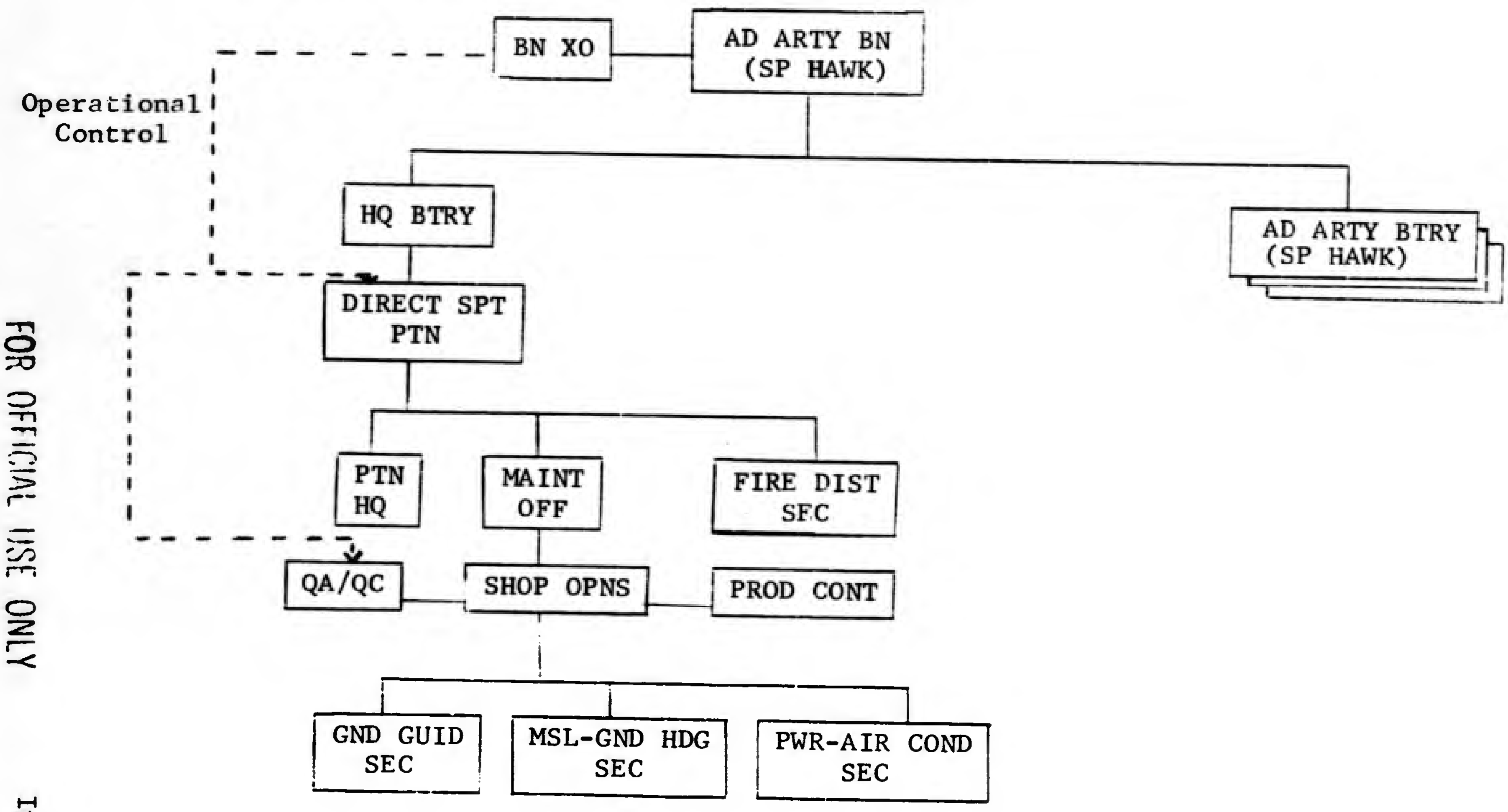
FORT MEADE GUIDED MISSILE SUPPORT FACILITY (AIR DEFENSE)



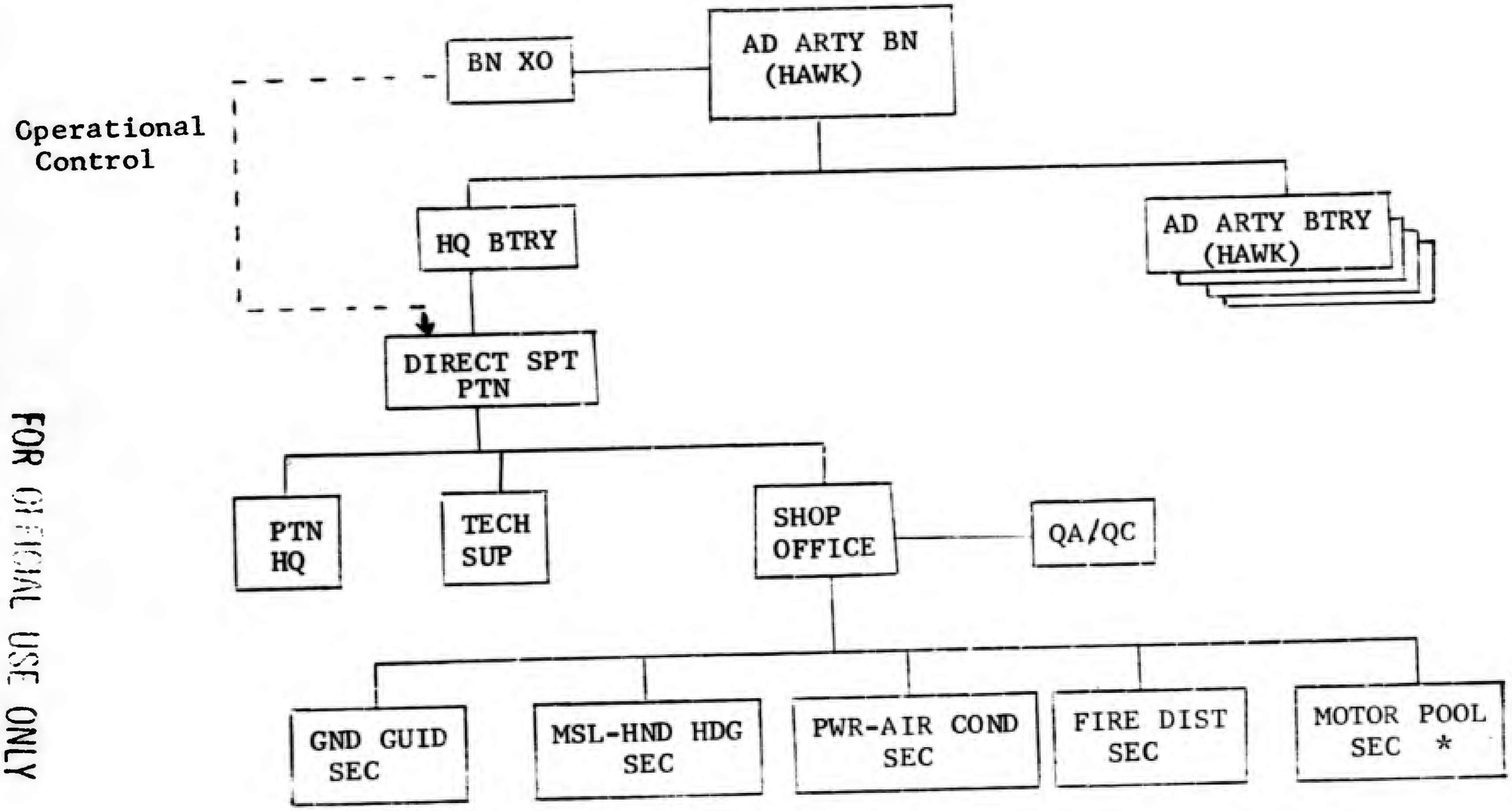
6th BN 562nd ARTY (SP HAWK) (GERMANY)



6th BN 517th ARTY (SP HAWK) (GERMANY)

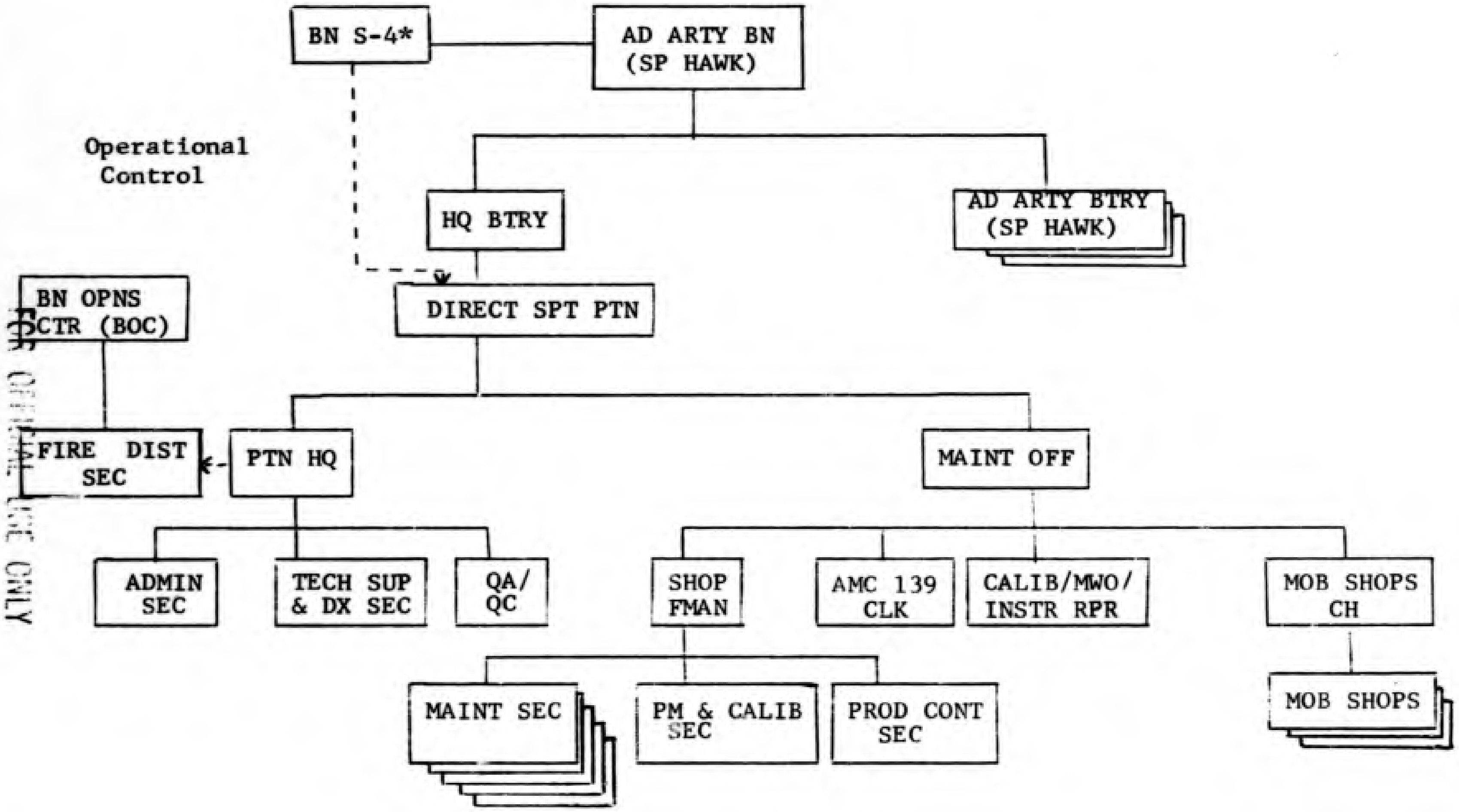


6th BN 52nd ARTY (HAWK) (GERMANY)



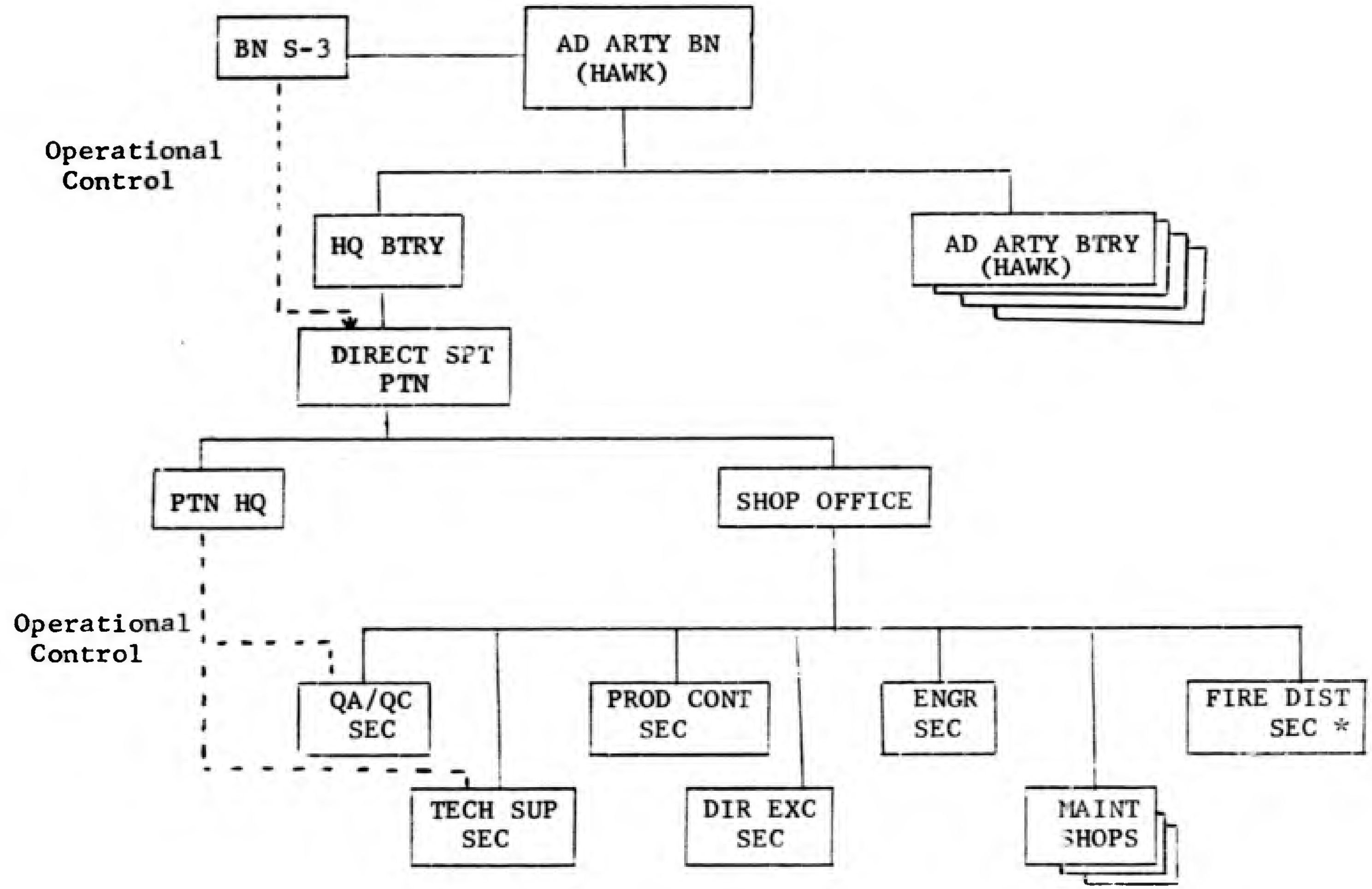
*Consists of three (3) each automotive mechanics assigned from HQ BTRY to support DSP vehicles only. Required due to distances between DSP and Bn Motor Pool.

3rd BN 7th ARTY (SP HAWK) (GERMANY)



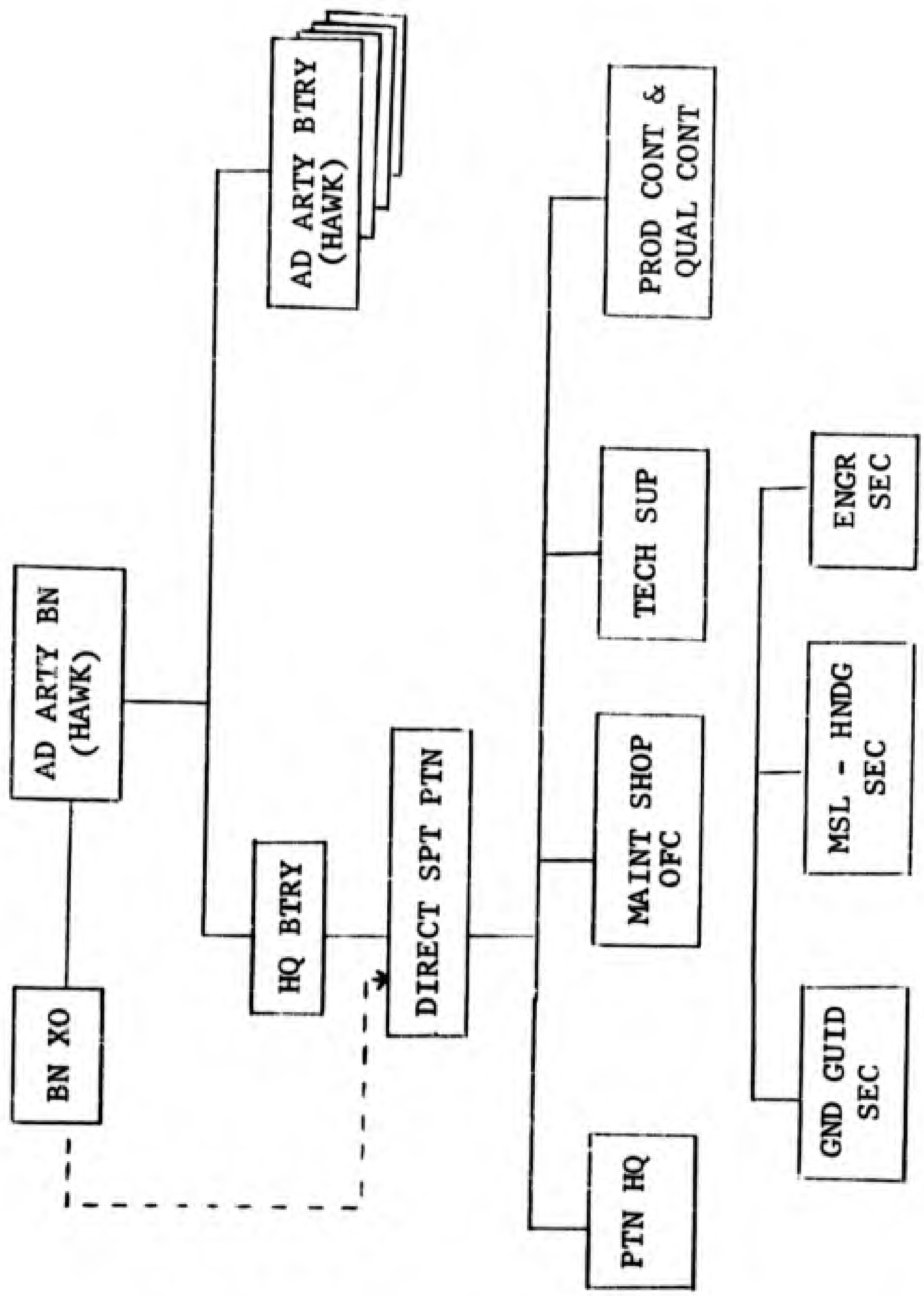
*BN S-4 is a 4516 CPT who is slotted against the Ord Msl Maint Off position.

6th BN 59th ARTY (HAWK) (GERMANY)



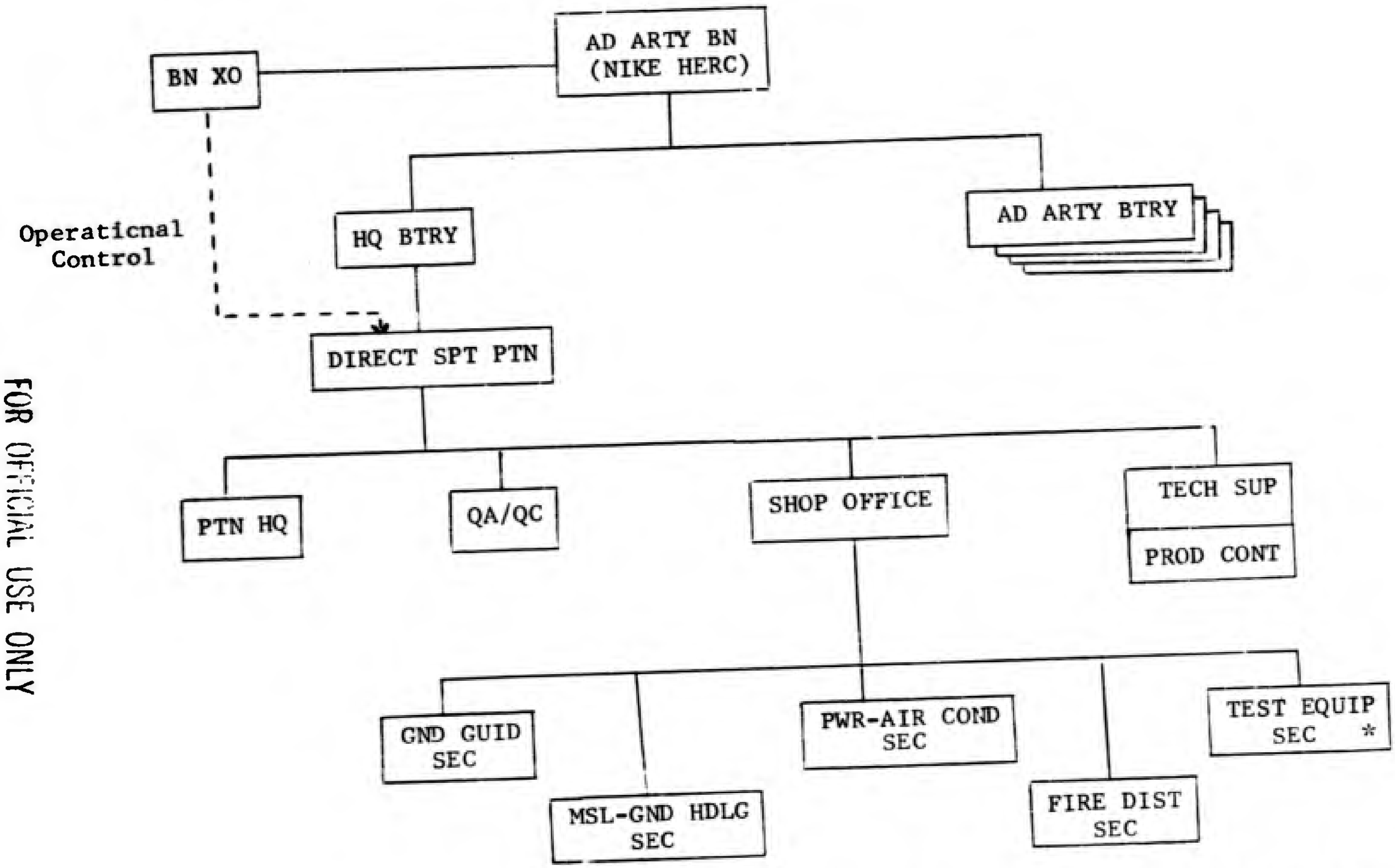
*IFF personnel are physically located at DSP; OC personnel are physically located at BOC; all are under operational control of the DSP

6th BN 62nd ARTY (HAWK) (GERMANY)



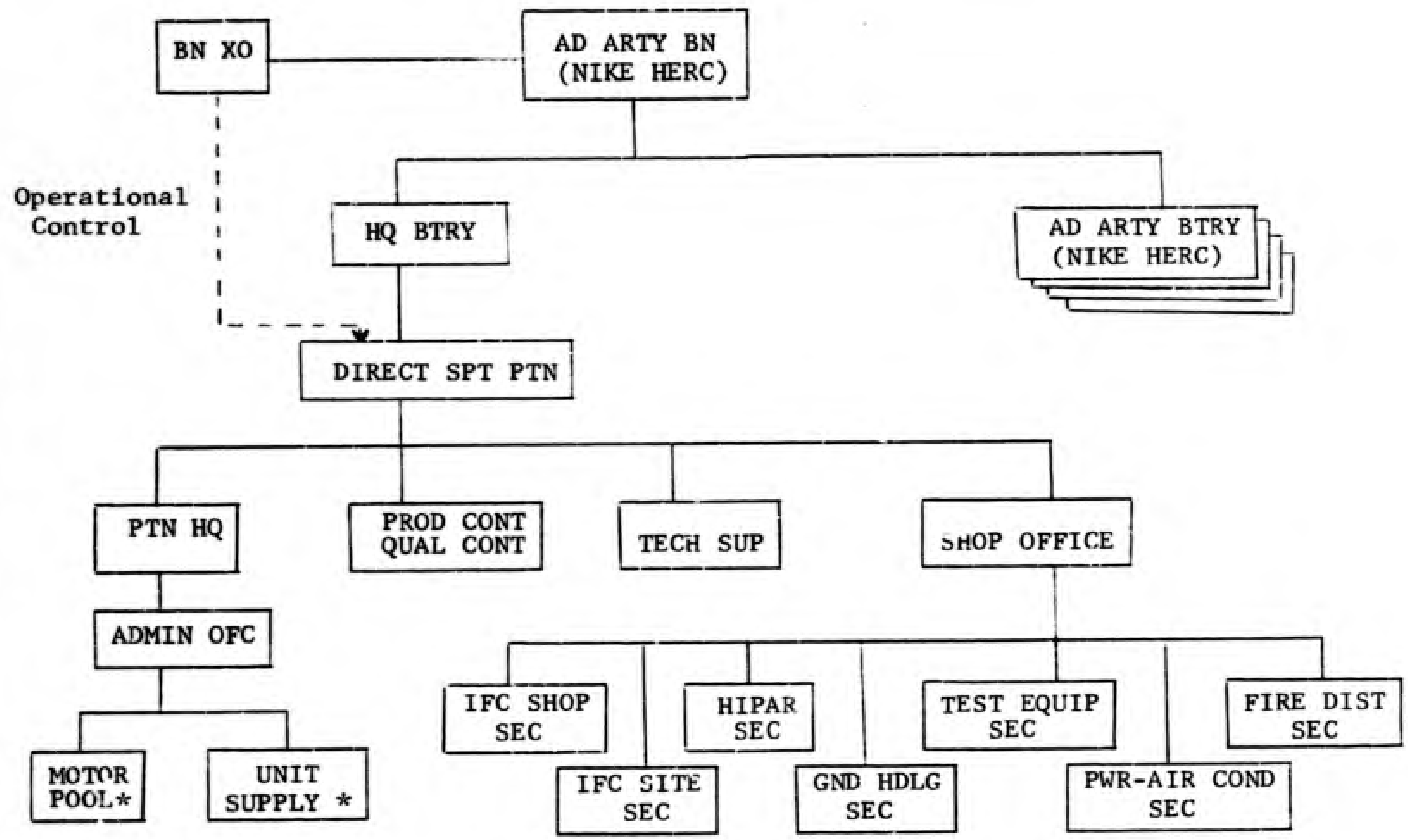
Operational Control

2nd BN 56th ARTY (NIKE HERC) (GERMANY)



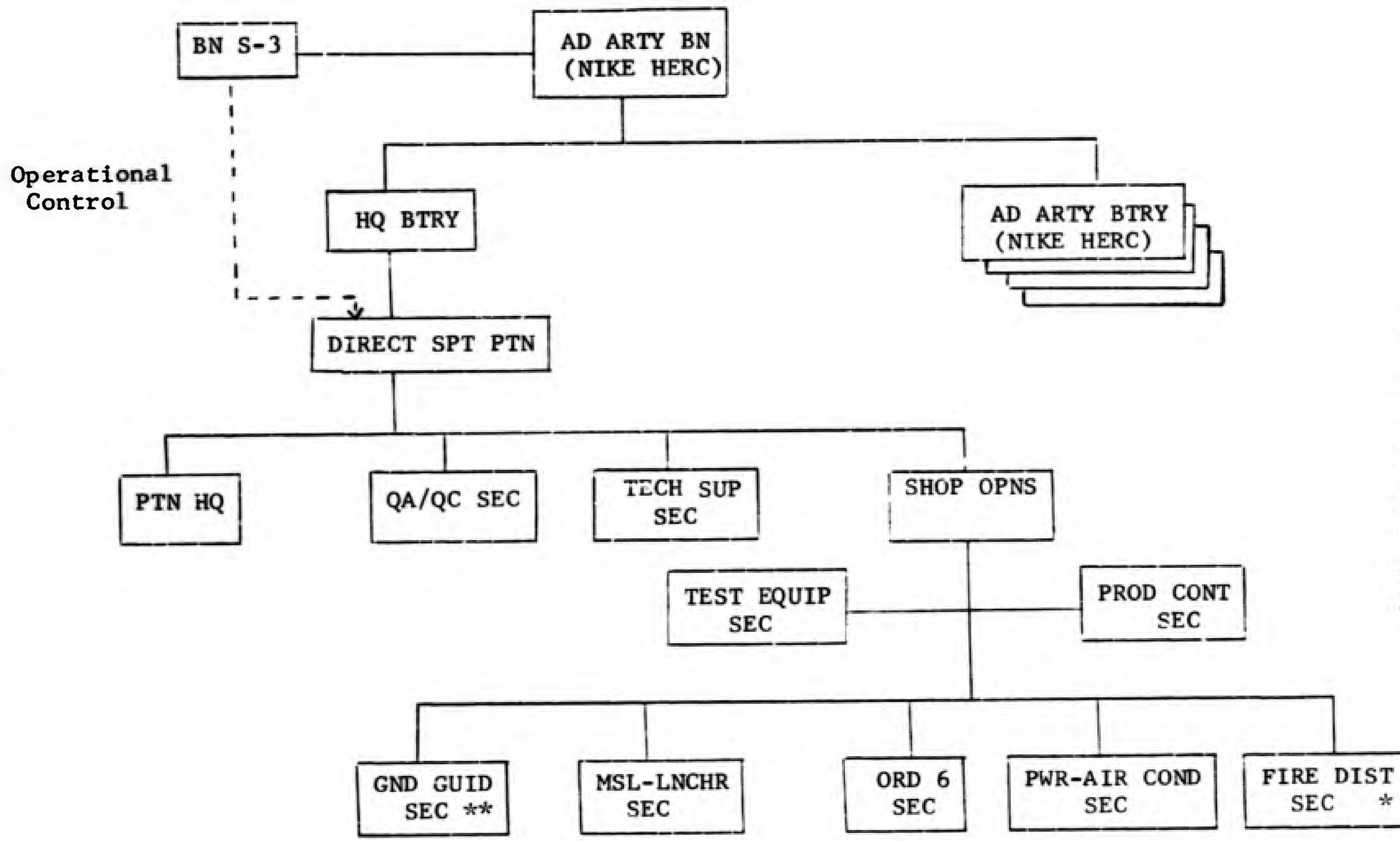
*Consists of two (2) each Ordnance missile system repairman who are used to maintain DSP Signal test and measuring equipment.

3rd BN 71st ARTY (NIKE HERC) (GERMANY)



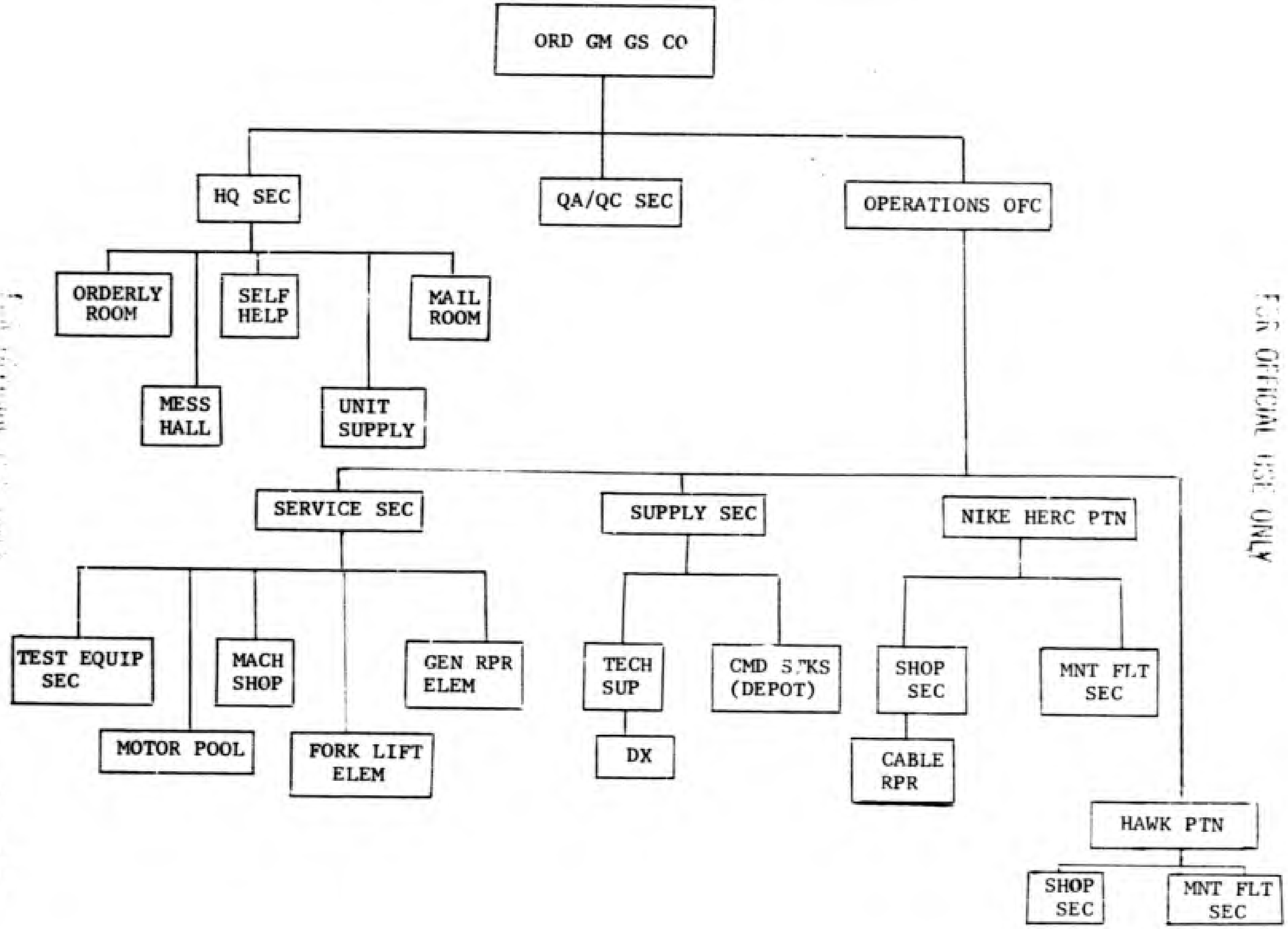
*These elements are organized under DSP due to the physical separation from HQ Btry. Personnel taken from DSP assets.

5th BN 1st ARTY (NIKE HERC) (GERMANY)

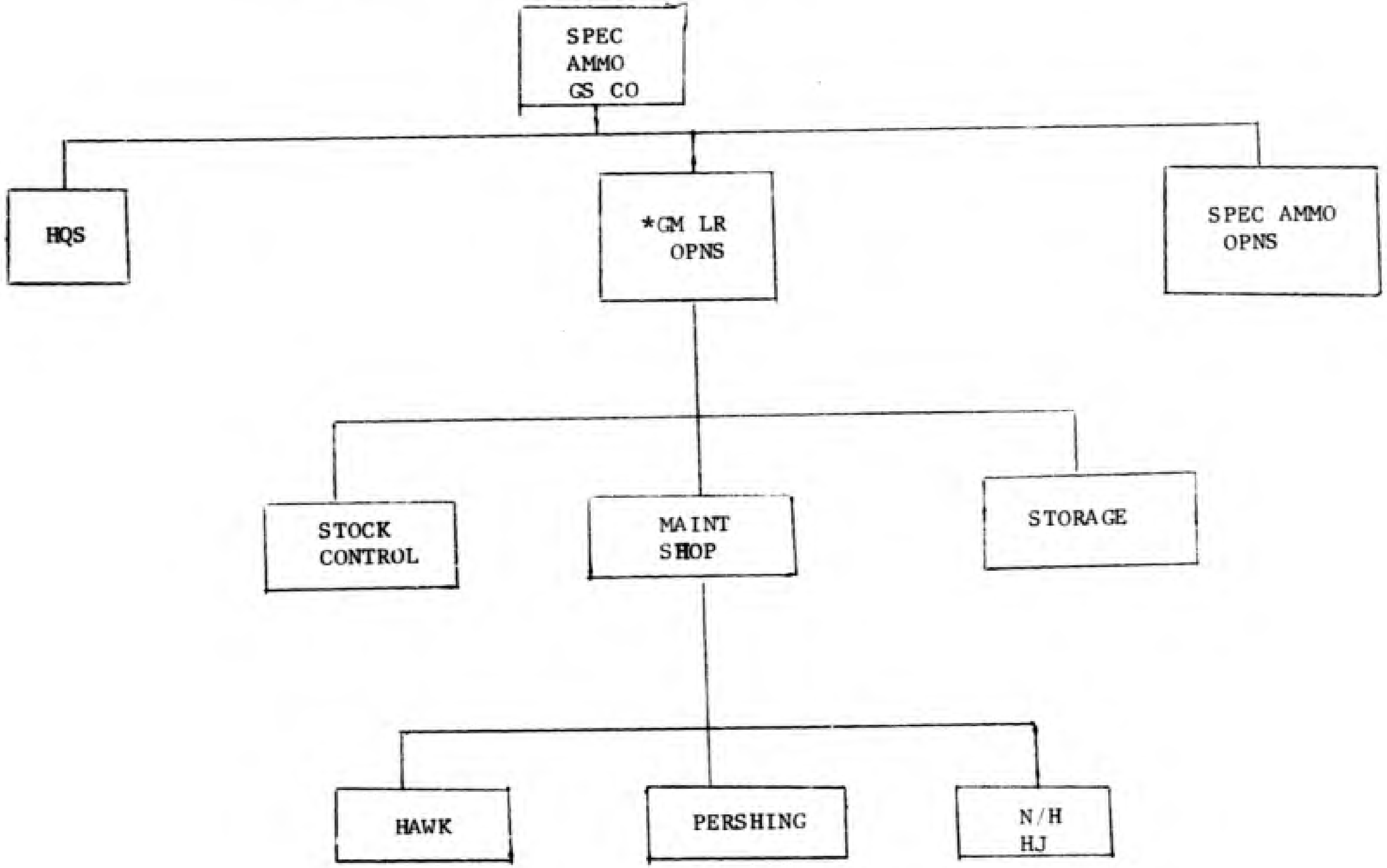


*Personnel physically work at BOC, but they are under the operational control of the DSP
**Personnel do only on-site repair functions.

4th ORD GMGS CO (NIKE HERC/HAWK) (GERMANY)

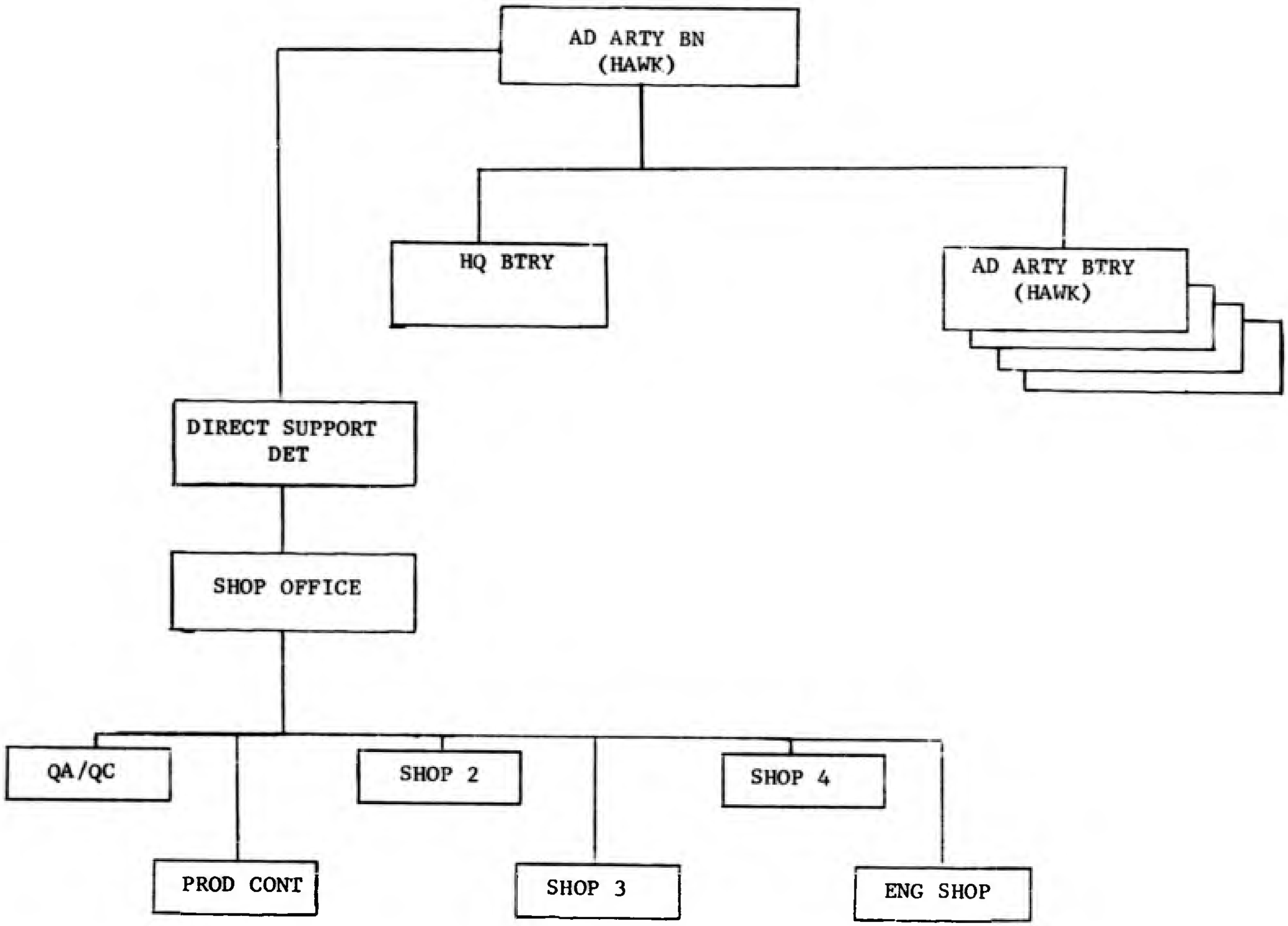


9th ORDNANCE SPECIAL AMMUNITION GENERAL SUPPORT COMPANY (GERMANY)



*Guided Missile and Large Rocket

2nd BN 71st ARTY (HAWK) (KOREA)



INCL:
SHOP OPNS
DX

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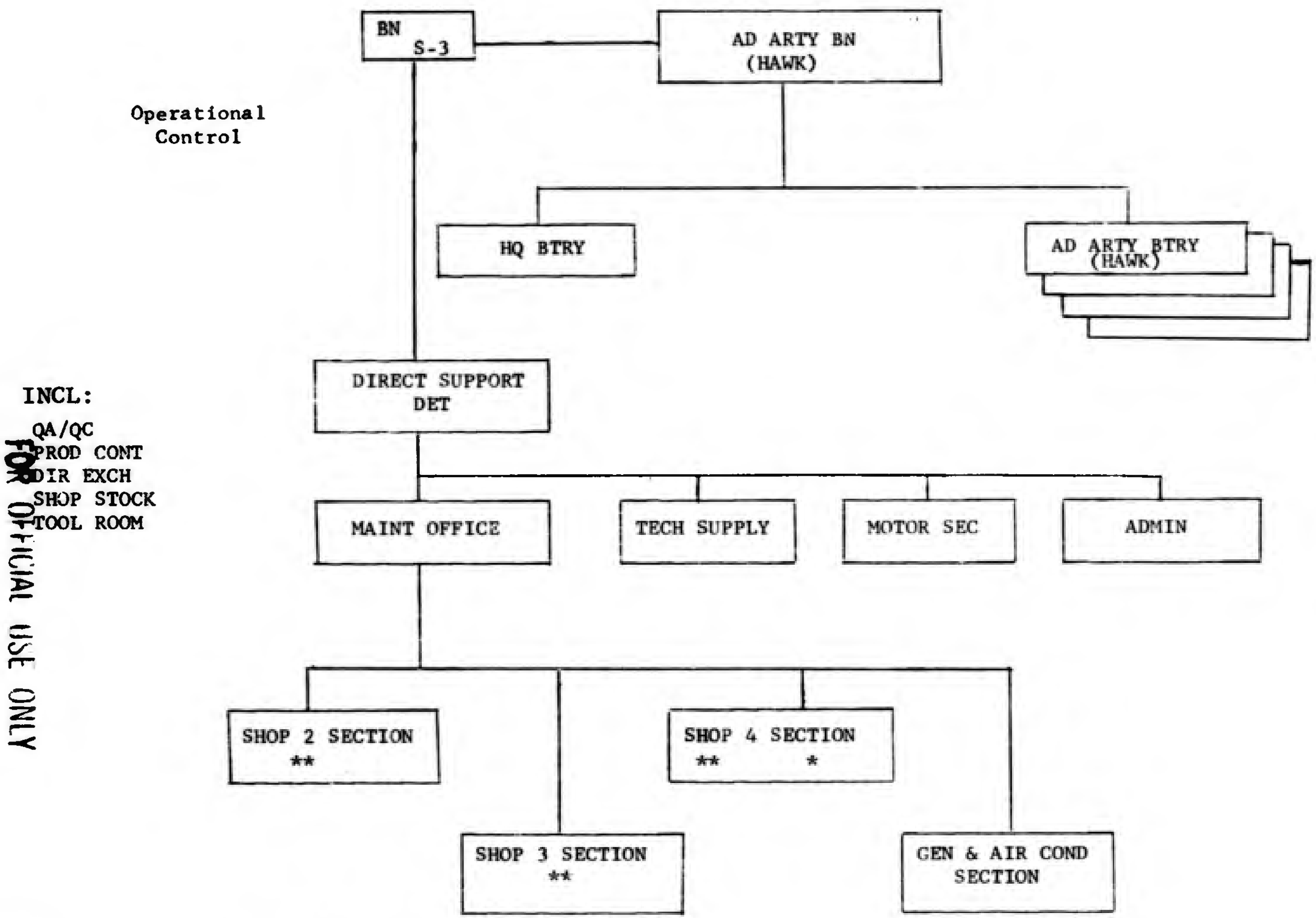
6th BN 44th ARTY (HAWK) (KOREA)



* ALSO PERFORM REPAIRS ON TEST EQUIPMENT
** ALSO PERFORM CONTACT TEAM SERVICES

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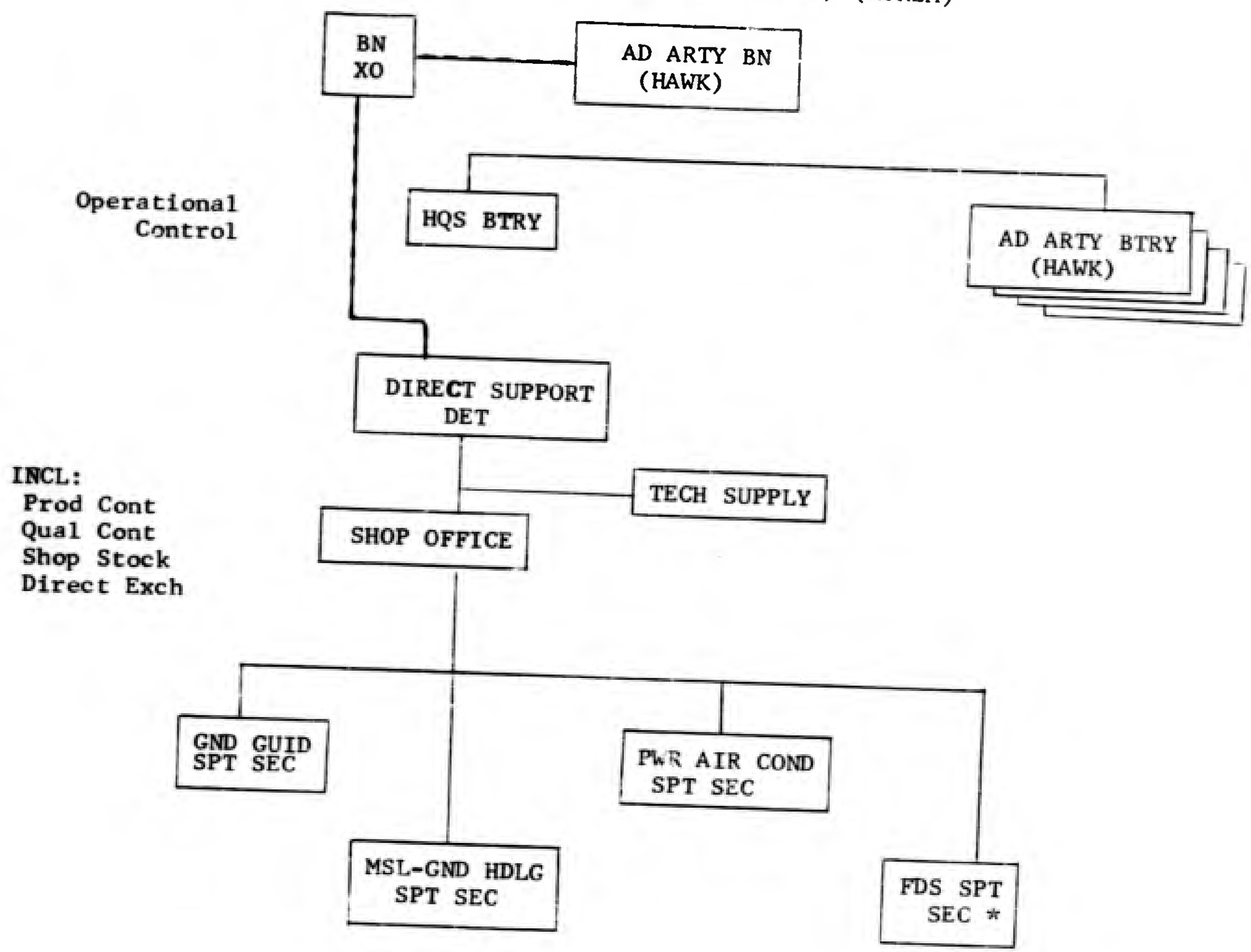
7th BN 2nd ARTY (HAWK) (KOREA)



*BN S-3 exercises operational control of this element, and it is physically located at the BOC

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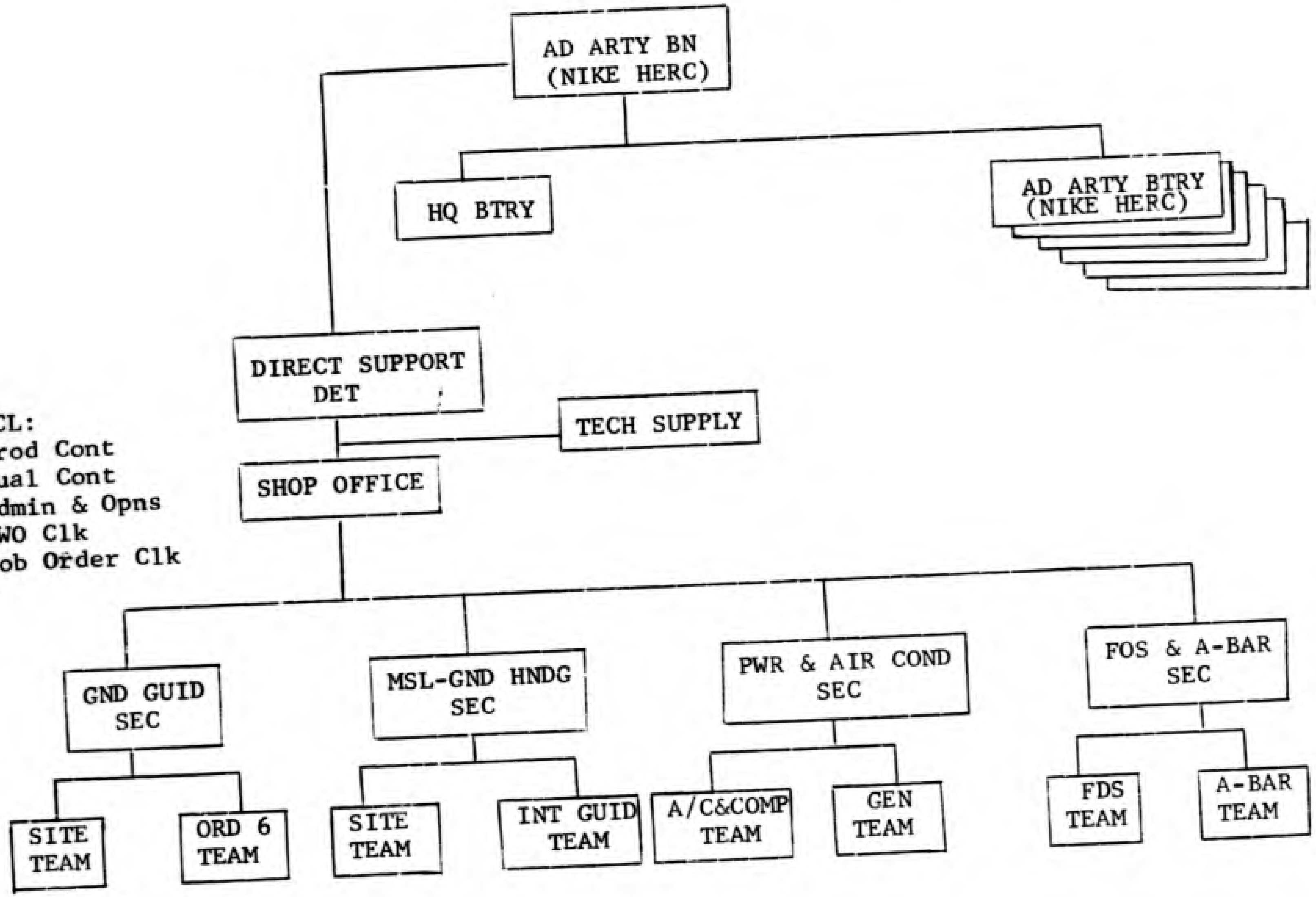
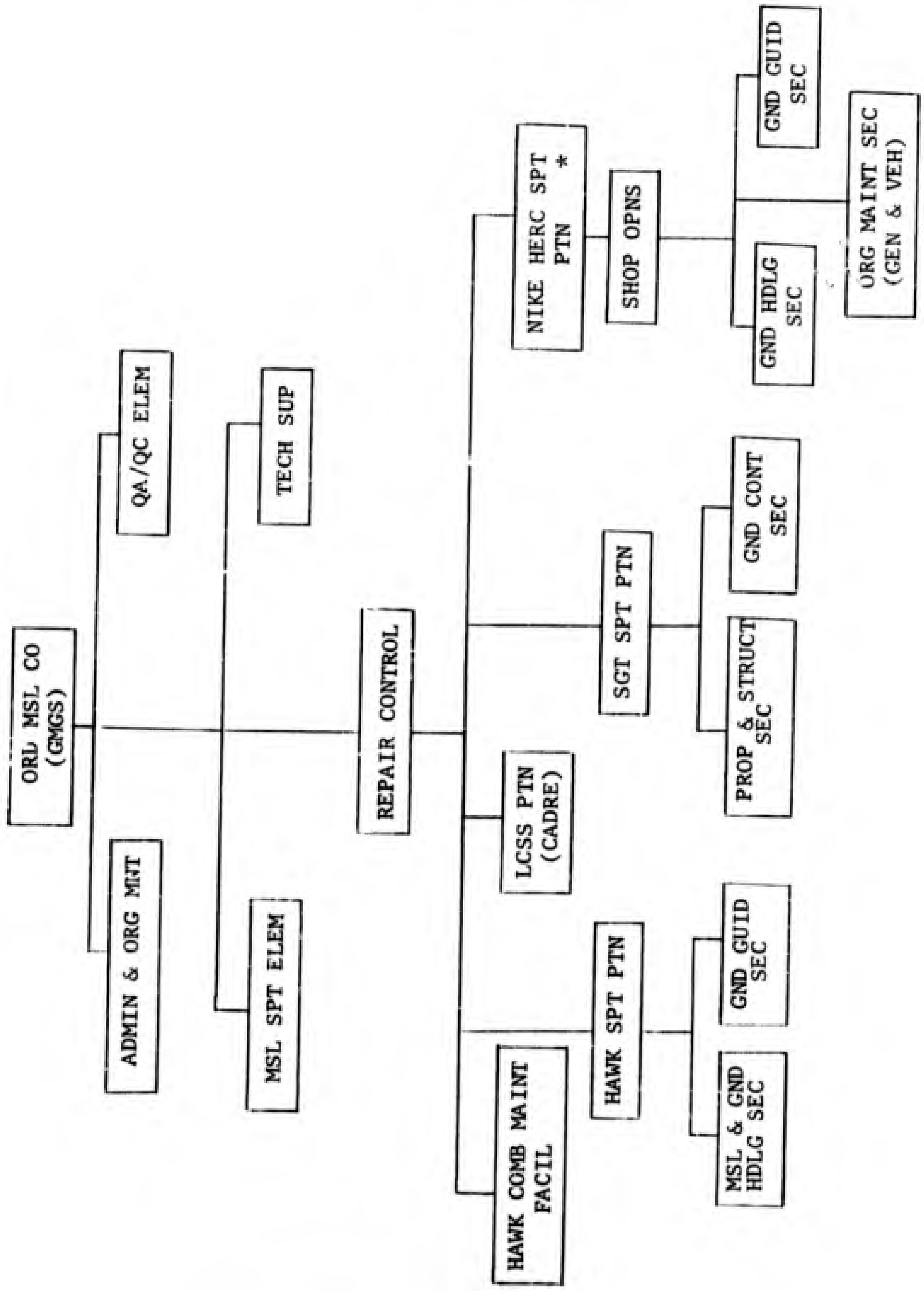
4th BN 44th ARTY (NIKE HERC) (KOREA)



30th ORD GMGS CO (HAWK/NIKE HERC/SGT) (KOREA)



*Located remote from CO HQ.

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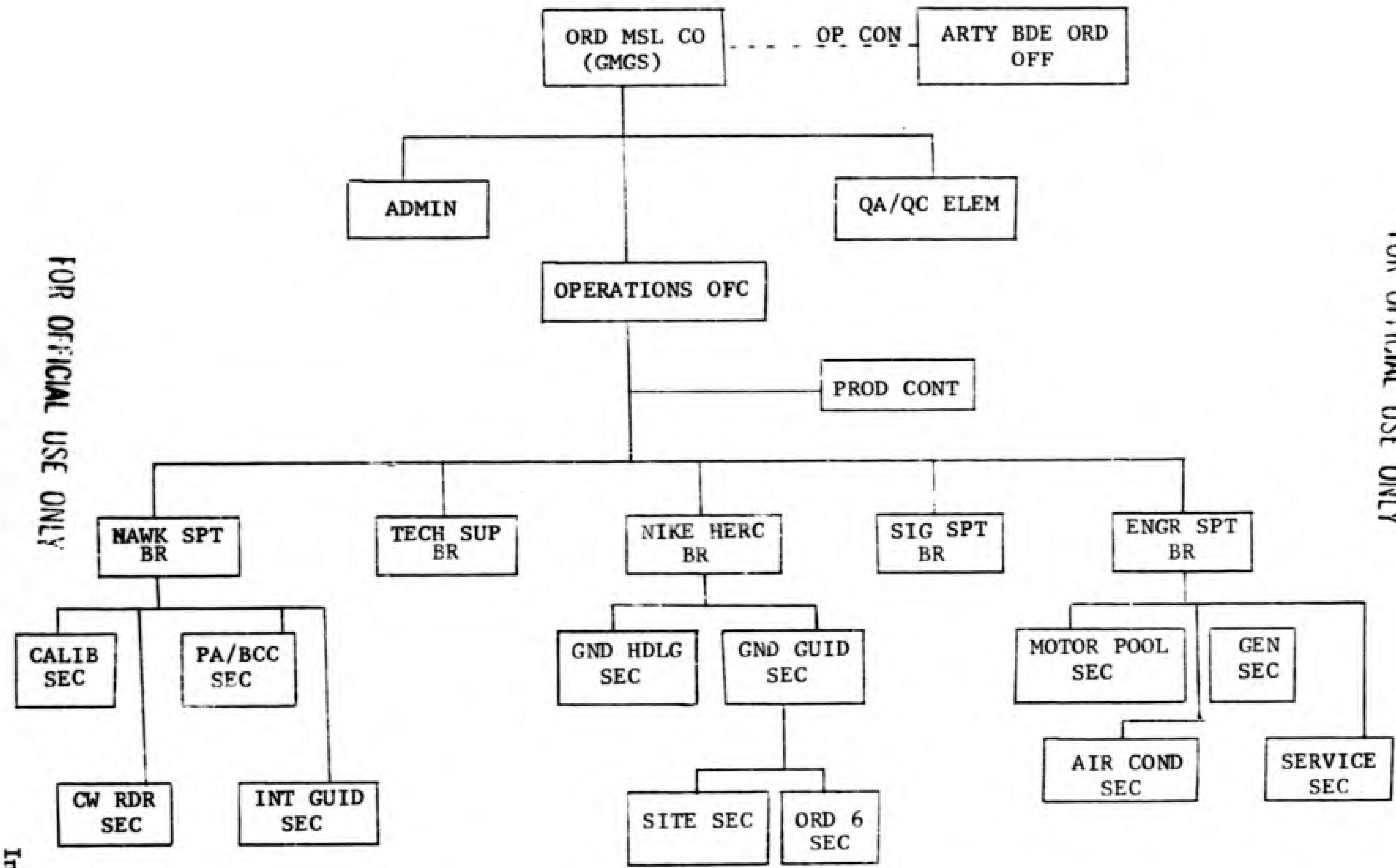
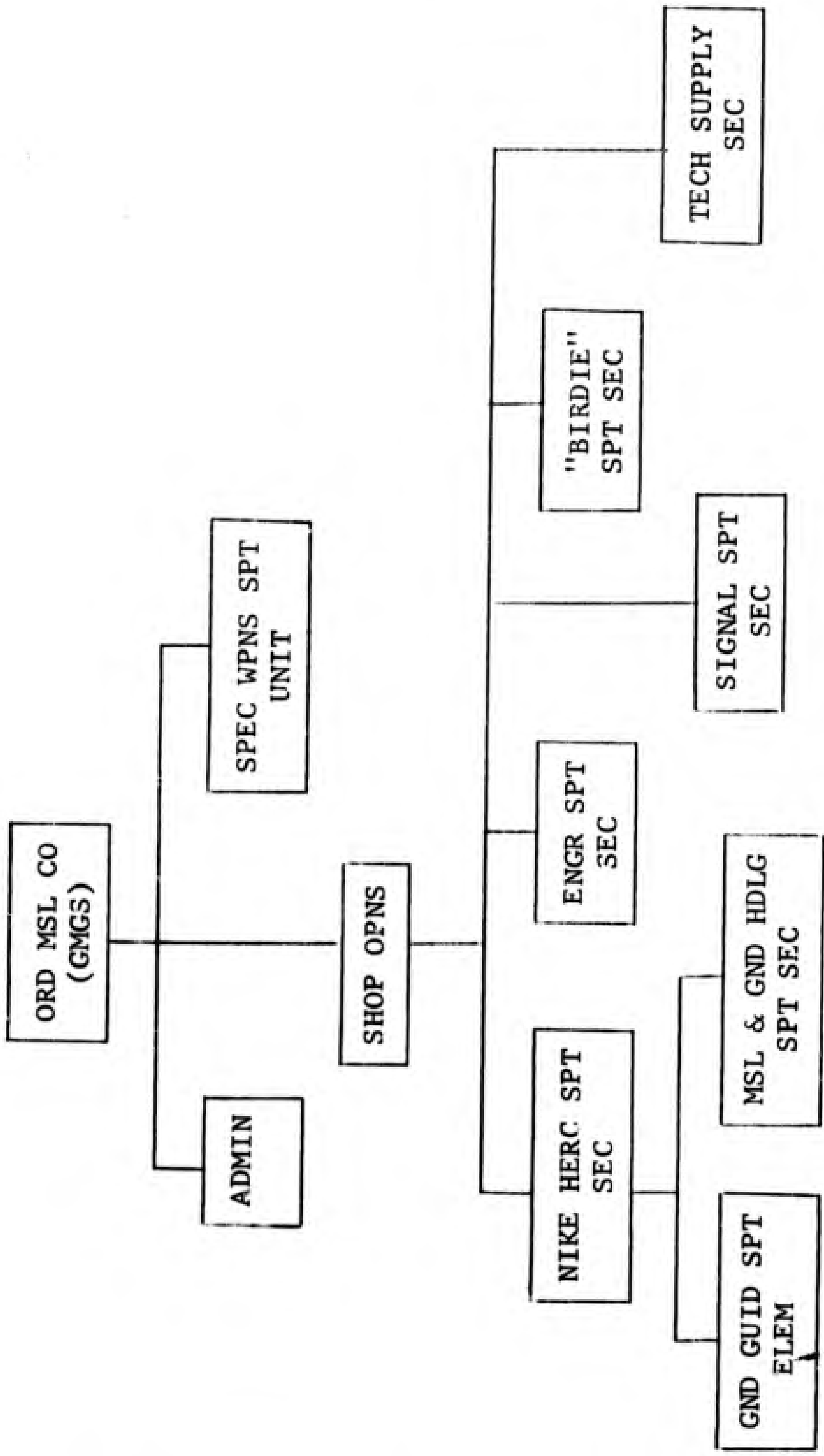
44th ORD GM-GS/DS COL (NIKE HERC/HAWK) (OKINAWA)



FOR OFFICIAL USE ONLY

524th GMGS/DS CO (NIKE HERC) (ALASKA)



2 - Series LAND COMBAT MISSILE SYSTEMS INCLOSURES

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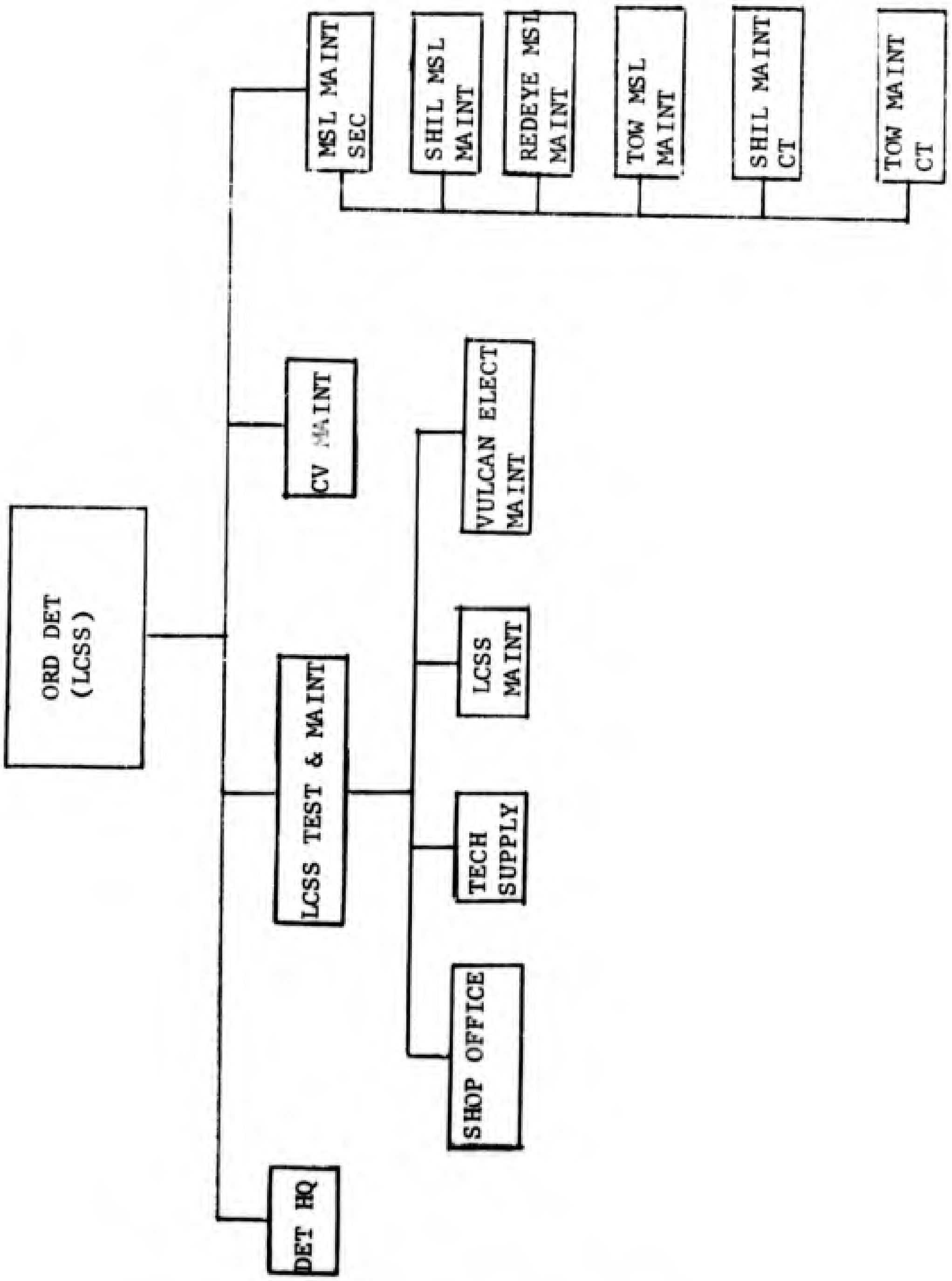
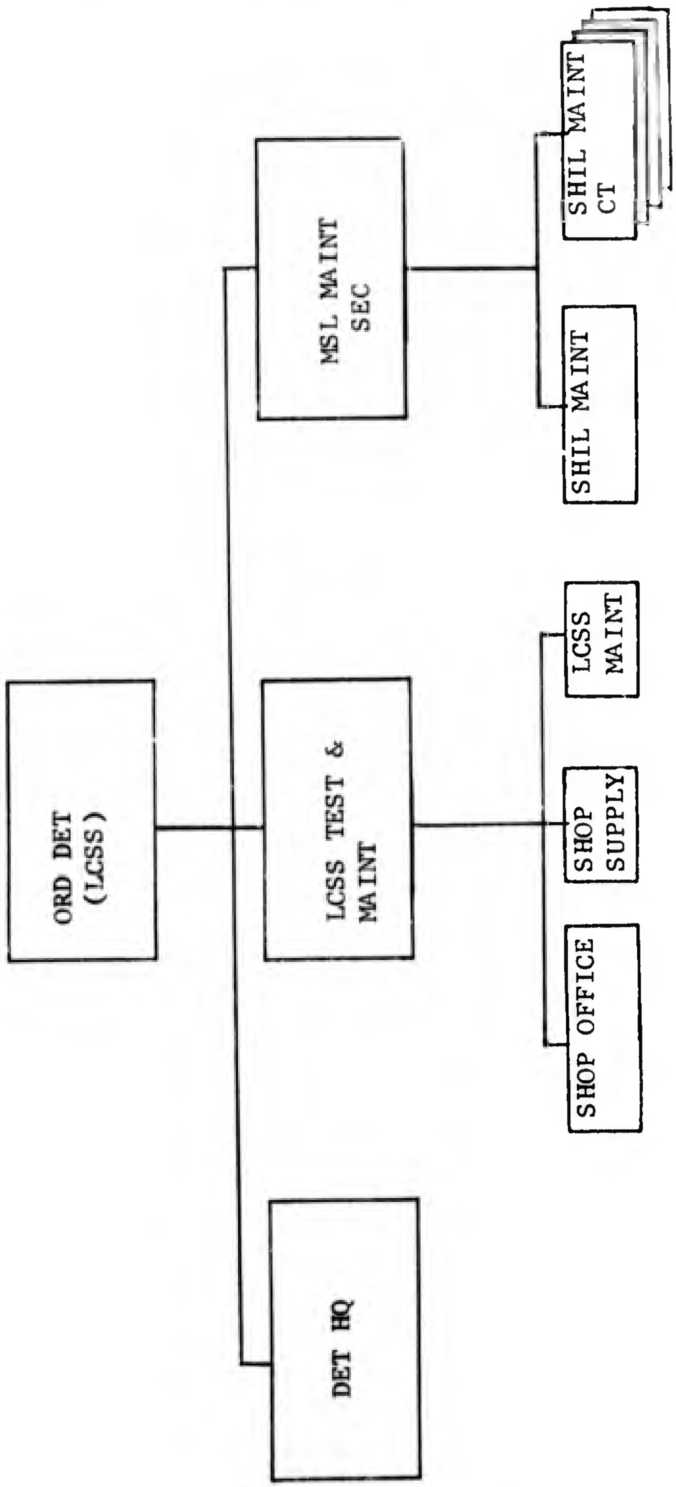
763rd ORD DET (LCSS) (CONUS)

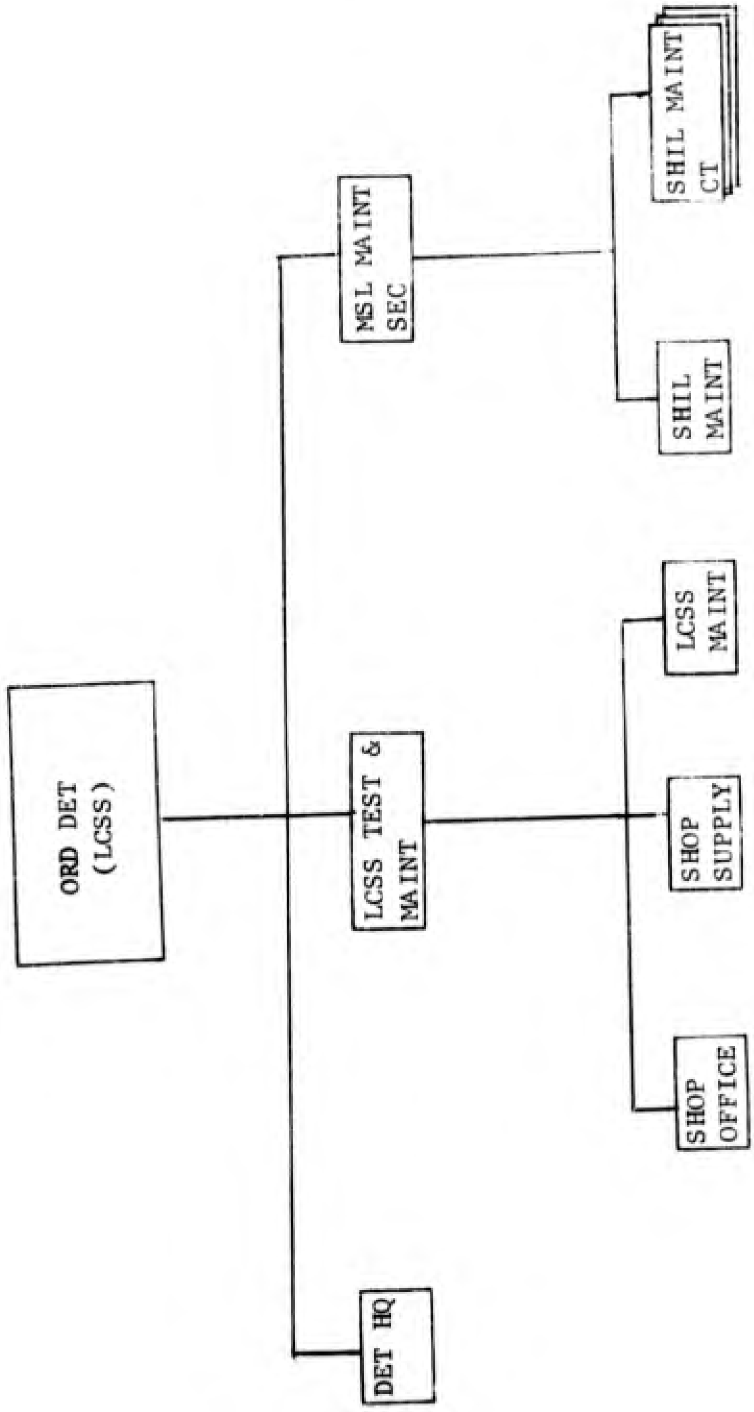


FOR OFFICIAL USE ONLY

181st ORD DET (LCSS) (CONUS)

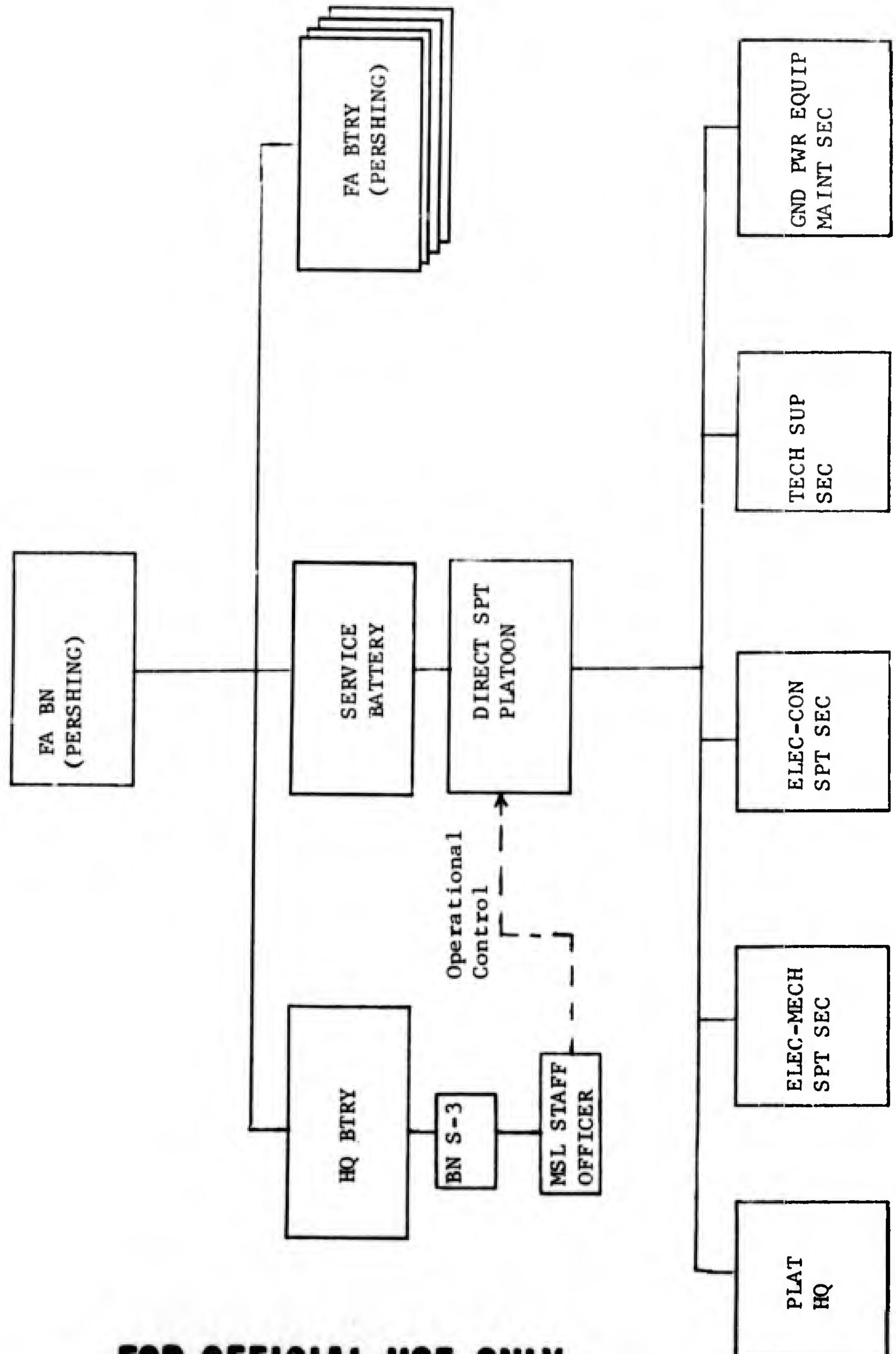


30th ORD DET (LCSS) (CONUS)



FOR OFFICIAL USE ONLY

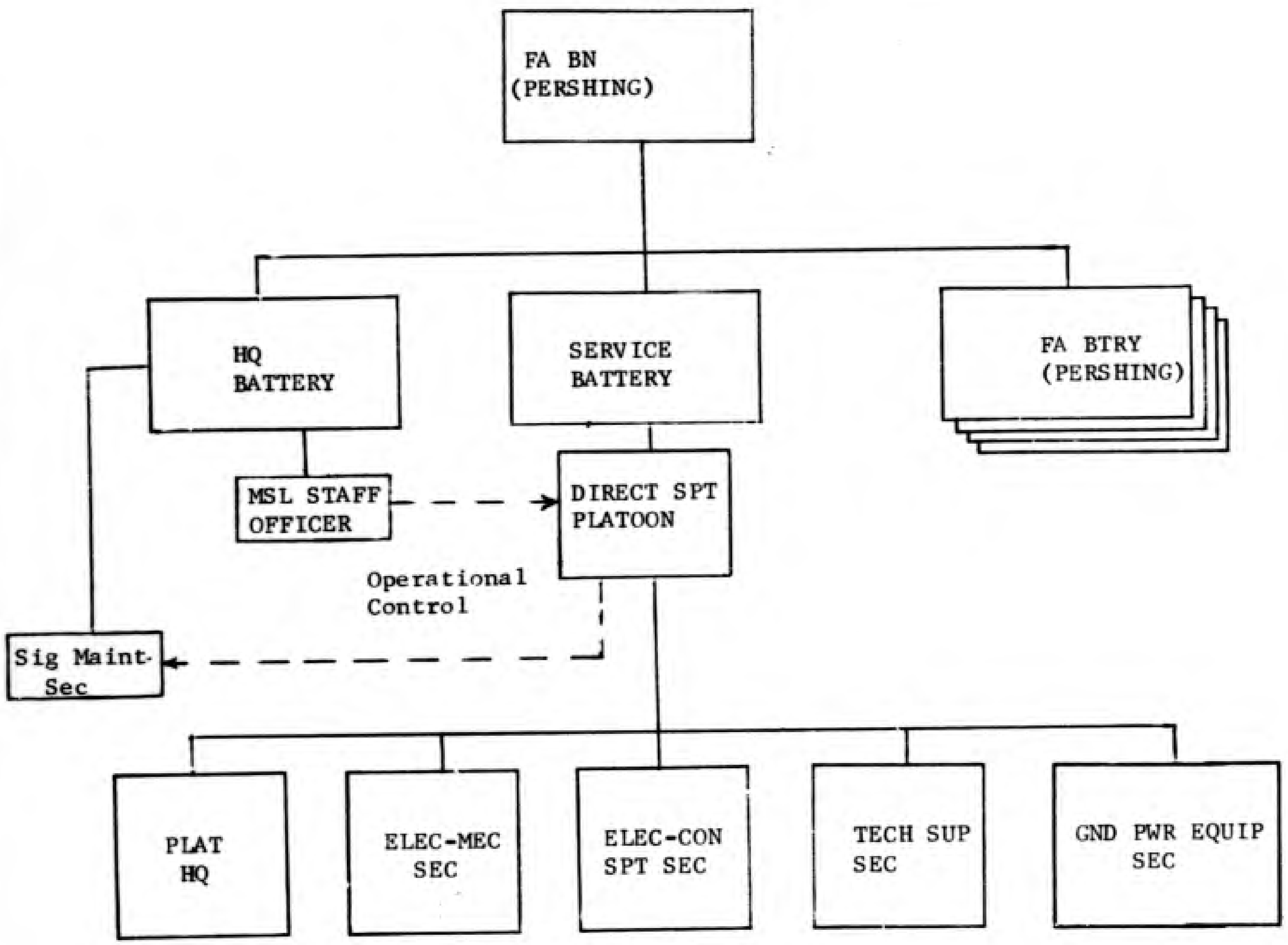
3rd BN, 84th ARTY (PERSHING) (GERMANY)



FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

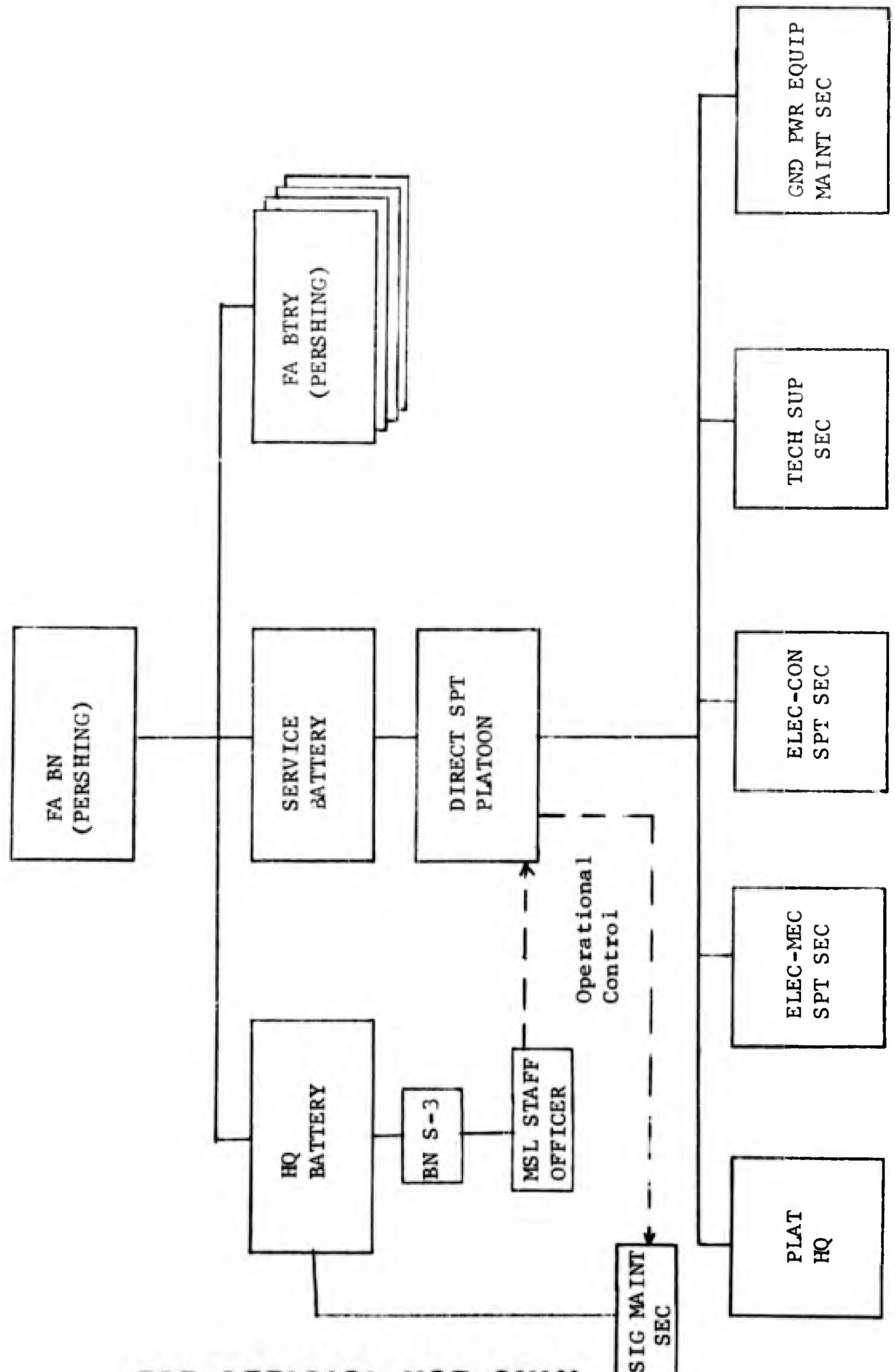
1st BN, 81st ARTY (PERSHING) (GERMANY)



FOR OFFICIAL USE ONLY

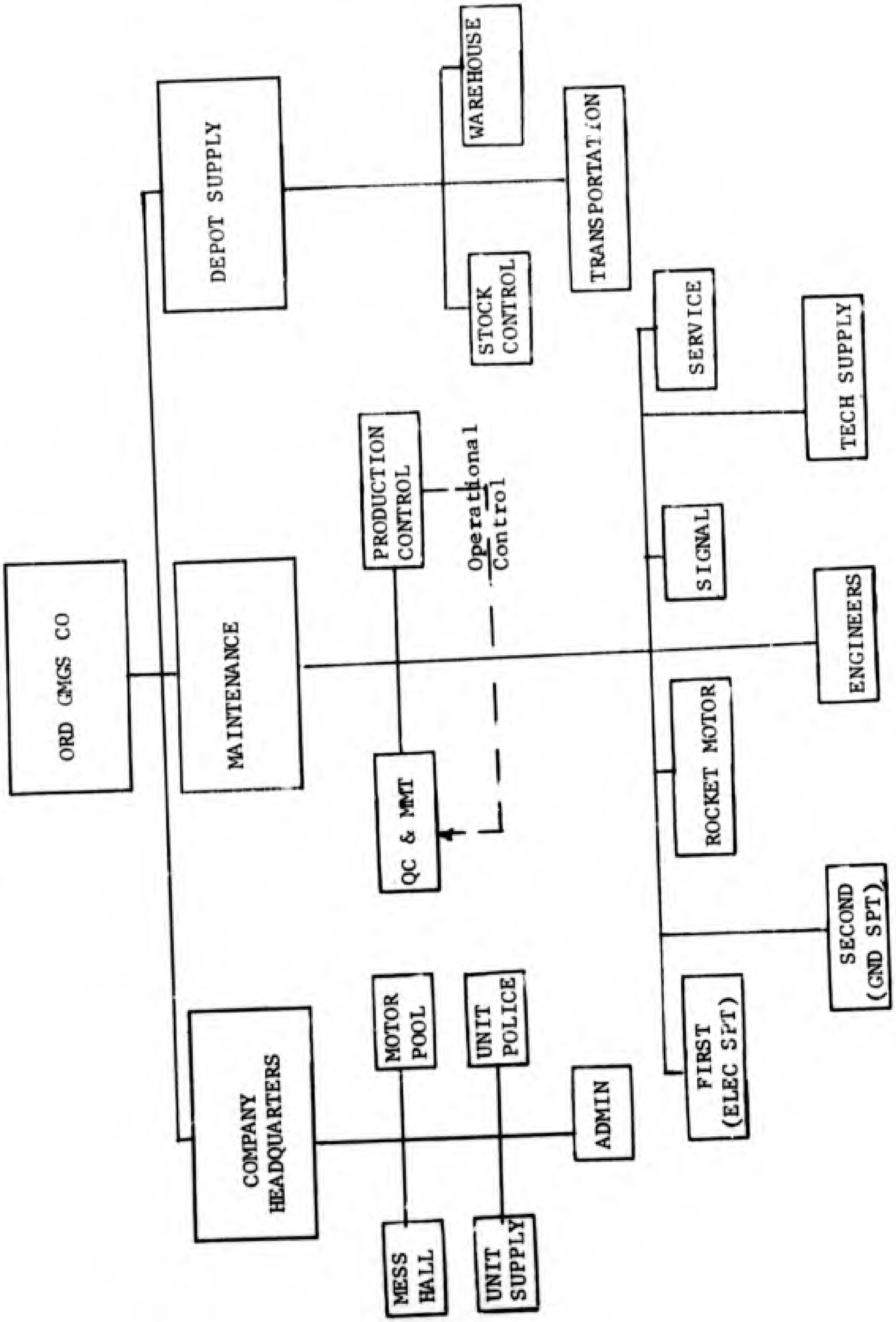
FOR OFFICIAL USE ONLY

4th BN, 41st ARTY (PERSHING) (GERMANY)

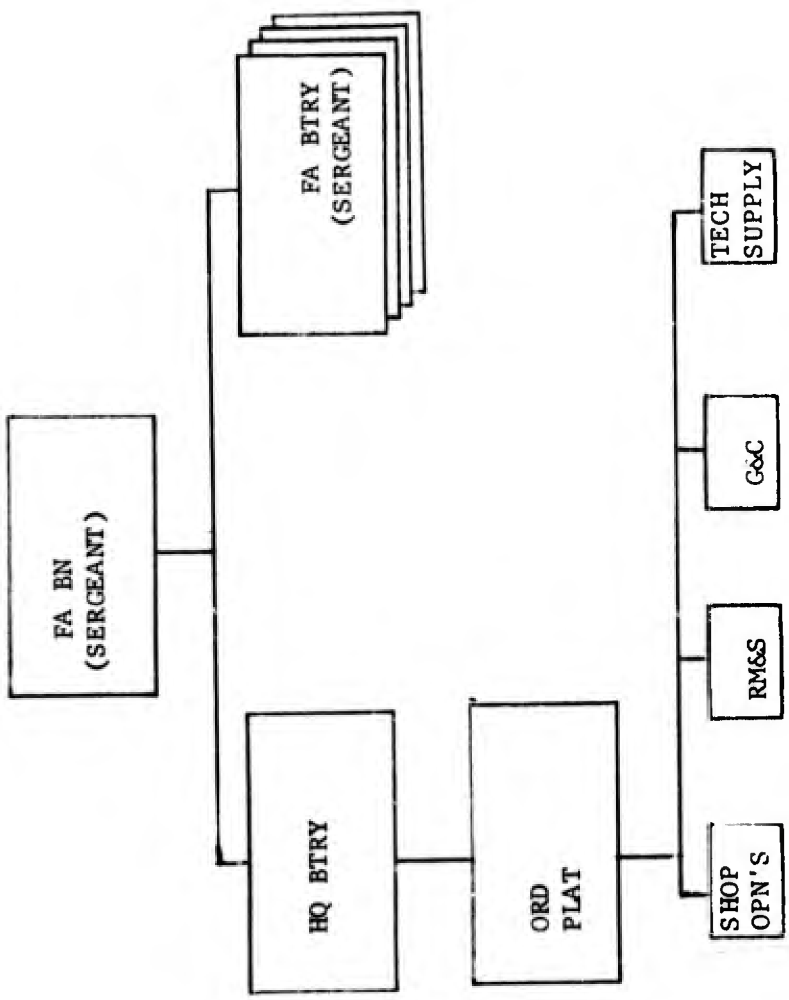


FOR OFFICIAL USE ONLY

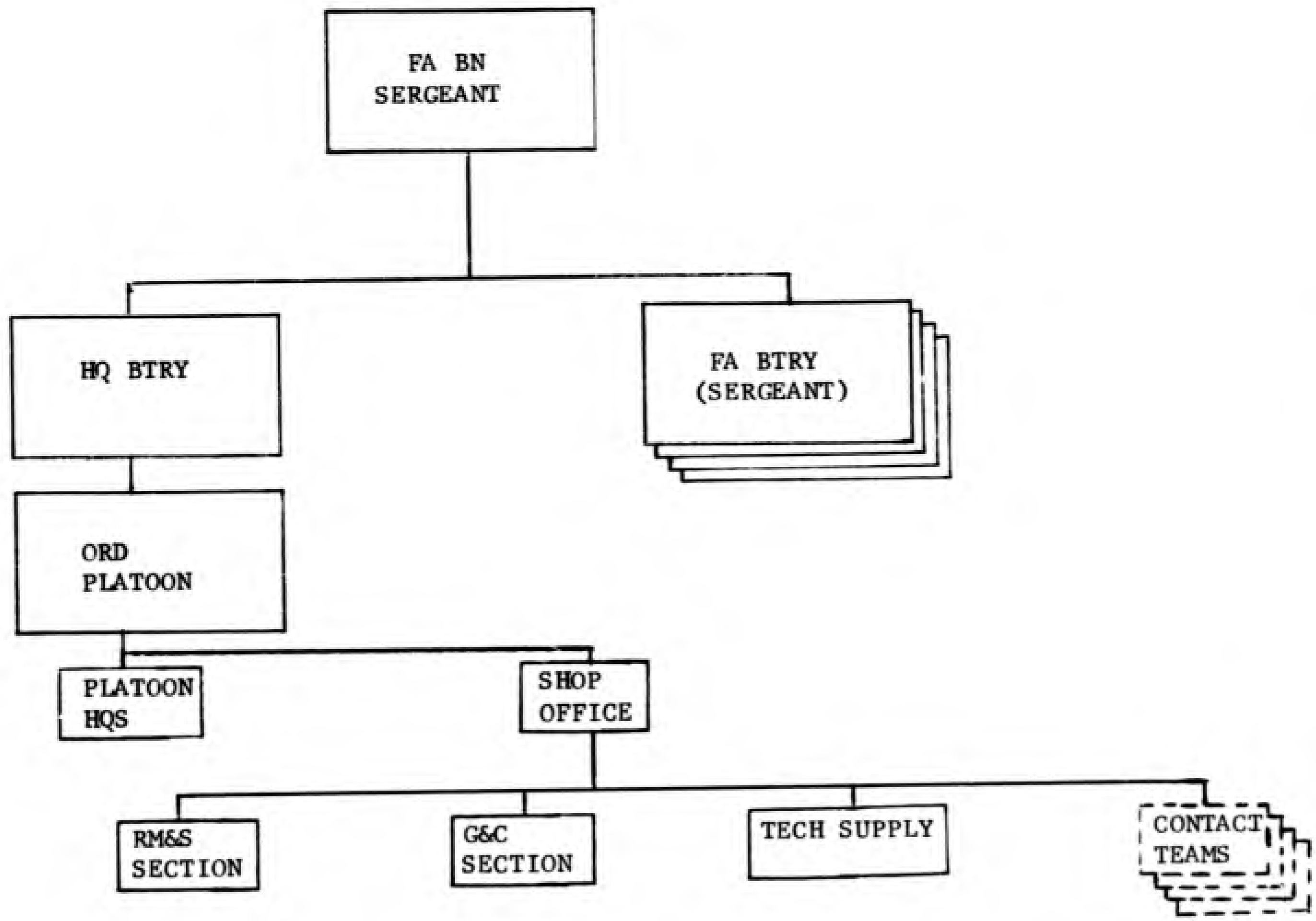
579th ORD GMGS CO (PERSHING) (GERMANY)



5th BN, 77th ARTY (SERGEANT) (GERMANY)



5th BN, 73rd ARTY (SERGEANT) (GERMANY)



Manned by personnel from
RM&S and G&C Section

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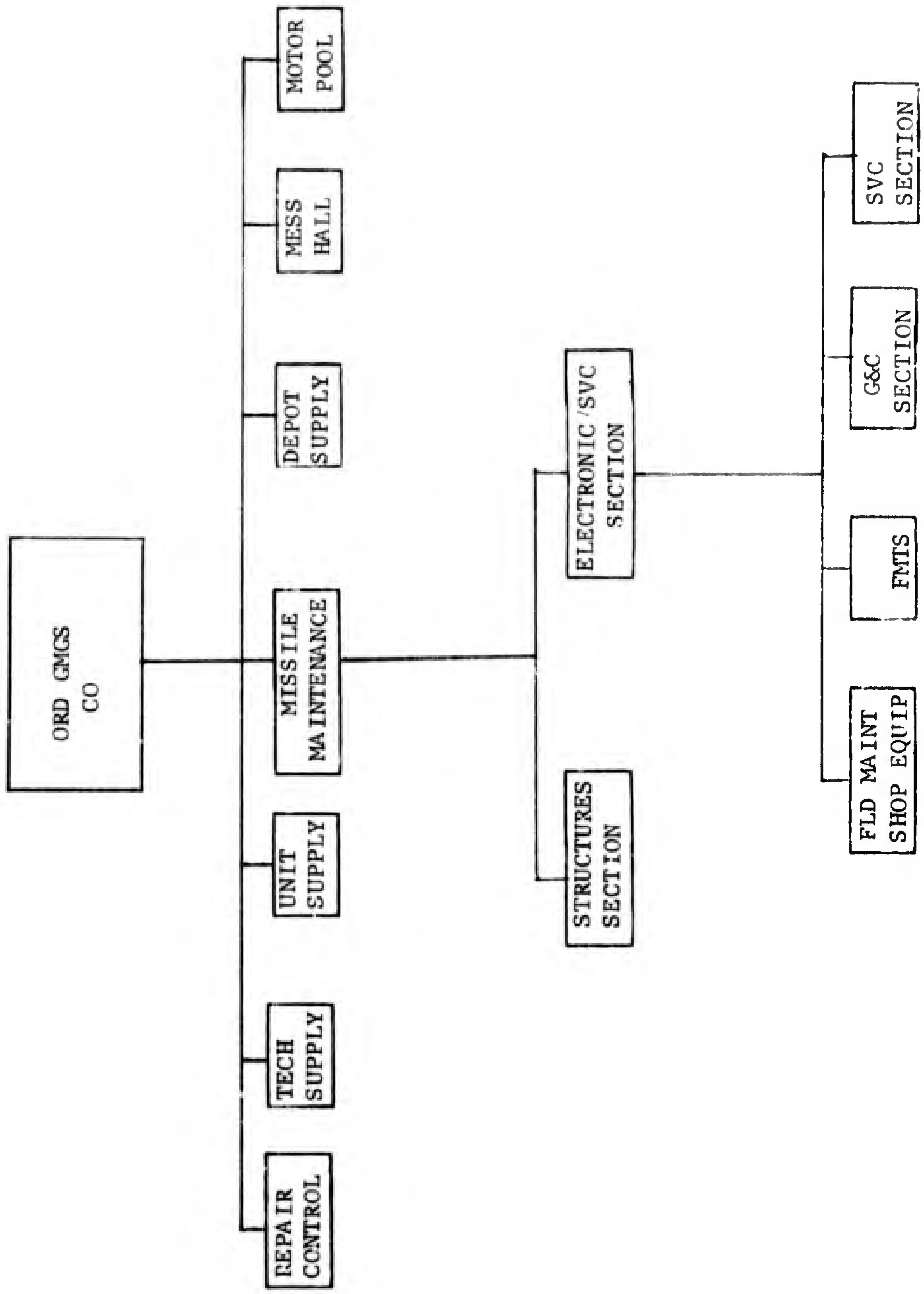
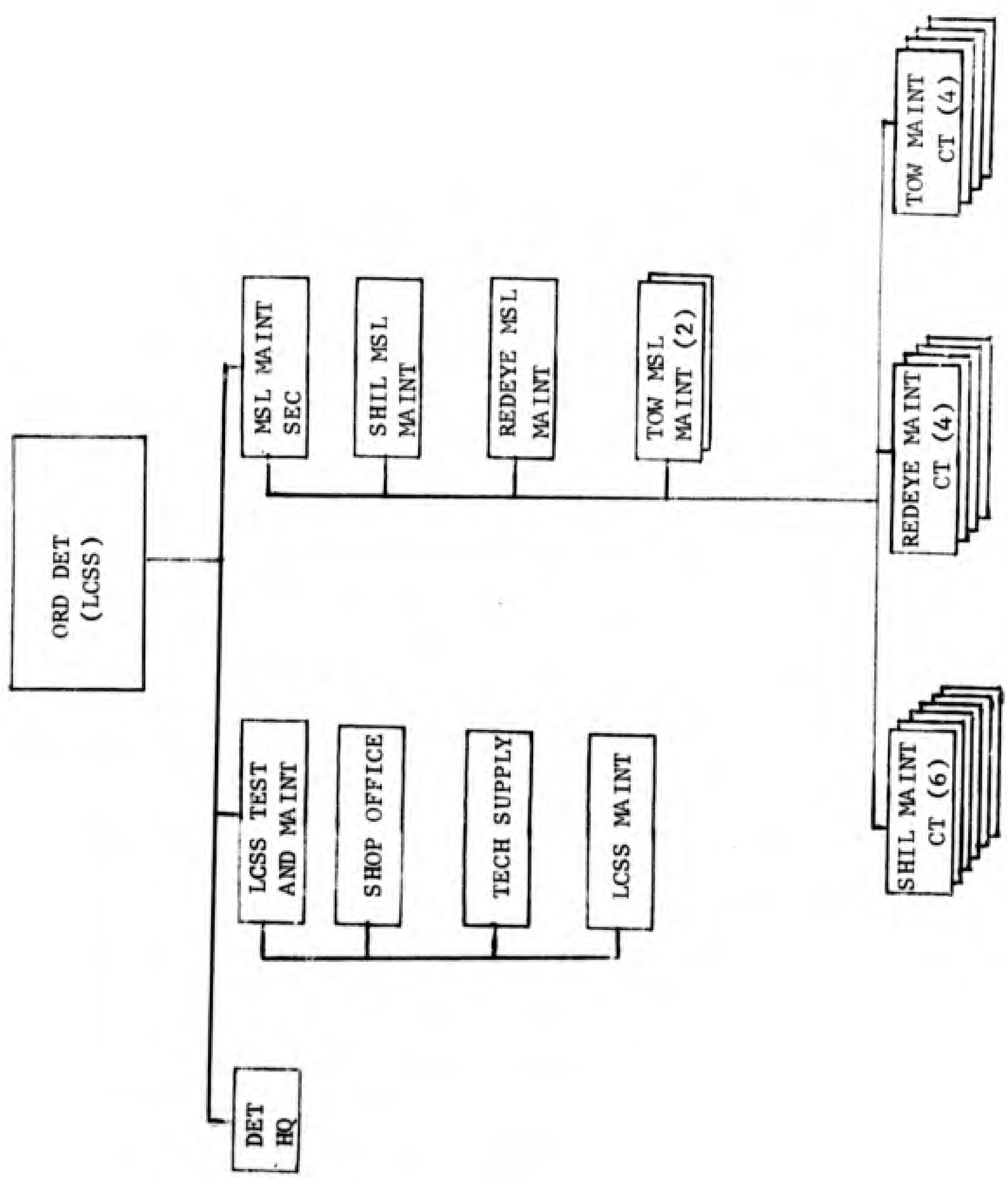
575th ORD GMGS CO (SERGEANT) (GERMANY)



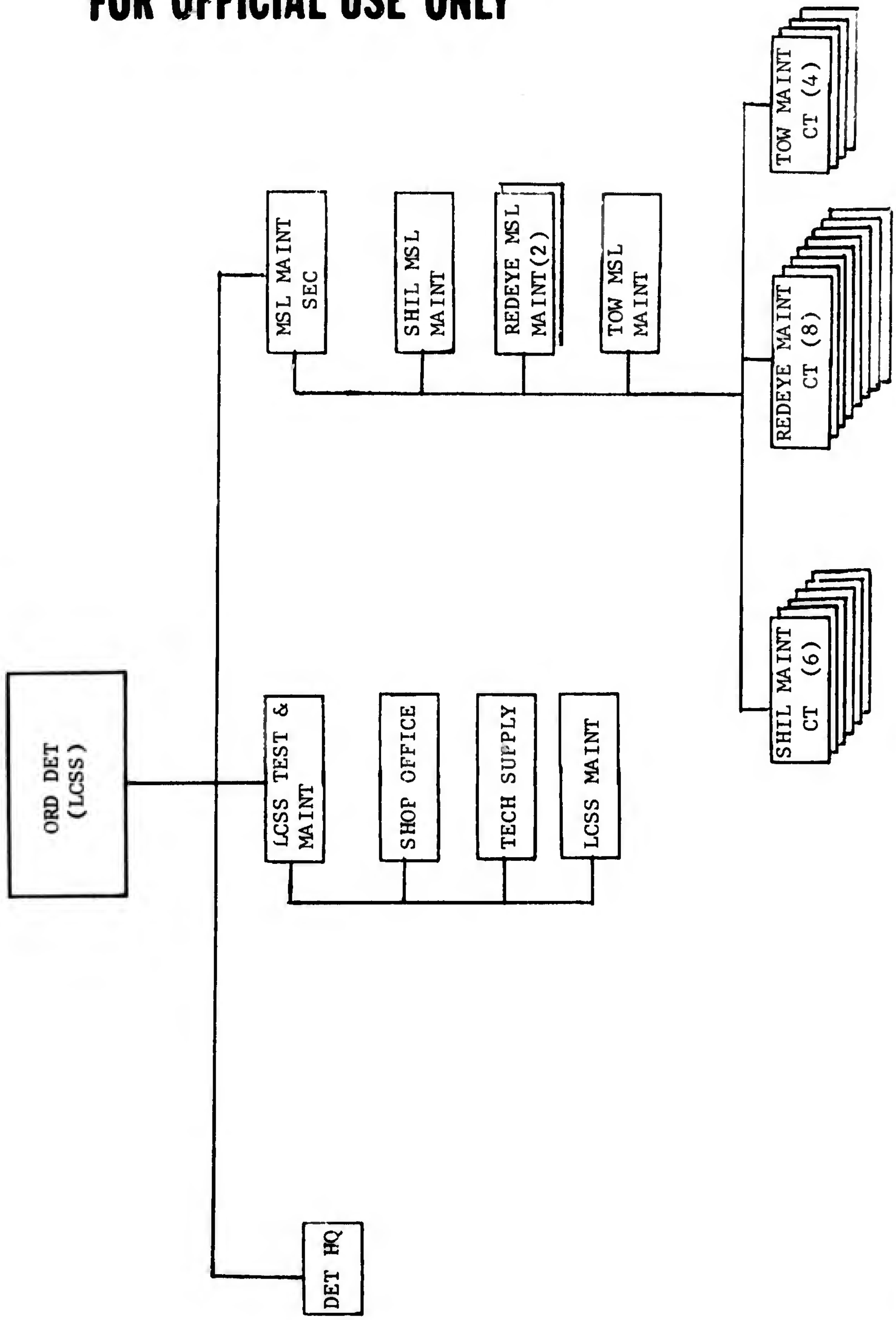
FOR OFFICIAL USE ONLY

223rd ORD DET (LCSS) (GERMANY)



FOR OFFICIAL USE ONLY

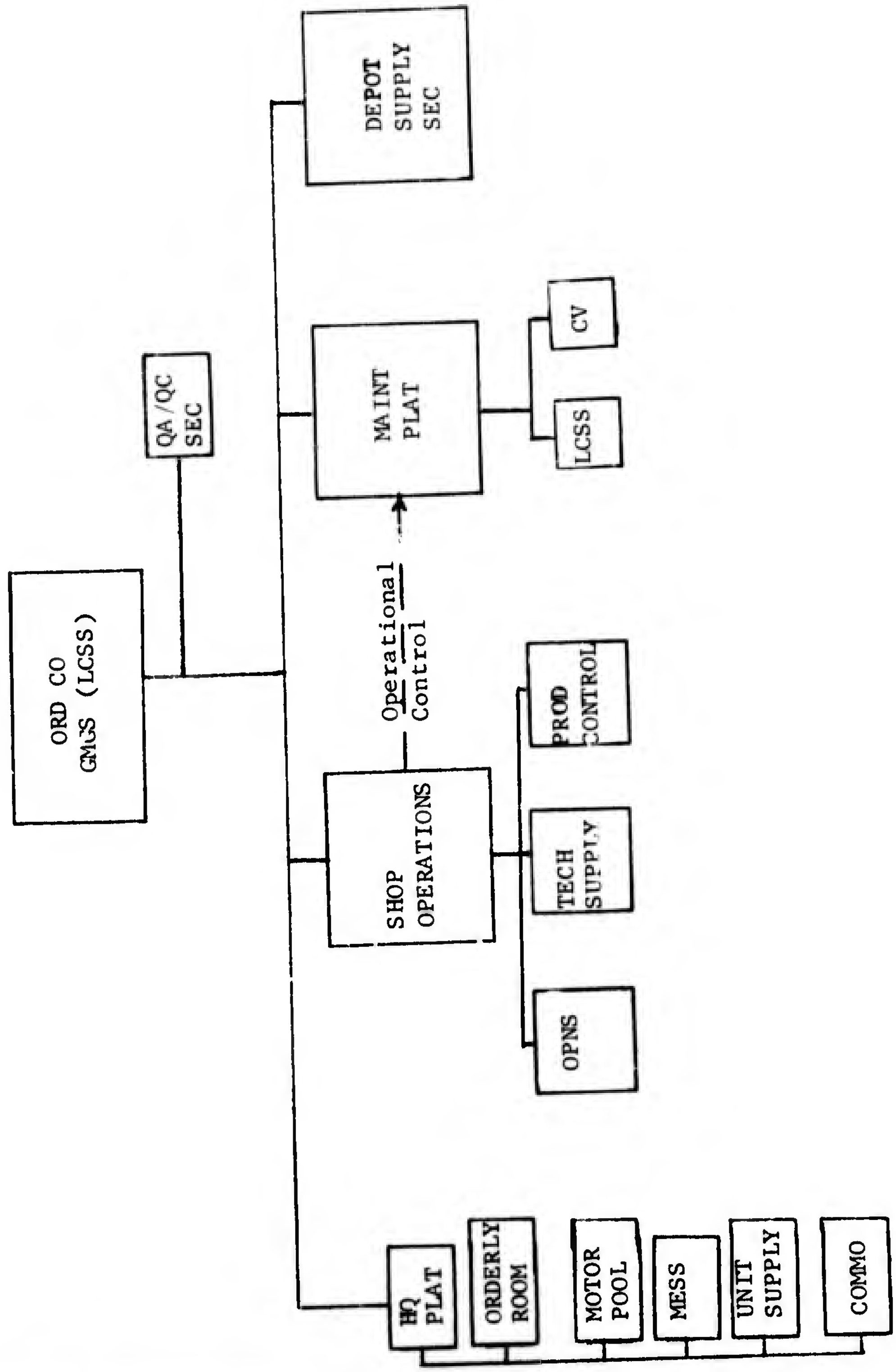
116th ORD DET (LCSS) (GERMANY)



FOR OFFICIAL USE ONLY

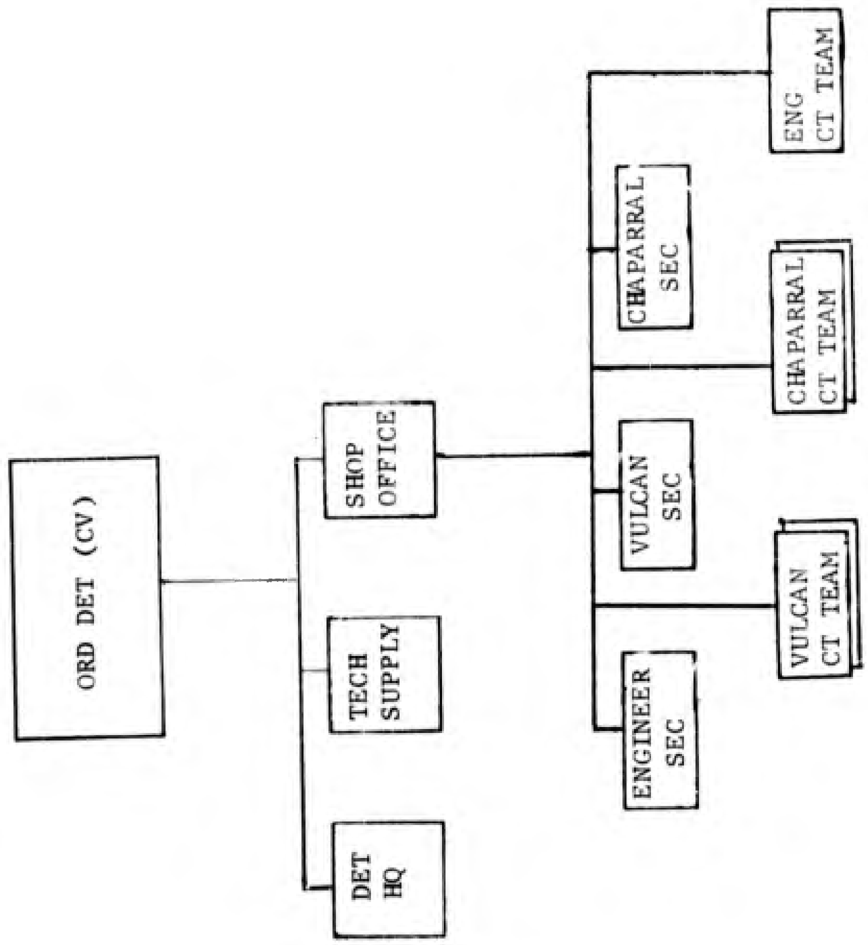
FOR OFFICIAL USE ONLY

563rd ORD GMGS CO (LCSS) (GERMANY)



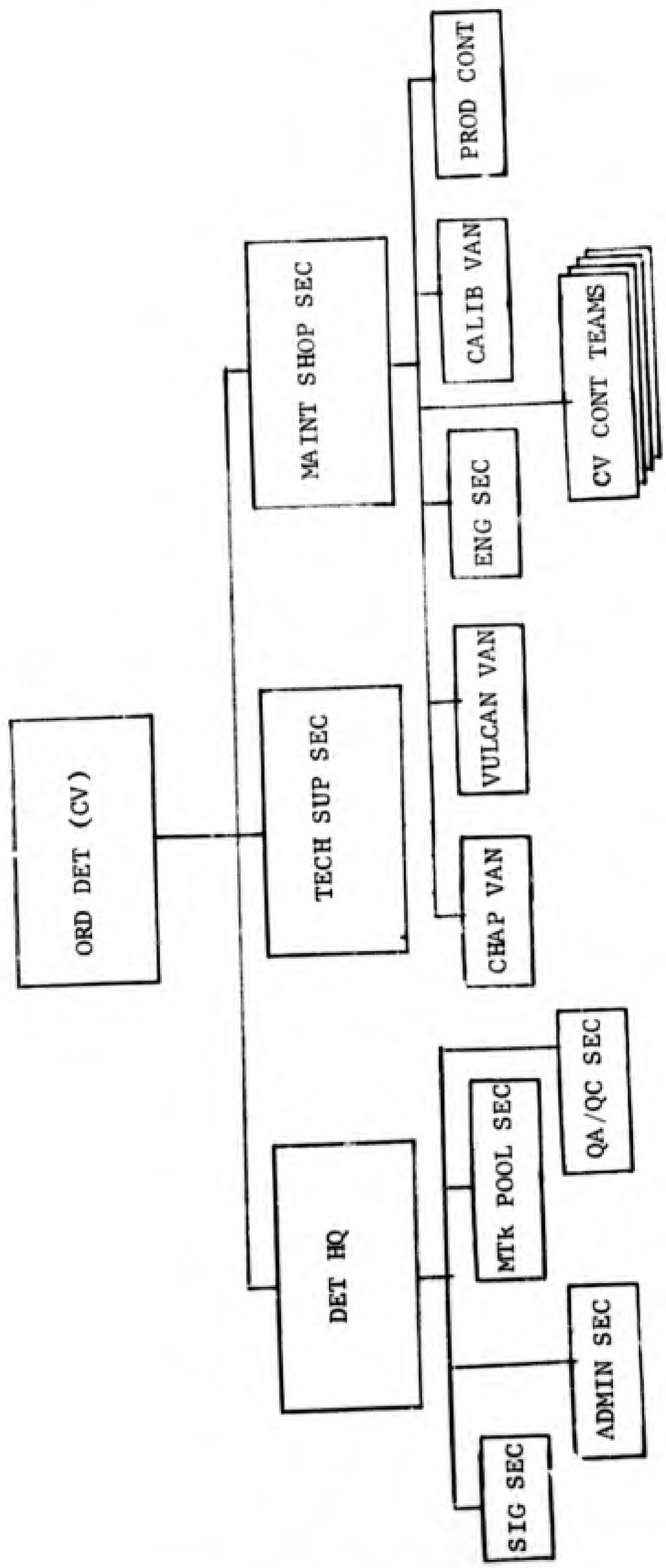
FOR OFFICIAL USE ONLY

280th ORD DET (CV) (GERMANY)



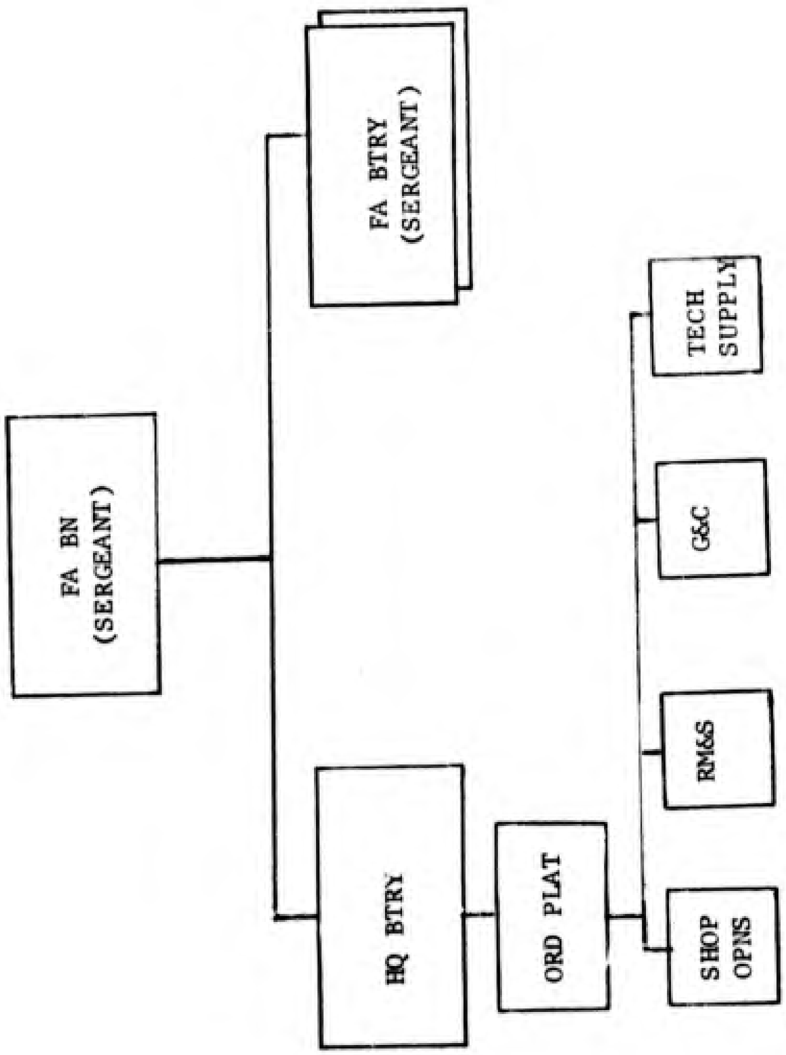
FOR OFFICIAL USE ONLY

92nd ORD DET (CV) (GERMANY)



FOR OFFICIAL USE ONLY

3rd BN, 81st ARTY (SERGEANT) (KOREA)



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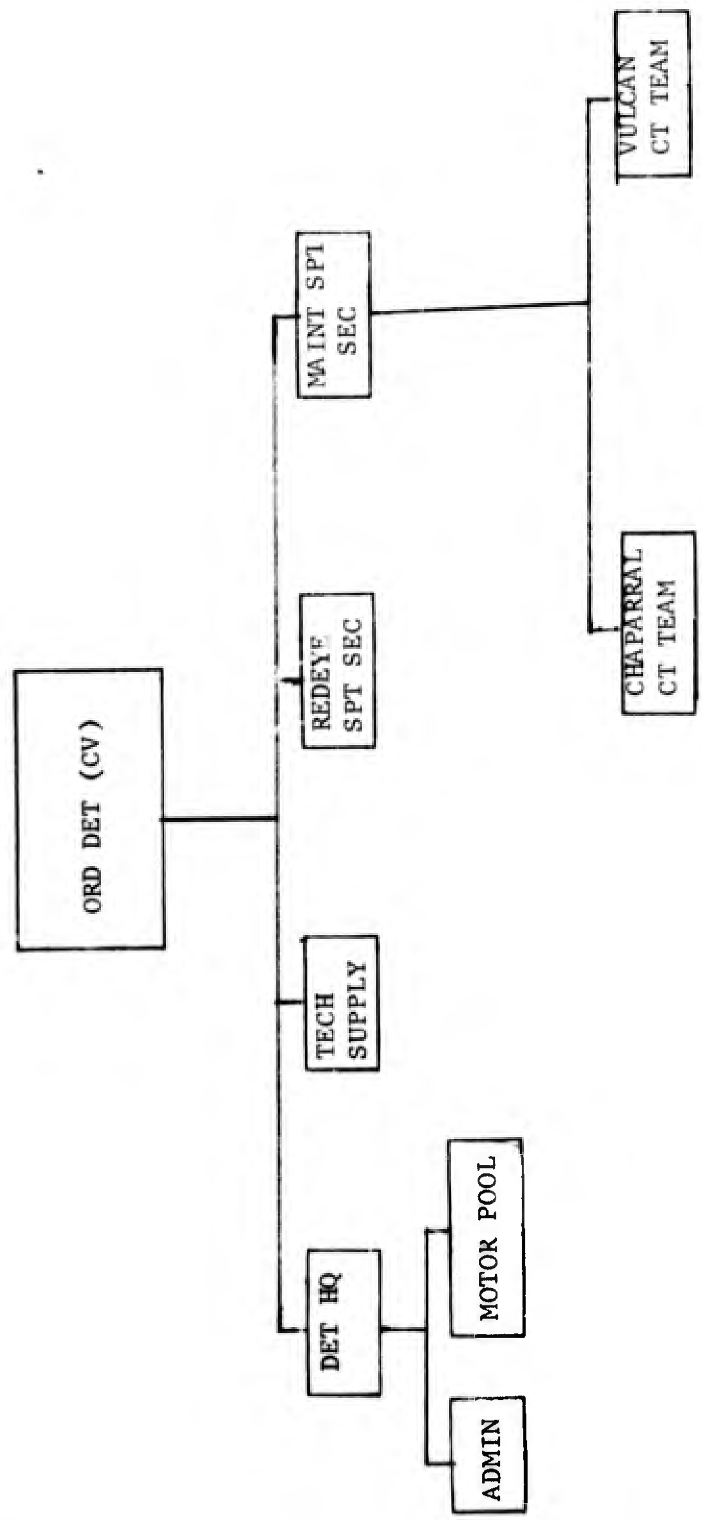
30th ORD GMGS CO (SERGEANT) (KOREA)

SEE INCL 1-18

90th ORD DET (CV) (KOREA)



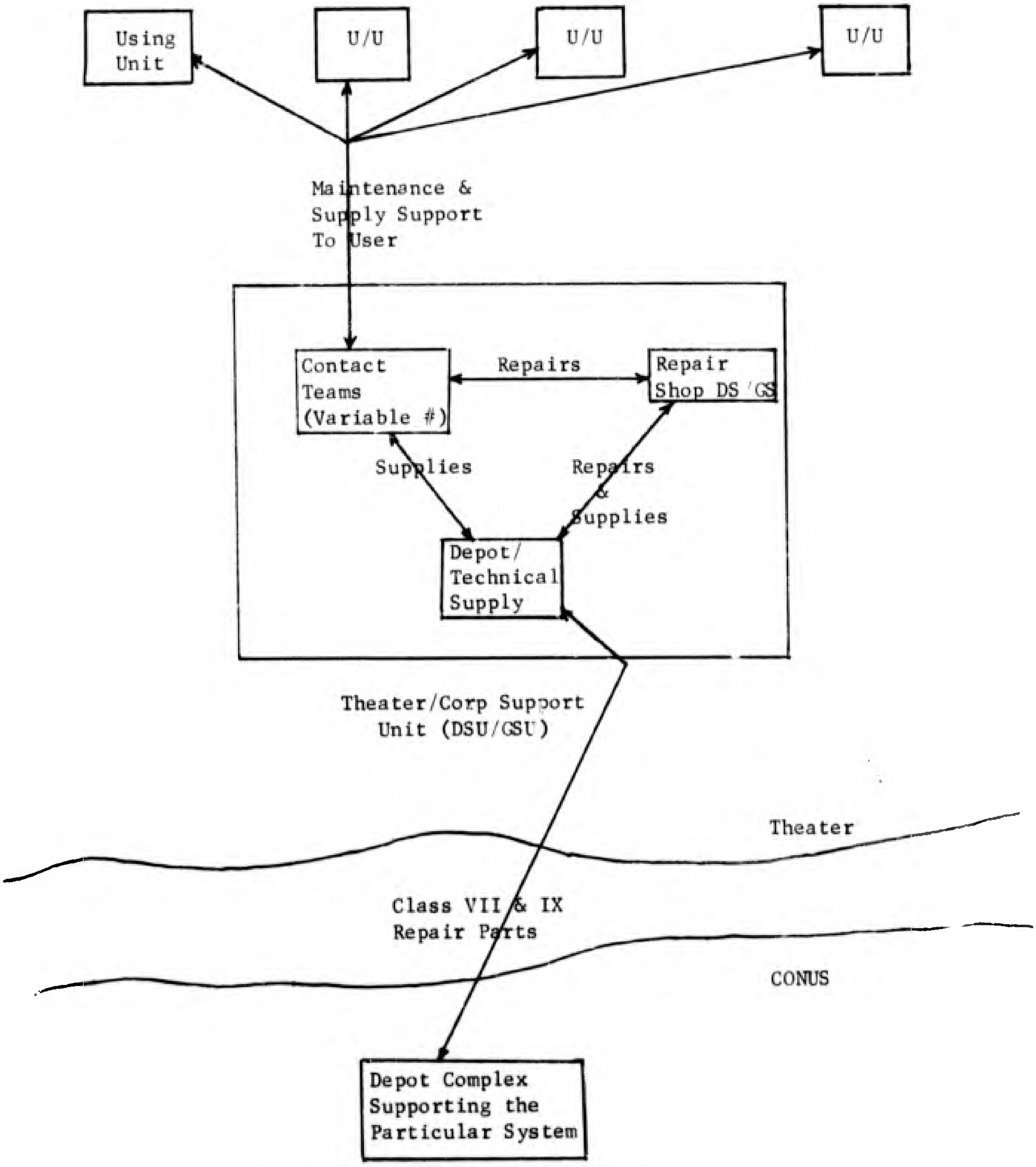
DSU/GSU PRIME MOVER AUTHORIZATION

The impact of large numbers of vehicles versus the number of personnel assigned to DSU/GSU has placed a heavy maintenance workload on missile support units. The ratio of men per prime mover is displayed below:

TYPE UNIT	*PERSONNEL ASSIGNED	VEHICLES AUTHORIZED	MEN/ VEHICLE
LCSS DSU	65	37	1.8
LCSS DSU	82	41	2.0
SGT DSU	15	17	.9
SGT DSU	27	17	1.6
SGT DSU	16	19	.9
SGT GSU	114	55	2.1
PERSH DSU	130	42	3.1
PERSH DSU	141	42	3.4
PERSH DSU	112	42	2.6
PERSH GSU	355	45	7.9
CV DSU	41	20	2.1
TOTAL	1098	377	2.9

*Actual assigned strength at time of visit, includes EM only. The DA TOE authorizations versus the actual strength at the time of visit shows that the actual impact on the field is 2.9 men per vehicle.

RECOMMENDED MISSILE SUPPORT STRUCTURE



IMPLEMENTED VERSUS CURRENT TOE

The chart below depicts the TOE the visited units were organized under versus the current series DA TOE at the time of the visit. Only 4 of the 17 units were organized under the current series TOE.

TYPE SUPPORT UNIT	TOE NOW USING	MTOE YES	MTOE NO	CURRENT TOE	ORGANIZED UNDER CURRENT TOE YES	ORGANIZED UNDER CURRENT TOE NO
USAREUR						
SERGEANT DSU	6-556T	X		6-556G		X
SERGEANT DSU	6-556T	X		6-556G		X
SERGEANT GSU	9-227E	X		9-59G		X
PERSHING DSU	6-619G	X		6-619G	X	
PERSHING DSU	6-619G	X		6-619G	X	
PERSHING DSU	6-619G	X		6-619G	X	
PERSHING GSU	9-227E	X		9-58G		X
LCSS DSU	9-550T	X		9-550G		X
LCSS DSU	9-550T	X		9-550G		X
LCSS GSU	9-550T	X		9-550G		X
CHAP/VULCAN DSU	9-550T	X		9-550G		X
CONUS						
LCSS DSU	9-550T	X		9-550G		X
LCSS DSU	9-550T	X		9-550G		X
LCSS DSU	9-550T	X		9-550G		X
EIGHTH ARMY						
SERGEANT DSU	6-556G	X		6-556G	X	
SERGEANT GSU	9-227E	X		9-59G		X
CHAP/VULCAN DSU	9-550T	X		9-550G		X

SERGEANT DS/GS FILL OF TECHNICAL MOS

The table below show the actual fill of Sergeant MOS at DS & GS level at the time of the visit:

UNIT	MOS	AUTH	OH	%FILL
GS # 1	21R	7	1	18
	21S	8	5	63
	21T	34	22	65
	46L	13	13	100
	21A	13	0	0
Total Tech MOS		75	41	55%
GSU # 2	21R	No data, CO says, "Cannot get replacements. Critically short, cannot maintain operations."		
	21S			
	21T			
	46L			
	21A			
DSU # 1	21R	5	0	0
	21S	6	3	50
	21T	5	2	40
	46L	8	3	37
	21A	(Data not available)		
Total Tech MOS		24	8	33%
DSU # 2	21R	5	4	80
	21S	6	5	84
	21T	5	2	40
	46L	8	8	100
	21A	3	0	0
Total Tech MOS		27	19	70%
DSU # 3	21R	2	1	50
	21S	3	0	0
	21T	4	4	100
	46L	5	3	60
	21A	3	0	0
Total Tech MOS		17	8	47%

PERSONNEL UTILIZATION

This inclosure provides a listing of those personnel who were assigned a duty or position which did not coincide with their assigned MOS.

PMOS	DMOS	ACTUAL JOB
4200	4516	Detachment Commander
1542	4516	Shop Officer
0505	4516	Shop Officer
4516	4516	Installation Coordinator
15E	71T	PLL Clerk-Korea
21L	21L	Unit Mail Clerk
21M	21M	Document Clerk
21L	21L	Courier
21L	21L	Duty Roster Clerk
46N	46N	Re-Up NCO
46N	46N	Unit Police Clerk
21L	21L	Document Control Spec
76R	76R	Finance Clerk
76Q	76Q	Morning Report Clerk
46L	46L	Special Duty - Gymnasium
51L	51L	Special Duty - Gymnasium
51U	51U	Special Projects
46L	46L	Shop Operations
44C	44C	Ammunition Section
21M	21M	Orderly Room Clerk
21M	21M	Special Duty - Post Engineer
21M	21M	Special Duty - Post Engineer
46N	46N	Orderly Room Clerk
21L	21L	Repair and Utilities
46N	46N	Security Guard
21L	21L	Security Guard
21M	21M	Technical Supply
21L	21L	Battery Supply
21M	21M	Repair and Utilities
46N	46N	Special Duty - Education Center
21L	21L	Repair and Utilities
21L	21L	Technical Supply
21A	21A	Battalion S-4 Section
27G	27G	Shop Clerk
27G	27G	Technical Supply
27G	27G	Technical Supply
27H	27H	Technical Supply
27H	27H	Technical Supply
27H	27H	Motor Sergeant
27H	27H	PLL Clerk

PMOS	DMOS	ACTUAL JOB
27H	27H	TAMMS Clerk
27H	27H	Motor Pool
27H	27H	Special Duty - Installation
27H	27H	Special Duty - Installation
27B	27B	Swimming Instructor
27G	27G	Training NCO

MANHOURS EXPENDED

The following is a listing of manhours expended per month based on a 30 day month, 8 hours per day. The details column includes personnel working full time out of their MOS. It is the feeling of the evaluator that the figures are lower than what is actually expended in the area of details.

EUROPE

TYPE UNIT	KP	GUARD	DETAILS	TOTAL EXPENDED	TOTAL AVAILABLE
SERGEANT GSU	0	1,000	1,296	2,296	27,360
SERGEANT DSU	0	240	96	336	3,600
SERGEANT DSU	72	480	504	1,056	6,380
PERSHING GSU	0	1,440	2,340	3,780	85,200
PERSHING DSU	480	1,440	4,848	6,768	31,200
PERSHING DSU	0	1,950	5,820	7,770	33,840
PERSHING DSU	0	2,400	4,300	6,700	26,880
LCSS GSU	720	1,200	7,264	9,184	31,200
LCSS DSU	240	0	1,096	1,336	16,800
LCSS DSU	240	240	902	1,382	15,600
CV DSU	240	0	240	480	12,720
TOTAL	1,992	10,390	28,706	41,088	290,180
Percent	1%	3.6%	9.9%	14.5%	------

CONUS

TYPE UNIT	KP	GUARD	DETAILS	TOTAL EXPENDED	TOTAL AVAILABLE
LCSS DSU	130	120	306	556	15,000 (approx)
LCSS DSU	128	0	488	616	14,880
LCSS DSU	328	0	352	680	14,880
TOTAL	586	120	1,146	1,852	44,760
Percent	1.3%	.3%	2.6%	4.2%	-----

KOREA

TYPE UNIT	KP	GUARD	DETAILS	TOTAL EXPENDED	TOTAL AVAILABLE
CV DSU	0	1,488	1,308	2,796	9,720
SGT DSU	0	480	584	1,064	3,840
TOTAL	0	1,968	1,892	3,860	13,560
Percent	0%	14.5%	13.9%	28.4%	-------

WORLDWIDE

TYPE UNIT	KP	GUARD	DETAILS	TOTAL EXPENDED	TOTAL AVAILABLE
Europe	1,992	10,390	28,706	41,088	290,780
CONUS	586	120	1,146	1,852	44,880
Korea	0	1,968	1,892	3,860	13,560
TOTAL	2,578	12,478	31,744	46,800	349,220
Percent	.7%	3.6%	9.1%	14.4%	-------

ORGANIZATION FOR QC AT DSU/GSU LEVEL

This organization was suggested by the Pershing General Support Company:

DUTY POSITION	GRADE	MOS	RQD
QC Officer	WO	241F	1
QC NCOIC	E8 (NC)	21L50	1
Msl Insp G&C	E7 (NC)	21L40	3
Msl Insp Computer	E7 (NC)	21M40	3
Msl Insp E/M	E7 (NC)	46N40	3
Engineer Insp	E7 (NC)	52D40	2
Engineer Insp	E7 (NC)	62C40	2
Commo Insp	E7 (NC)	31E40	2
Commo Insp	E7 (NC)	26L40	2
Topo Inst Insp	E5	41B20	1
Clerk Typist	E4	76R20	1

This organization was suggested by a Pershing DSU:

DUTY POSITION	GRADE	MOS	RQD
QC NCOIC	E7	21L40	1
Msl Insp G&C	E6	21L20	2
Msl Insp E/M	E6	46N20	2
Msl Insp Computer	E6	21M20	2

Evaluator Note: Engineer and communications equipment inspectors need to be added to this organization.

CLERICAL POSITIONS IN FIELD UNITS

The following is a listing of clerical positions which are utilized by units in field. Only a small sample of the units visited provided the evaluators with this type of data.

GSU # 1

POSITION	NUMBER OF CLERKS
Orderly Room	8
Maintenance Shop	3

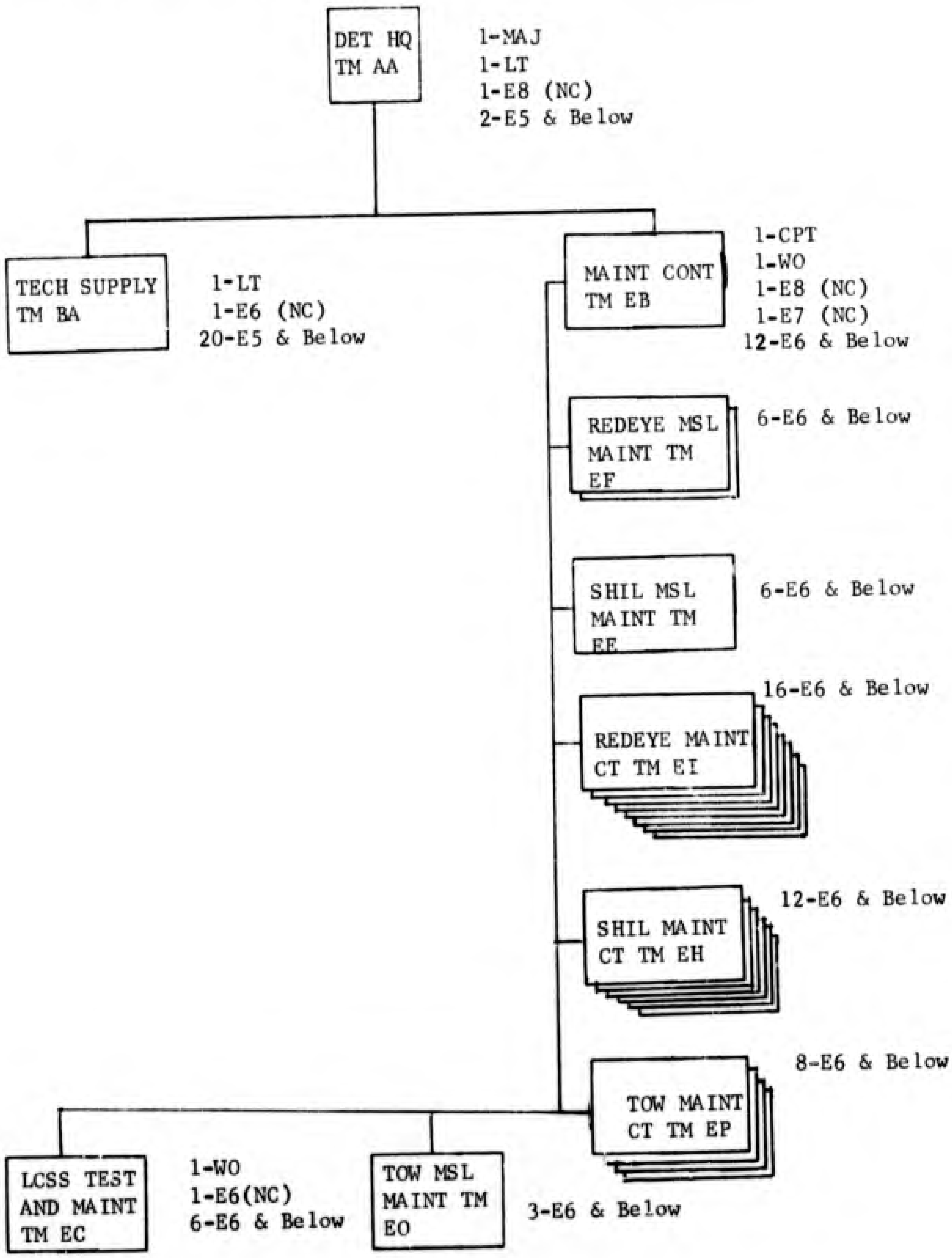
GSU # 2

POSITION	NUMBER OF CLERKS
Orderly Room	1
Maintenance Shop	3

GSU # 3

POSITION	NUMBER OF CLERKS
Orderly Room	7 (2 mail clerks)
Maintenance Shop	2 (1 publication clerk)

STRUCTURE OF TOE 9-550G
The Organization of an LCSS DSU as Suggested by TOE 9-550G



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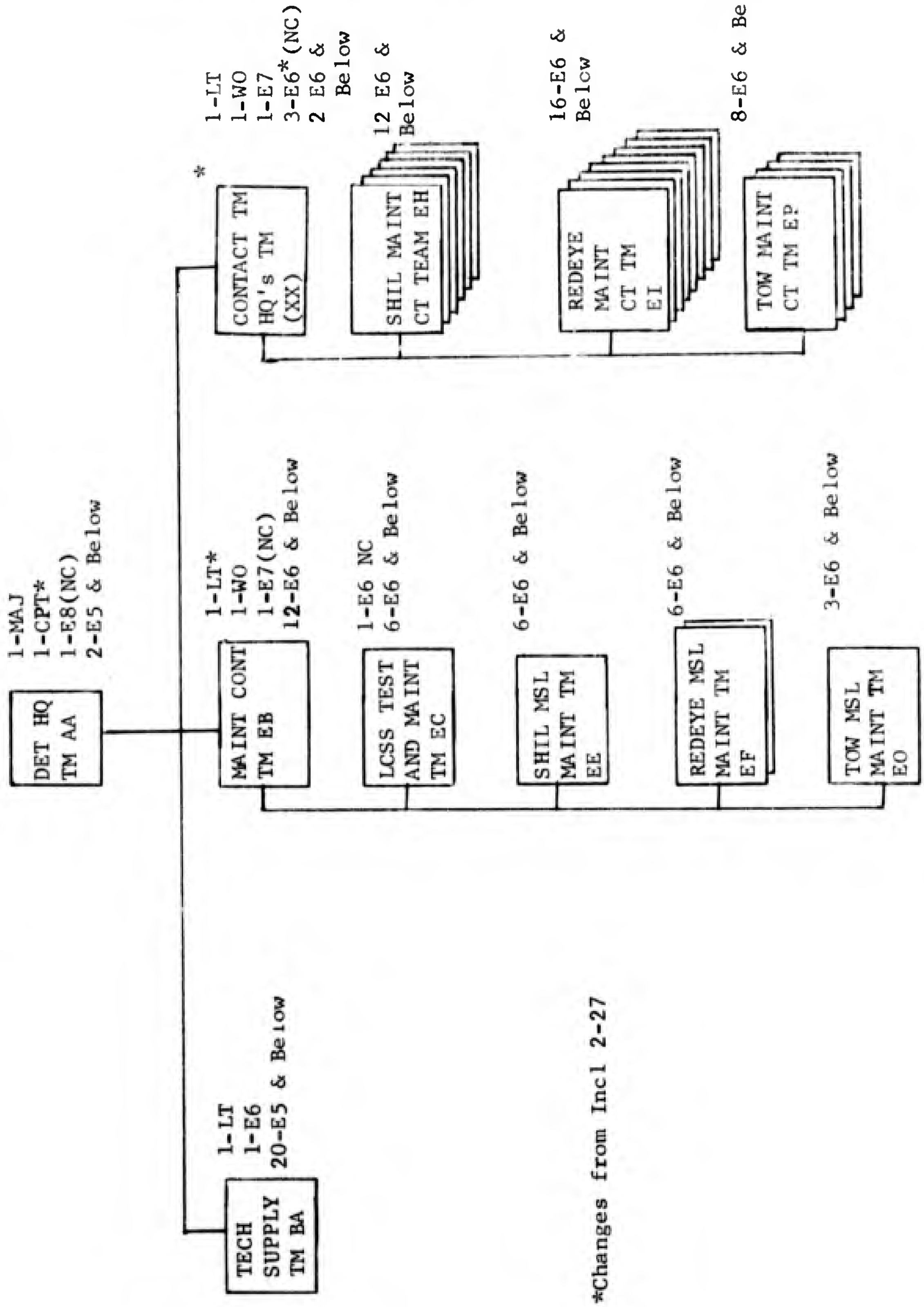
RESTRUCTURE OF TOE 9-550G
The Organization of an LCSS DSU as Recommended



*Changes from Incl 2-27

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LAND COMBAT DSU TECH SUPPLY STOCKAGE
AND WORKLOAD DATA

UNIT	STOCKAGE: ASL LINES (LESS DX)	STOCKAGE: DX LINES	STOCKAGE: ASL TOTAL	WORKLOAD: AVG RQNS RECEIVED PER MONTH	WORKLOAD: AVG RQNS SUBMITTED OR PASSED PER MONTH	WORKLOAD: AVG ISSUES PER MONTH
DSU 1 (PERSHING)	1758	288	2046	450	505	295
DSU 2 (PERSHING)	1920	295	2215	750	427	450
DSU 3 (PERSHING)	1589	302	1891	927	149	469
DSU 4 (SGT)	198	428	626	114	32	N/A
DSU 5 (SGT)	678	344	1023	169	69	56
DSU 6 (SGT)	433	40	473	N/A	70	54
DSU 7 (LCSS)	149	175	324	146	164	65
DSU 8 (LCSS)	597	110	707	60	50	20
DSU 9 (LCSS)	1008	0	1008	N/A	N/A	N/A
DSU 10 (C/V)	486	0	486	N/A	200	80
DSU 11 (C/V)	1810	0	1810	366	314	51

LAND COMBAT DSU TECH SUPPLY STAFFING

UNIT	WO	ENL SUPV	REPAIR PARTS SP	REPAIR PARTS CLERK	REPORTS CLERK	PACKING & CRATING	TOTAL
DSU 1 (PERSHING)	1	3	11	6	1	0	22
DSU 2 (PERSHING)	1	3	11	6	1	0	22
DSU 3 (PERSHING)	1	3	11	6	1	0	22
DSU 4 (SGT)	0	1	5	2	0	0	8
DSU 5 (SGT)	0	1	5	2	0	0	8
DSU 6 (SGT)	0	1	4	2	0	0	7
DSU 7 (LCSS)	0	0	4	1	0	0	5
DSU 8 (LCSS)	0	0	4	1	0	0	5
DSU 9 (LCSS)	0	1	8	4	0	1	14
DSU 10 (C/V)	0	1	6	0	0	1	8
DSU 11 (C/V)	0	1	6	0	0	1	8

NUMBER OF ASL LINES PER STOCK CONTROL AND WAREHOUSING SPECIALIST IN LAND COMBAT DSU

	ASL LINES PER STOCK CONTROL SP	ASL LINES PER WAREHOUSE SPECIALIST
DSU 1 (PERSHING)	424	332
DSU 2 (PERSHING)	459	359
DSU 3 (PERSHING)	392	306
DSU 4 (SGT)	286	223
DSU 5 (SGT)	467	364
DSU 6 (SGT)	270	210
DSU 7 (LCSS)	185	144
DSU 8 (LCSS)	404	314
DSU 9 (LCSS)	288	224
DSU 10 (C/V)	185	144
DSU 11 (C/V)	688	537

NUMBER OF REPAIR PARTS SPECIALISTS REQUIRED
BY APPLICATION OF MACRIT

	STOCK # CONTROL	WAREHOUSE *	TOTAL	ACTUAL
DSU 1 (PERSHING)	9	12	21	11
DSU 2 (PERSHING)	10	13	23	11
DSU 3 (PERSHING)	9	11	20	11
DSU 4 (SGT)	3	4	7	5
DSU 5 (SGT)	5	6	11	5
DSU 6 (SGT)	2	3	5	4
DSU 7 (LCSS)	2	2	4	4
DSU 8 (LCSS)	3	4	7	4
DSU 9 (LCSS)	5	6	11	8
DSU 10 (C/V)	2	3	5	6
DSU 11 (C/V)	8	11	19	6

MACRIT = 1 indiv/200 lines
* MACRIT = 1 indiv/172 lines

TYPICAL RECURRING REPORTS SUBMITTED BY A TECH SUPPLY IN USAREUR

DIRECT SUPPORT

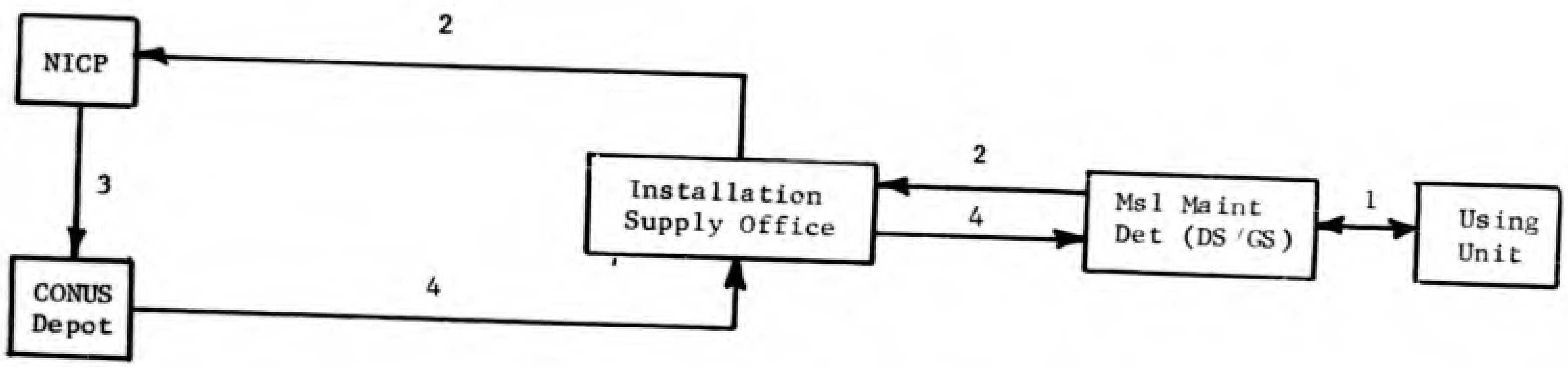
REPORT	FREQUENCY	TO
1. ADPE Utilization Report	Daily	Bn
2. Mechanized Stock Record Accounting Management Report	Daily	COSCOM
3. DS Supply Support Test	Weekly/ Monthly	MATCOM
4. Review of Requisitions Rejected by MATCOM	Weekly	Bn
5. Supply Activity Stock Status and Performance Report	Monthly	COSCOM
6. Stock Status Report (ZZA Cards)	Monthly	COSCOM
7. Due-In Reconciliation Report	Monthly	MATCOM
8. Review of Overage Requisitions	Monthly	COSCOM
9. DX Report	Monthly	COSCOM
10. Inventory Adjustment Report	Quarterly	COSCOM
11. Unit Readiness Report	Quarterly	DA
12. Review of High Dollar Requisitions (Telephonic)	As Required	Corps
13. Report of Excesses	As Required	MATCOM
14. Location and Inventory Survey ("Count 5")	As Required	COSCOM

GENERAL SUPPORT

REPORT*	FREQUENCY	TO
1. Installation Supply Management Analysis Report	Monthly	AWSCOM
2. Project Clean Report	Unknown	AWSCOM

*In addition to most of the DS reports.

TYPICAL SUPPLY SUPPORT STRUCTURE FOR CONUS SUPPORT UNIT
(MEDIUM COST, HIGH DENSITY MISSILE SYSTEM)



LEGEND:
1. Direct exchange or DA Form 2407 Maintenance Request action.
2. Requisition for replenishment and fringe item repair parts.
3. Materiel Release Order.
4. Repair parts flow.

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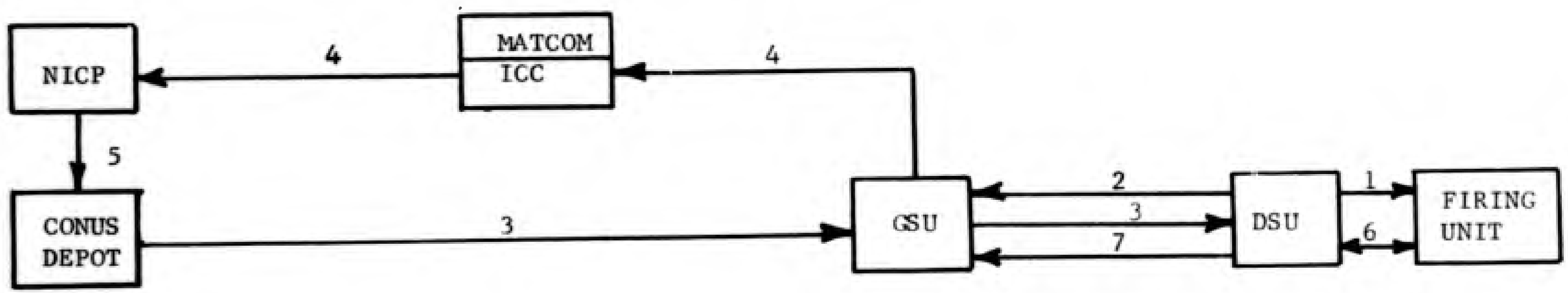
FLOW OF PERSHING 1A SYSTEM PECULIAR REPAIR PARTS IN USAREUR



LEGEND:

1. User resupply from DS unit.
2. Requisition for DS level stocks and passing of unfilled user requisitions.
3. Resupply of repair parts.
4. Requisition for GS level stocks and passing of unfilled DS and user requisitions.
5. Materiel Release Order.
6. Direct exchange of most PEMA Secondary Items with recoverability codes of R, S, and T.
7. Direct exchange with depot.

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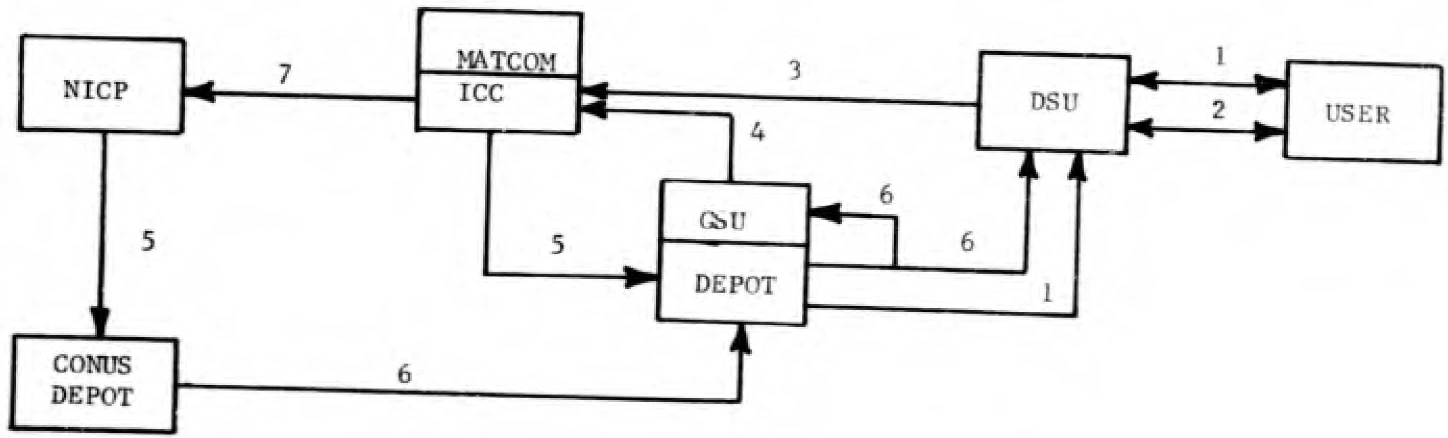
FLOW OF SERGEANT AND MEDIUM COST/HIGH DENSITY MISSILE SYSTEM
PECULIAR REPAIR PARTS IN USAREUR



LEGEND:
1. Direct exchange of assemblies.
2. User resupply from DS unit (very limited requirement).
3. Requisition for DS level stocks and passing of unfilled user requisitions.
4. Requisition from GSU tech supply for GS level stocks and unfilled shop requirements.
5. Materiel release order directing shipment of available stockage to the requisitioner.
6. Resupply of repair parts.
7. Requisition for repair parts not available in theater.

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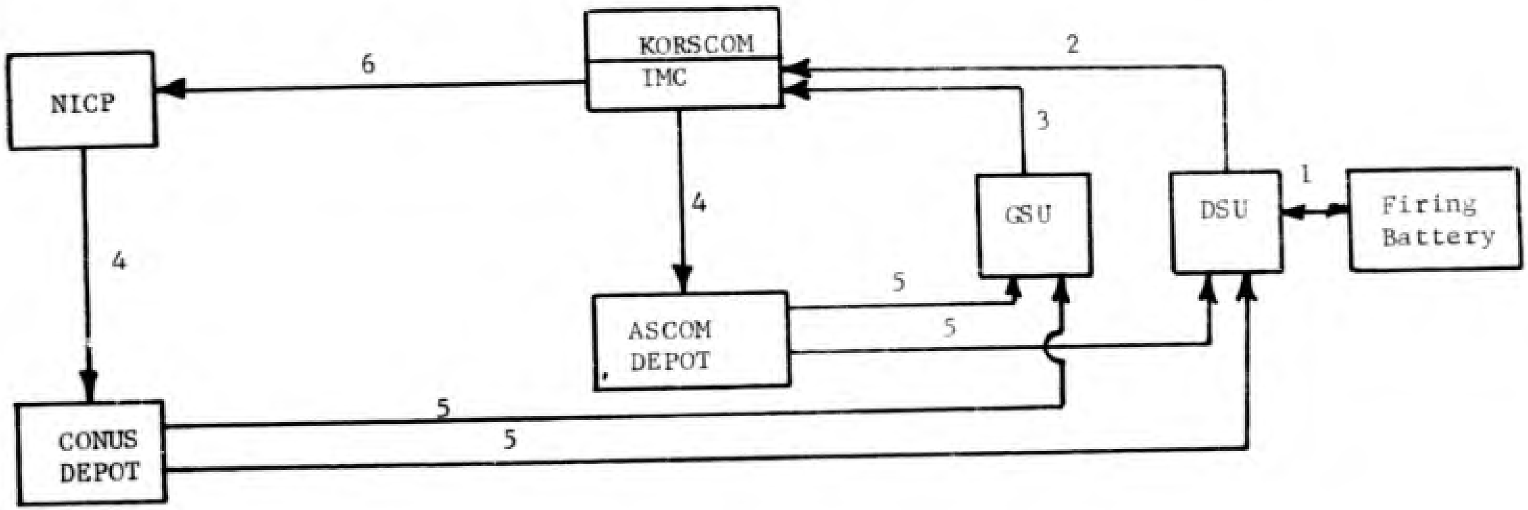
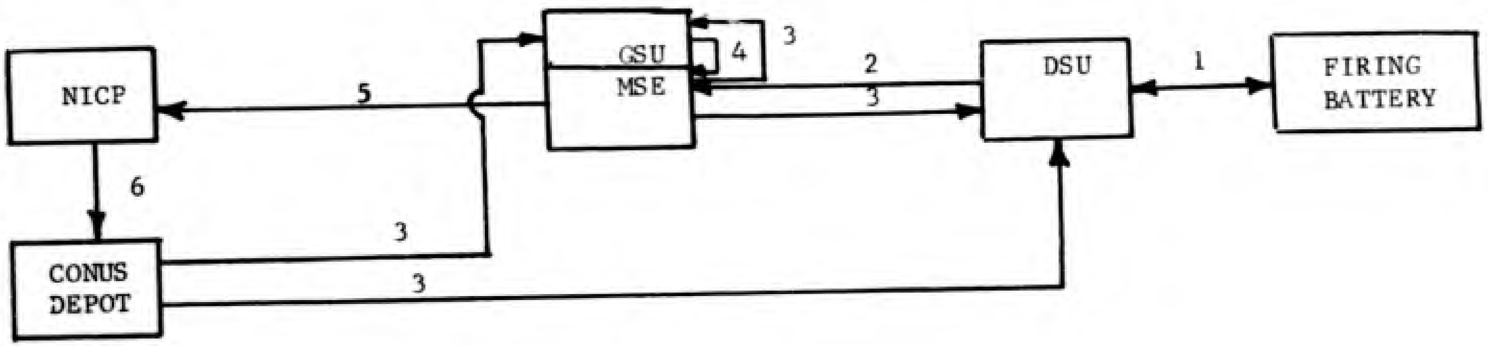
FLOW OF SERGEANT SYSTEM PECULIAR REPAIR PARTS IN EIGHTH ARMY (CURRENT)



LEGEND:

1. User resupply from DSU.
2. Requisition for DS level stocks and passing of unfilled user requisitions.
3. Requisition for GS level stocks.
4. Materiel release order directing shipment of available stockage to the requisitioner.
5. Resupply of repair parts.
6. Requisition for repair parts not available in theater and replenishment stocks.

FUTURE FLOW OF SERGEANT SYSTEM PECULIAR REPAIR PARTS IN EIGHTH ARMY



LEGEND:
1. User resupply from DSU.
2. Requisition for DS level stocks and passing of unfilled user requisitions.
3. Resupply of repair parts.
4. Requisition for GS level stocks.
5. Requisition for repair parts not available in theater and replenishment stocks.
6. Materiel release order directing shipment of available stockage to the requisitioner.

	PRODUCTION CONTROL					TECH SUPPLY	
	Await Parts	Evacuated	Other	TOTAL	Output 30 Day Average	Avg Rqns Submitted or Passed Per Month	Total of Open Rqns Beyond IPG Time Frame
DSU 1	136	26	135	297	N/A	505	1357
DSU 2	60	40	35	139	N/A	427	374
DSU 3	53	6	45	104	147	149	858
DSU 4	27	0	10	37	63	32	47
DSU 5	44	0	36	80	---	69	226
DSU 6	13	0	47*	61	23	70	210
DSU 7	36	0	22	58	194	164	19
DSU 8	22	0	59	81	170	50	8
DSU 9	25	0	22	57	42	---	----
DSU 10	42	0	23	65	91	200	----
DSU 11	78	0	20	98	34	314	----
GSU 1	115	0	221*	336	163	111	116
GSU 2	125	0	26	151	244	60	172
GSU 3	---	--	---	---	---	---	381

*Excessive backlogs in awaiting shop due to preparations for IG inspection.

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Data below provides an overview of the amount of effort expended on the technical assistance program in the field.

TECH ASSISTANCE VISIT

Person Making Visit	Frequency of Visits					
	Daily	Weekly	Monthly	Quarterly	Annually	Never
DSU Commanders	1	1		1	1	5
GSU Commanders				1		
Shop Warrant Officers	5	3	1	1		

Of particular impact is that of the five CO's who hever visit the supported unit, two of these were CO's of separate detachments which supported a wide variety of units located at widely dispersed sites.

3 - Series CONVENTIONAL AMMUNITION INCLOSURES

	CONUS							GERMANY							
Grade	SMAJ	MSG	SFC	SSG	SGT	SP5	TOTAL	SMAJ	MSG	SFC	SSG	SGT	SP5	TOTAL	SMAJ
MOS															
55B			1	7			8			3	18	2	5	28	
55C				1			1			1	1	1		3	
55D															
55G										1	1			2	
55X*											4			4	
55Z		1	2				3		1	7				8	
63B															
None Listed											2			2	
Total		1	3	8			12		1	12	26	3	5	47	
School Trained Ammo		1	2	3			6			2	5	1	3	11	
Not School Trained Ammo			1	3			4		1	6	16	2	2	27	
Unknown				2			2			4	5			9	
Total		1	3	6			12		1	12	26	3	5	47	

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ENLISTED STATISTICAL DATA

KOREA						VIETNAM							OKINAWA						
MSG	SFC	SSG	SGT	SP5	TOTAL	SMAJ	MSG	SFC	SSG	SGT	SP5	TOTAL	SMAJ	MSG	SFC	SSG	SGT	SP5	TOTAL
	4	9	3	2	18			4	8		3	15				2			
	1				1				1			1							
															1				
								1				1							
		1			1				1			1							
8	3				11	1	1	5	2			9	1	1	1				
	1		1		2														
8	9	10	4	2	33	1	1	10	12		3	27	1	1	2	2			
2	3	4	2		11	1		3	1			5	1	1	1				
5	6	4	2	2	19			6	11		3	20			1	2			
1		2			3		1	1				2							
8	9	10	4	2	33	1	1	10	12		3	27	1	1	2	2			

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NAWA				ALASKA							RECAPULATION						
SSG	SGT	SP5	TOTAL	SMAJ	MSG	SFC	SSG	SGT	SP5	TOTAL	SMAJ	MSG	SFC	SSG	SGT	SP5	TOTAL
2			2				4			4			12	48	5	10	75
													2	3	1		6
			1										1				1
													2	1			3
														6			6
			3			1				1	2	12	19	2			35
													1		1		2
														2			2
2			6			1	4			5	2	12	37	62	7	10	130
			3				1			1	2	4	11	14	3	3	37
2			3			1	3			4		6	21	39	4	7	77
												2	5	9			16
2			6			1	4			5	2	12	37	62	7	10	130

Inclosure 3-1

CONUS

Grade	COL	LTC	MAJ	CPT	1/LT	2/LT	CW4	CW3	CW2	TOTAL	BG	COL	LTC	MAJ
MOS														
261														
411A							1	1	8	10				
1193														
1542														
4201				1						1				
4514					1	2				3				2
4515		2								2		2	4	1
4516				1						1				1
4517														1
4815														
9224														
None Listed		1								1	1			
Total		3		2	1	2	1	1	8	18	1	2	4	5
School Trained Ammo		2			1	2				5		2	4	3
Not School Trained Ammo				2			1	1	8	12				1
Unknown		1								1	1			1
Total		3		2	1	2	1	1	8	18	1	2	4	5

				GERMANY											KOREA				
BG	COL	LTC	MAJ	CPT	1/LT	2/LT	CW4	CW3	CW2	TOTAL	COL	LTC	MAJ	CPT	1/LT	2/LT	CW4	CW3	CW2
							1	1	5	7									2
														1					
				1						1	1			1					
				1						1					1				
			2	4	5	6				17			1	3	3	1			
	2	4	1	1						8	1	1	3						
			1	1						2				2					
			1	1						2			1	2	1				
1										1		1			1				
1	2	4	5	9	5	6	1	1	5	39	2	2	5	9	6	1			2
	2	4	3	6	5	6	1		3	30	1	1	5	7	4	1			
			1	3				1	2	7	1			2	1				1
1			1							2		1			1				1
1	2	4	5	9	5	6	1	1	5	39	2	2	5	9	6	1			2

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OFFICE STATISTICAL DATA

A VIETNAM O

2/LT	CW4	CW3	CW2	TOTAL	COL	LTC	MAJ	CPT	1/LT	2/LT	CW4	CW3	CW2	TOTAL	COL	LTC	MAJ	CPT
			2	2							2	1	2	5				
				1														
				2														
				1				1						1				
1				8			2	4	3					9				1
				5	2	4	5	2						13		1	1	1
				2														
				4			1	3						4				
								1						1				
							1	3						4				
				2	1									1				
1			2	27	3	4	9	14	3		2	1	2	38		1	1	2
1				19	2	4	9	13	3			1	2	34		1	1	2
			1	5				1			2			3				
			1	3	1									1				
1			2	27	3	4	9	14	3		2	1	2	38		1	1	2

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DATA

OKINAWA										ALASKA									
COL	LTC	MAJ	CPT	1/LT	2/LT	CW4	CW3	CW2	TOTAL	COL	LTC	MAJ	CPT	1/LT	2/LT	CW4	CW3	CW2	TOTAL
						1		1	2										
								1	1							1		1	2
			1	2					3				1						1
	1	1	1						3										
	1	1	2	2		1		2	9				1			1		1	3
	1	1	2	2				1	7				1			1			2
						1		1	2									1	1
	1	1	2	2		1		2	9				1			1		1	3

E ONLY

KA

RECAPULATION

2/LT	CW4	CW3	CW2	TOTAL	BG	COL	LTC	MAJ	CPT	1/LT	2/LT	CW4	CW3	CW2	TOTAL
												1		1	2
	1		1	2								5	3	19	27
									1						1
						1			2						3
									3	1					4
				1				5	13	14	9				41
						5	12	10	4						31
								1	4						5
								3	6	1					10
									1						1
								1	3						4
					1	1	2			1					5
	1		1	3	1	7	14	20	37	17	9	6	3	20	134
	1			2		5	12	18	29	15	9	2	1	6	97
			1	1		1		1	8	1		4	2	13	30
					1	1	2	1		1				1	7
	1		1	3	1	7	14	20	37	17	9	6	3	20	134

Organizations Contacted	CONUS				GERMANY					
	8th Ord Co	Ft. Bragg Garrison ASP	608th Ord Co	Ft. Benning	15th Ord Bn	84th Ord Bn	101st Ord Bn	144th Ord Co	184th Ord Co	501st Ord Co
TOE	9-17	TDA	9-17	TDA	9-86F	9-86G	9-86F	9-17E	9-17G	9-1
Modified by MTOE	Yes	N/A	No	N/A	Yes	Yes	Yes	Yes	Yes	Yes
Number of Storage Areas	N/A	1	N/A	1	N/A	64	1	2	2	
Level of Maintenance	N/A	DS	N/A	DS	N/A	DS	N/A	DS	DS	DS
Stockage Level Short Tons	N/A	3750	N/A	1750	N/A[7]	140000[6]	N/A[7]	540	13680[6]	N/
Line Numbers Stocked	N/A	1060	N/A	450	N/A[7]	157[6]	N/A[7]	950	100[6]	N/
Lot Numbers Stocked	N/A	3226	N/A	1300	N/A[7]	6400[6]	N/A[7]	100	250[6]	N/
Number Transactions Average Monthly	N/A	350	N/A	2600	N/A[7]	400[6]	N/A[7]	800	35[6]	N/
Tonnage Rewarehoused Average Monthly	N/A	2800	N/A	75	N/A	700[6]	N/A	UNK	150[6]	N/

	GERMANY							OKINAWA							
[illegible] Ord Bn	101st Ord Bn	144th Ord Co	184th Ord Co	501st Ord Co	663rd Ord Co	Miesau Army Depot	HQ USAEUR	196th Ord Bn	137th Ord Co	175th Ord Co	Chibana Army Depot	2nd Logistical Command	HQ USARYIS	23rd Direct Support Group	6th Ord Bn
86G	9-86F	9-17E	9-17G	9-17G	9-17E[1]	TDA	TDA	9-86G	9-48G	9-17G	TDA	TDA	TDA	29-202	9-36G
s	Yes	Yes	Yes	Yes	Yes	N/A	N/A	Yes	Yes	No	N/A	N/A	N/A	Yes	Yes
64	1	2	2	2	2	1	N/A	1[2]	N/A	N/A	1	N/A	N/A	N/A	1[3]
	N/A	DS	DS	DS	DS	GS	N/A	GS	DS	GS	GS	N/A	N/A	N/A	N/A
0000[6]	N/A[7]	540	13680[6]	N/A[6]	UNK	218000	N/A	UNK[9]	UNK[9]	UNK[9]	UNK[9]	N/A	N/A	N/A	N/A[7]
157[6]	N/A[7]	950	100[6]	N/A[6]	UNK	1200	N/A	UNK[9]	UNK[9]	UNK[9]	UNK[9]	N/A	N/A	N/A	N/A[7]
6400[6]	N/A[7]	100	250[6]	N/A[6]	UNK	11500	N/A	UNK[9]	UNK[9]	UNK[9]	UNK[9]	N/A	N/A	N/A	N/A[7]
400[6]	N/A[7]	800	35[6]	N/A[6]	UNK	20000	N/A	UNK[9]	UNK[9]	UNK[9]	UNK[9]	N/A	N/A	N/A	N/A[7]
700[6]	N/A	UNK	150[6]	N/A[6]	UNK	3500	N/A	UNK[9]	UNK[9]	UNK[9]	UNK[9]	N/A	N/A	N/A	N/A[7]

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ORGANIZATIONAL STATISTICAL DATA

	KOREA														
HQ USARYIS	23rd Direct Support Group	6th Ord Bn	83rd Ord Bn	7th Ord Co	55th Ord Co	58th Ord Co	609th Ord Co	696th Ord Co	833rd Ord Co	2nd Inf Div Sup Cmd	HQ KORSCOM	HQ 8th US Army	3rd Ord Bn	191st Ord Bn	40th Ord Co
TDA	29-202	9-36G	9-86G	9-47E	9-17G	9-17G	9-38G	9-17G[1]	9-48G	29-1	TDA	TDA	9-86F	9-86F	9-1
N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	Yes	Yes	Yes
N/A	N/A	1[3]	N/A	1	1	1	1	3	1	N/A	N/A	N/A	1	1	
N/A	N/A	N/A	N/A	DS	GS	GS	GS	GS	GS	N/A	N/A	N/A	N/A	N/A	DS
N/A	N/A	N/A[7]	N/A[7]	N/A	27240	N/A[8]	18000	13181	N/A	N/A	N/A	N/A	31056	30561	UNK
N/A	N/A	N/A[7]	N/A[7]	N/A	1350	N/A[8]	UNK	463	N/A	N/A	N/A	N/A	UNK	2500	UNK
N/A	N/A	N/A[7]	N/A[7]	N/A	2550	N/A[8]	2550	2200	N/A	N/A	N/A	N/A	1829	8000	UNK
N/A	N/A	N/A[7]	N/A[7]	N/A	UNK	N/A[8]	200	350	N/A	N/A	N/A	N/A	981	1100	UNK
N/A	N/A	N/A[7]	N/A[7]	N/A	5212	UNK	150	N/A[10]	N/A	N/A	N/A	N/A	UNK	150	UNK

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VIETNAM													ALASKA	
3rd Ord Bn	191st Ord Bn	40th Ord Co	60th Ord Co	71st Ord Co	78th Ord Det	182nd Ord Det	504th Ord Det	576th Ord Co	606th Ord Co	611th Ord Co	DaNang Sup Cmd	HQ USARV	HQ USA Garrison Ft. Richardson	HQ USA Garrison Ft. Wainwright
9-86F	9-86F	9-17	9-17G	9-17G	9-530G	9-500D	9-530G	9-17G	9-17G	9-17G	TDA	TDA	TDA	TDA
Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A
1	1	1	N/A[4]	N/A[4]	N/A[4]	N/A	N/A[4]	N/A[4]	N/A[4]	N/A[4]	4	N/A	1	1
N/A	N/A	DS	N/A[5]	N/A[5]	DS	N/A	DS	N/A[5]	N/A[5]	N/A[5]	DS	N/A	UNK	UNK
31056	30561	UNK	N/A	N/A	N/A	91264	N/A	N/A	N/A	N/A	29647	N/A	UNK	UNK
UNK	2500	UNK	N/A	N/A	N/A	N/A[11]	N/A	N/A	N/A	N/A	N/A[11]	N/A	UNK	UNK
1829	8000	UNK	N/A	N/A	N/A	N/A[11]	N/A	N/A	N/A	N/A	N/A[11]	N/A	UNK	UNK
981	1100	UNK	N/A	N/A	N/A	N/A[11]	N/A	N/A	N/A	N/A	N/A[11]	N/A	UNK	UNK
UNK	150	UNK	N/A	N/A	N/A	N/A[11]	N/A	N/A	N/A	N/A	N/A[11]	N/A	UNK	UNK

		ALASKA		
DaNang Sup Cmd	HQ USARV	HQ USA Garrison Ft. Richardson	HQ USA Garrison Ft. Wainwright	HQ USARAL
TDA	TDA	TDA	TDA	TDA
N/A	N/A	N/A	N/A	N/A
4	N/A	1	1	N/A
DS	N/A	UNK	UNK	N/A
29647	N/A	UNK	UNK	N/A
N/A[11]	N/A	UNK	UNK	N/A
N/A[11]	N/A	UNK	UNK	N/A
N/A[11]	N/A	UNK	UNK	N/A
N/A[11]	N/A	UNK	UNK	N/A

NOTES:
1. Programed to convert to TOE 9-38G.
2. Operates Chibana Army Depot.
3. Operates Camp Ames Storage Area.
4. Battalion operates a consolidate ammunition depot.
5. Battalion operates a consolidated maintenance operation using renovation detachment.
6. Totals for battalion include company stocks.
7. Battalion has no stock control section.
8. Unit to be deactivated.
9. Data could not be obtained due to mission priorities.
10. Rewarehousing not being performed at this time.
11. Records are kept in total tonnage by condition code only.

Inclosure 3-3

5

55A Ammunition Helper

Time to MOS Reclassification	MOS Reclassified To					
	55B	55C	55F	55X[1]	76M(55B30)	TOTAL
1-4 months	43	9	5		16	73
4-8 months	29	6	1	1	11	48
8-12 months	3	6	1		1	11
T						
TOTAL	75	21	7	1	28	132[2]

NOTE:

1. Required to be school trained to be assigned this MOS.

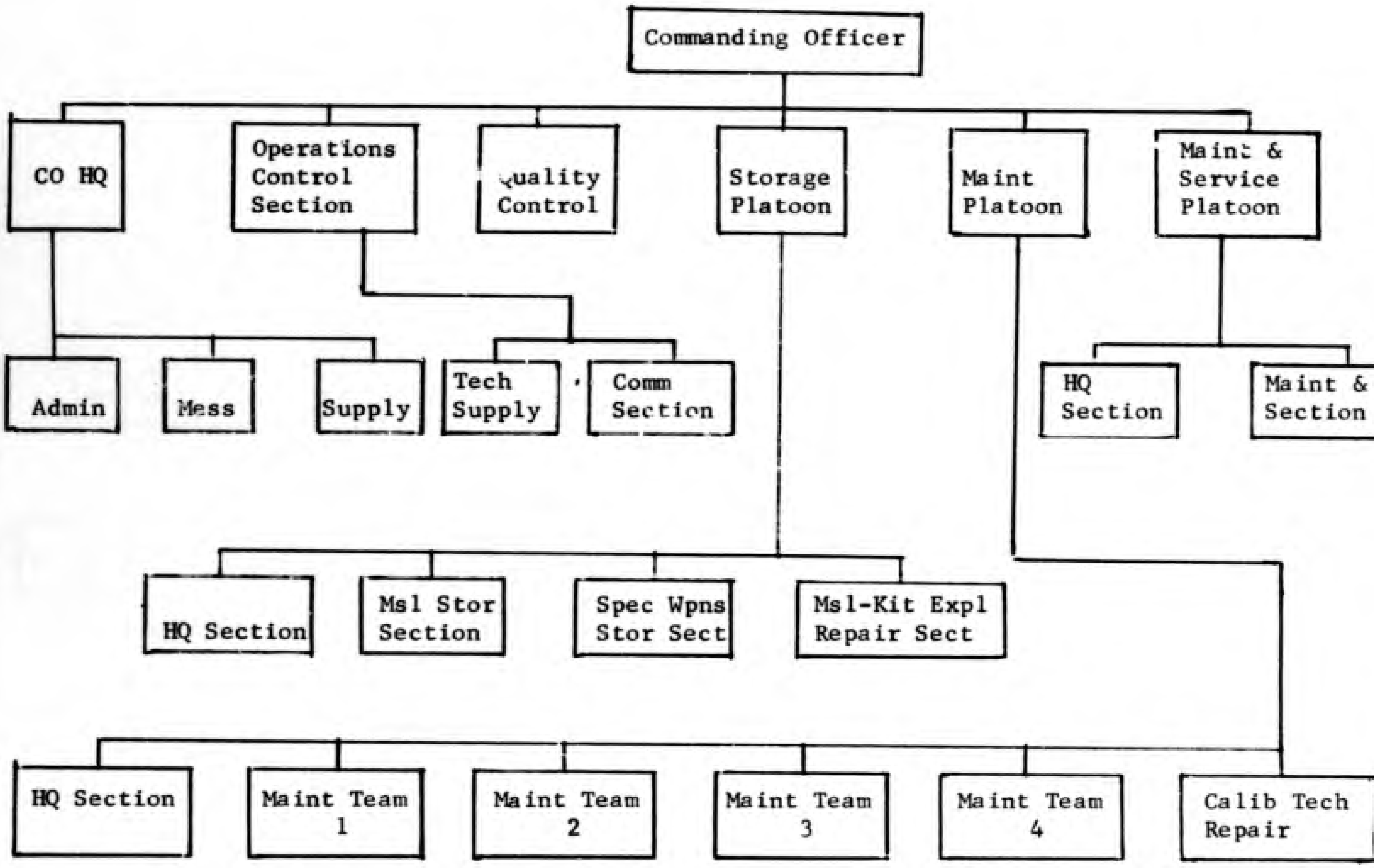
2. Thirty-eight personnel did not respond to question and are not included in totals.

Response to question of description of 55A

Authorized but not available	37
Not required for mission accomplishment	11
Not sufficiently qualified to be useful	27
Excessive number authorized due to use of MHE	12
Used for other than ammunition related functions	17
Did not respond to question	52

4 - Series SPECIAL AMMUNITION INCLOSURES

MTOE 9-377D



THE MAINT PLT & STORAGE PLT ARE UNDER THE OPERATIONS CONTROL SECTION FOR ORGANIZATION AND FUNCTIONAL STRUCTURE.

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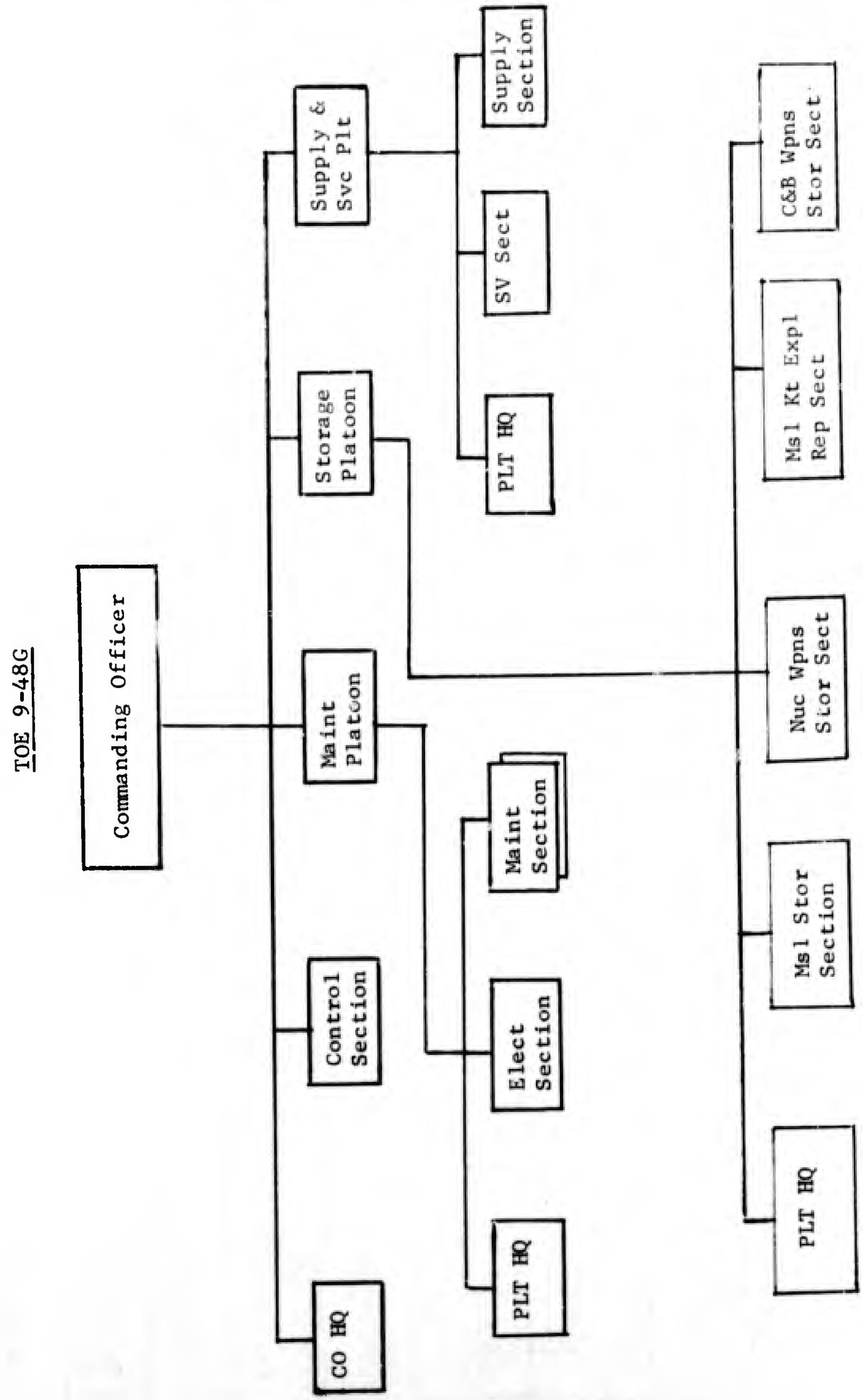

FOR OFFICIAL USE ONLY

COMMUNICATIONS EQUIPMENT (RADIO) CONVOY CONTROL

	TOE 9-47G	MTOE 9-47EE701	TOE 9-48G	TOE 9-87E	TOE 9-377D	MTOE 9-87EE701	MTOE 9-87EE702	MTOE 9-377DE701	MTOE 9-377DE702
AN/GRR-5	2								
AN/GRR-5 In 3/4 T Truck			1						
AN/VRC-10 In 1/4 T Truck					5				
AN/PRC-25	2	2							
AN/GRC-26 In 2 1/2 T Truck	1								
AN/GRA-39 (Antenna)			1	2		2		1	1
AN/GRC-46				1	2				
AN/VRC-46							4	4	3
AN/VRC-46 In 1/4 T Truck	2	6	1	1		5		1	2
AN/VRC-46 In Shop Van								1	1
AN/VRC-47 In 1/4 T Truck	1	1		1		1		1	1

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COMMUNICATIONS EQUIPMENT (RADIO) CONVOY CONTROL
(CONT'D)

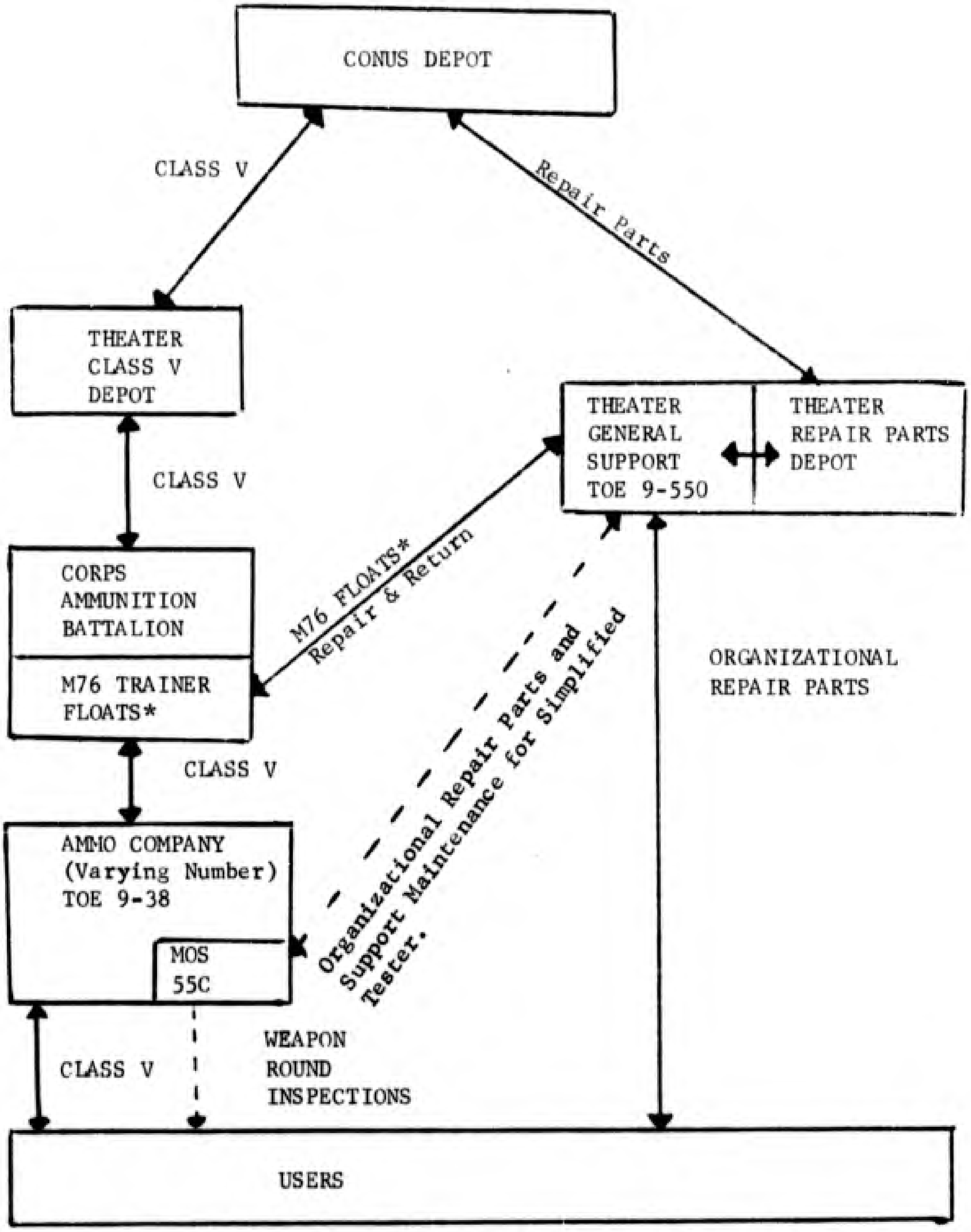
	TOE 9-47G	MTOE 9-47EE701	TOE 9-48G	TOE 9-87E	TOE 9-377D	MTOE 9-87EE701	MTOE 9-87EE702	MTOE 9-377DE701	MTOE 9-377DE702
AN/VRC-47 In 3/4 T Truck	1			1					
AN/VRC-47 In 1 1/4 T Truck	1	1							
AN/VRC-49 In 2 1/2 T Truck				1					
AN/VRC-53 In 1/4 T Truck	4								
AN/GRC-122		3	1						
AN/GRC-122 In 1 1/4 T Truck								3	1
AN/GRC-142						2	4		

FOR OFFICIAL USE ONLY

5 - Series REDEYE MISSILE SYSTEM INCLOSURES

FOR OFFICIAL USE ONLY

RECOMMENDED REDEYE SUPPORT STRUCTURE

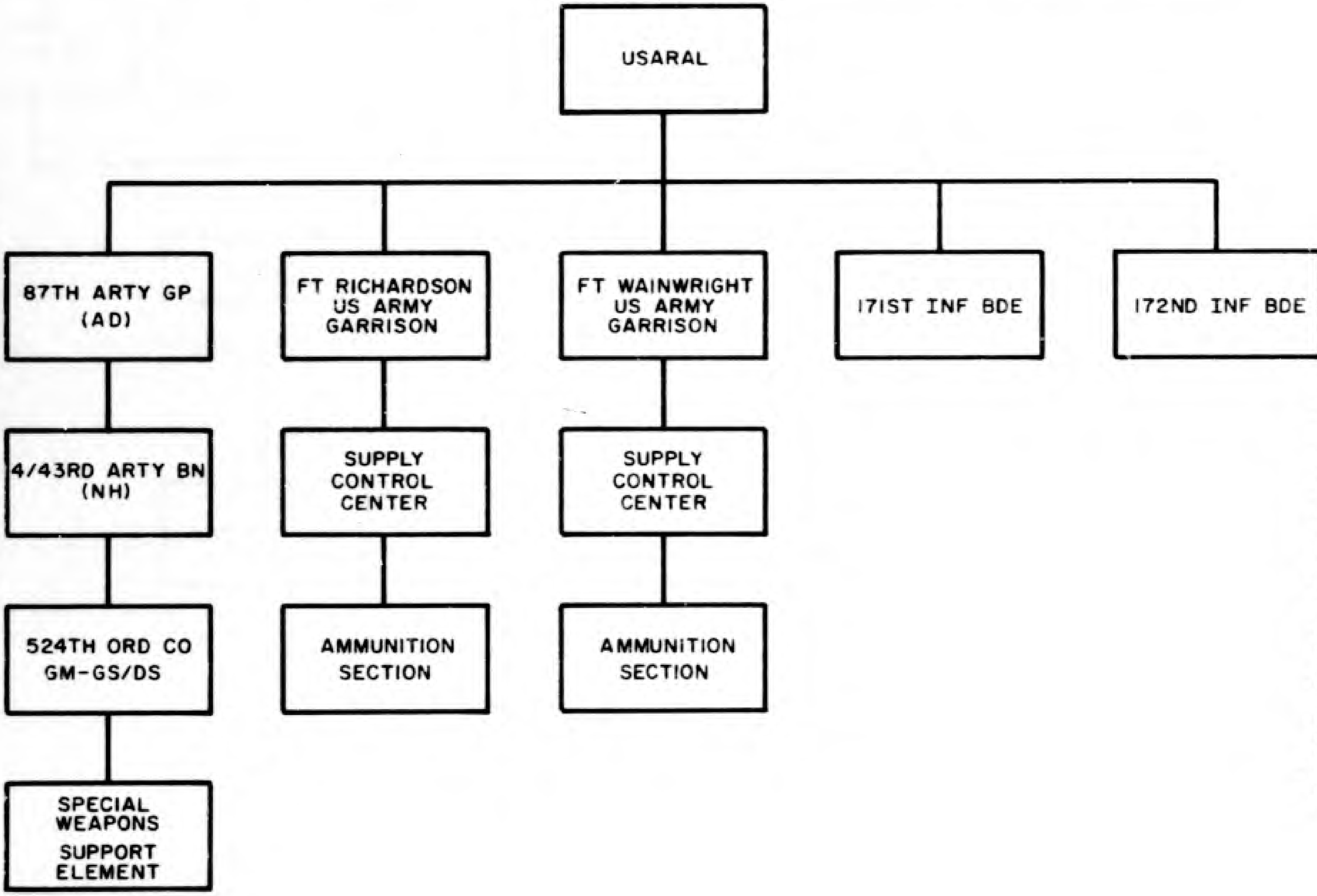


*M76 Training sets are processed through Class V channels under CTA 23-103

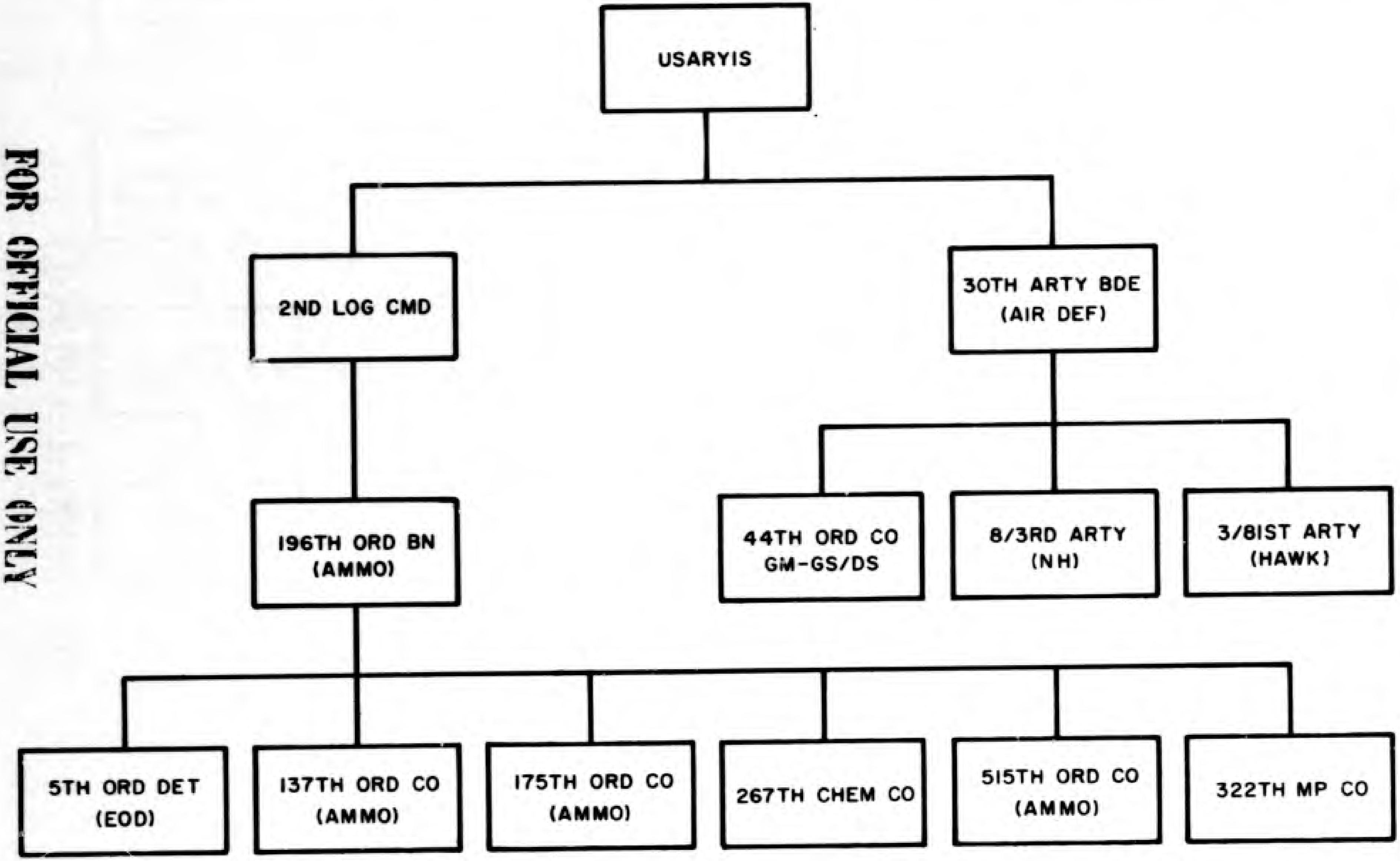
FOR OFFICIAL USE ONLY

6 - Series GENERAL INCLOSURES

US ARMY ALASKA
COMMAND & CONTROL STRUCTURE FOR MISSILES & MUNITIONS



USARYIS COMMAND & CONTROL STRUCTURE FOR MISSILES & MUNITIONS



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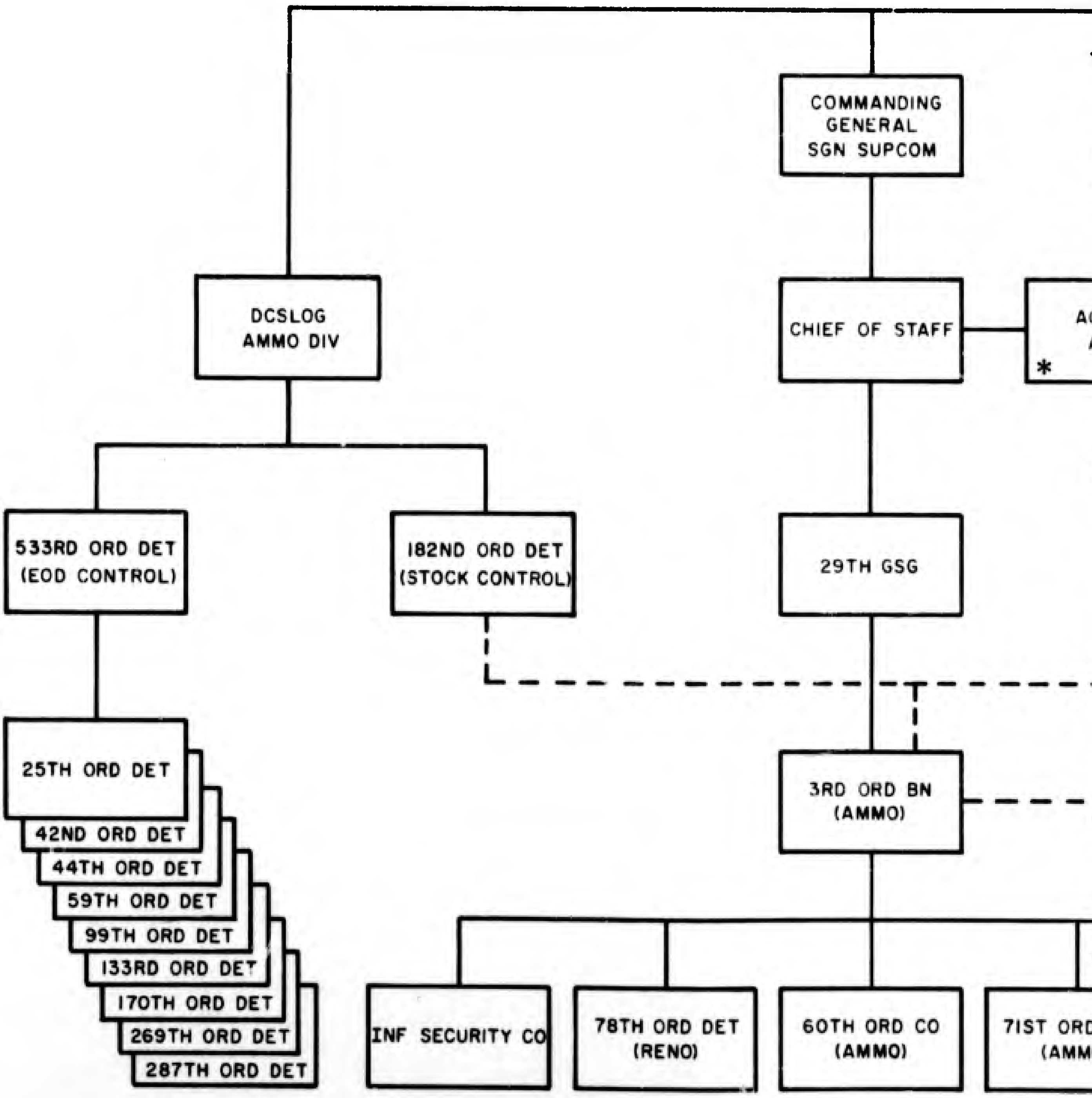
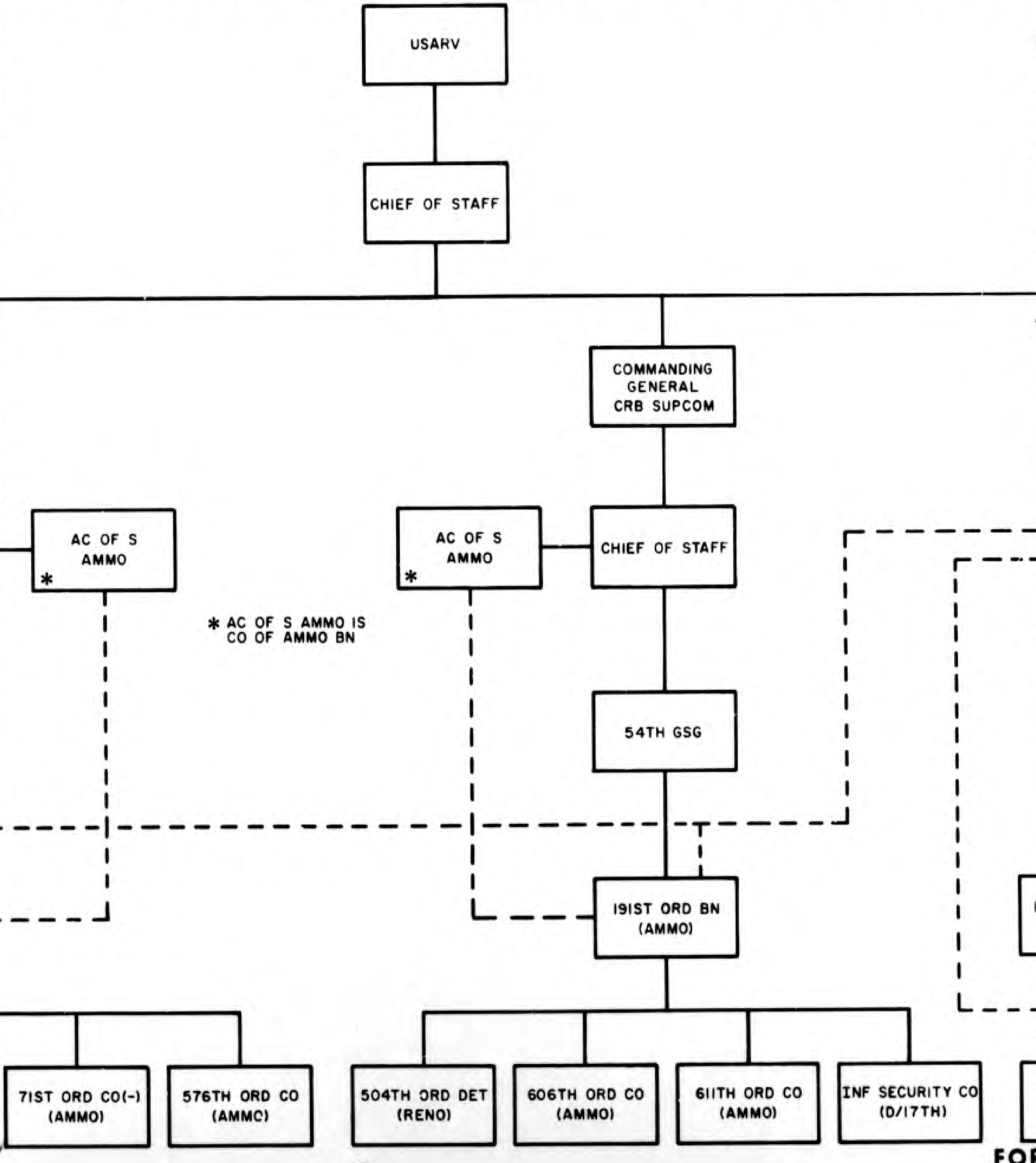
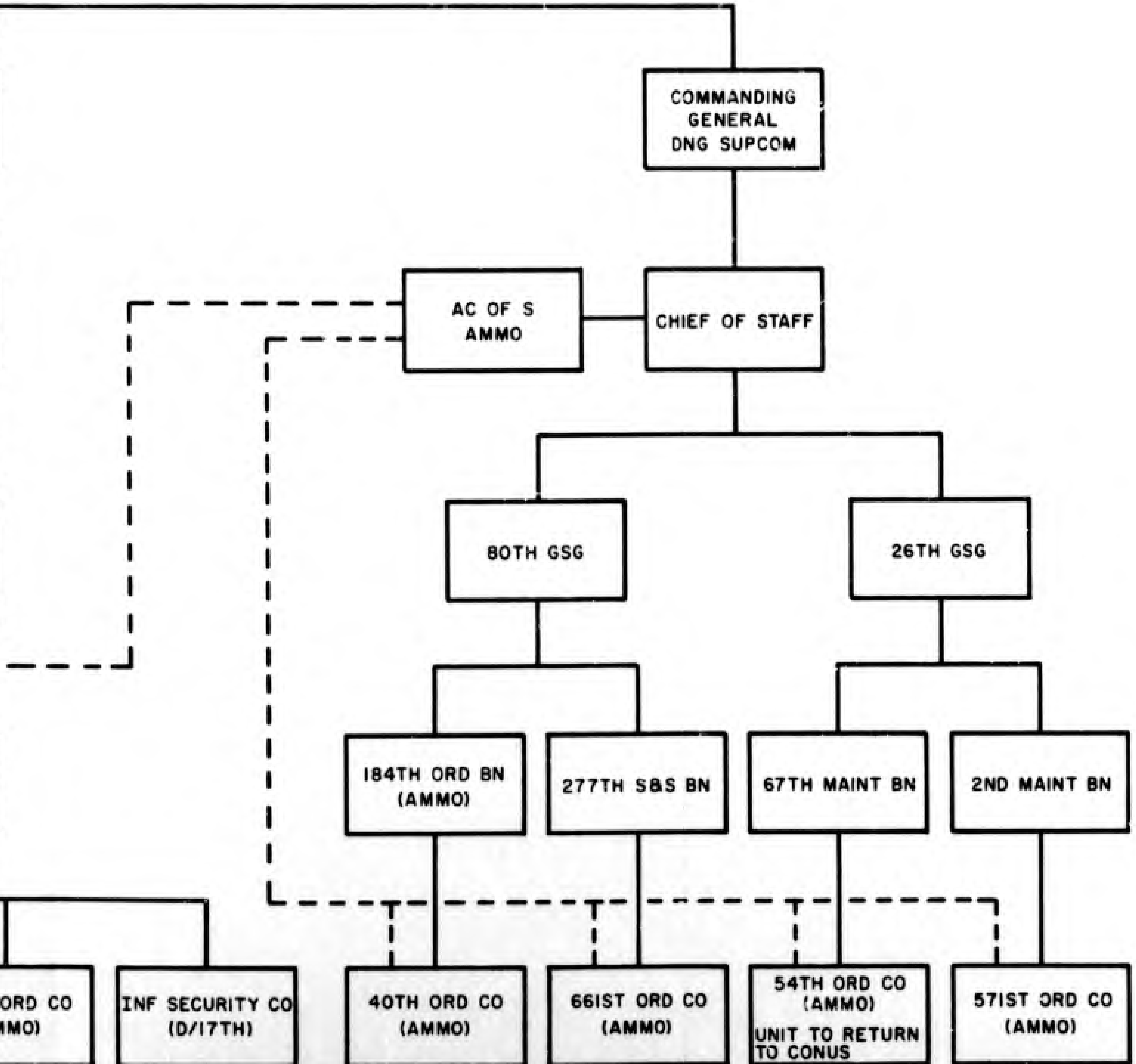
US A


COMMANDING GENERAL SGN SUPCOM
DCSLOG AMMO DIV
CHIEF OF STAFF
*
533RD ORD DET (EOD CONTROL)
182ND ORD DET (STOCK CONTROL)
29TH GSG
25TH ORD DET
42ND ORD DET
44TH ORD DET
59TH ORD DET
99TH ORD DET
133RD ORD DET
170TH ORD DET
269TH ORD DET
287TH ORD DET
3RD ORD BN (AMMO)
INF SECURITY CO
78TH ORD DET (RENO)
60TH ORD CO (AMMO)
71ST ORD

US ARMY VIETNAM COMMAND & CONTROL STRUCTURE FOR MUNITIONS

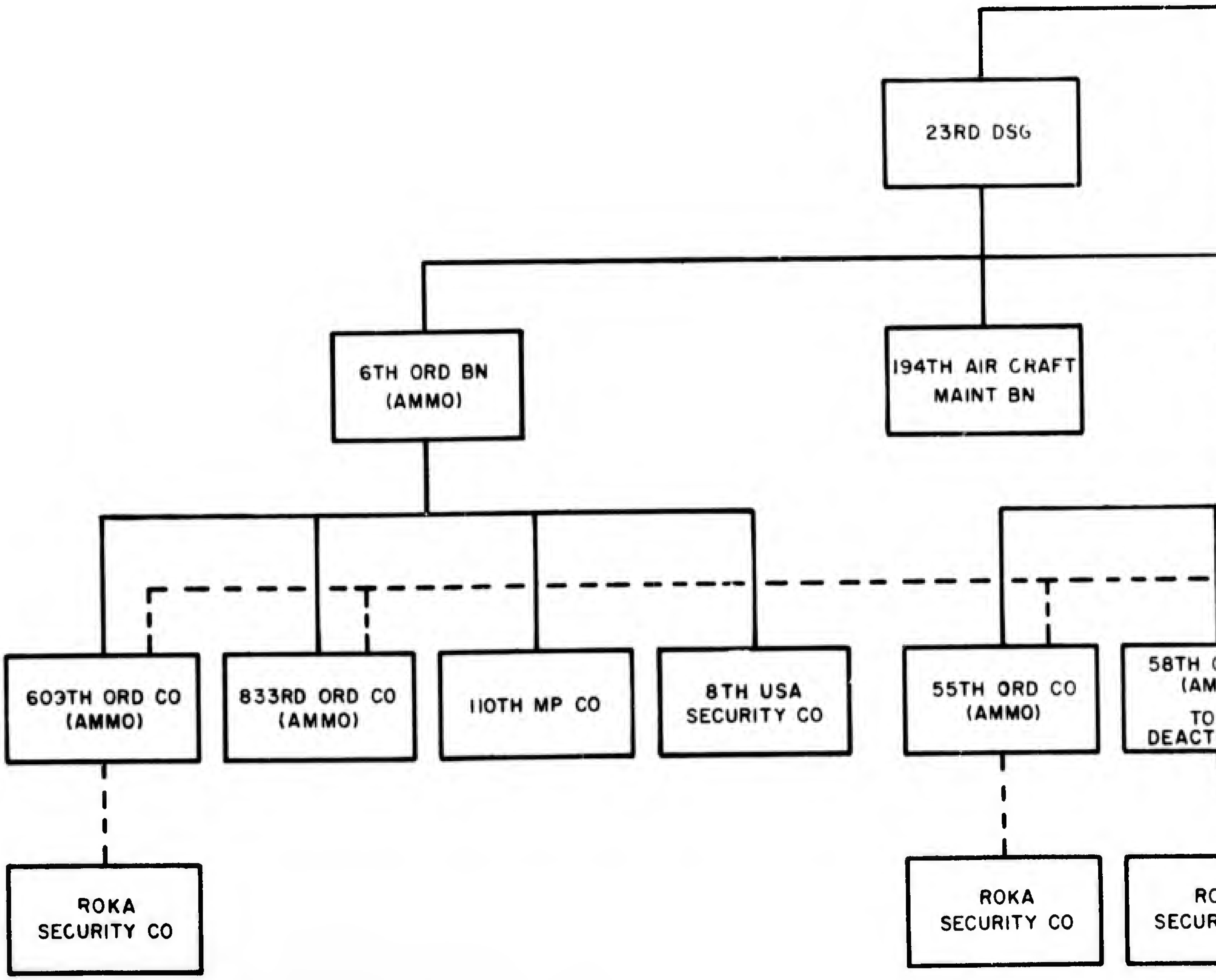


URE FOR MUNITIONS **FOR OFFICIAL USE ONLY**



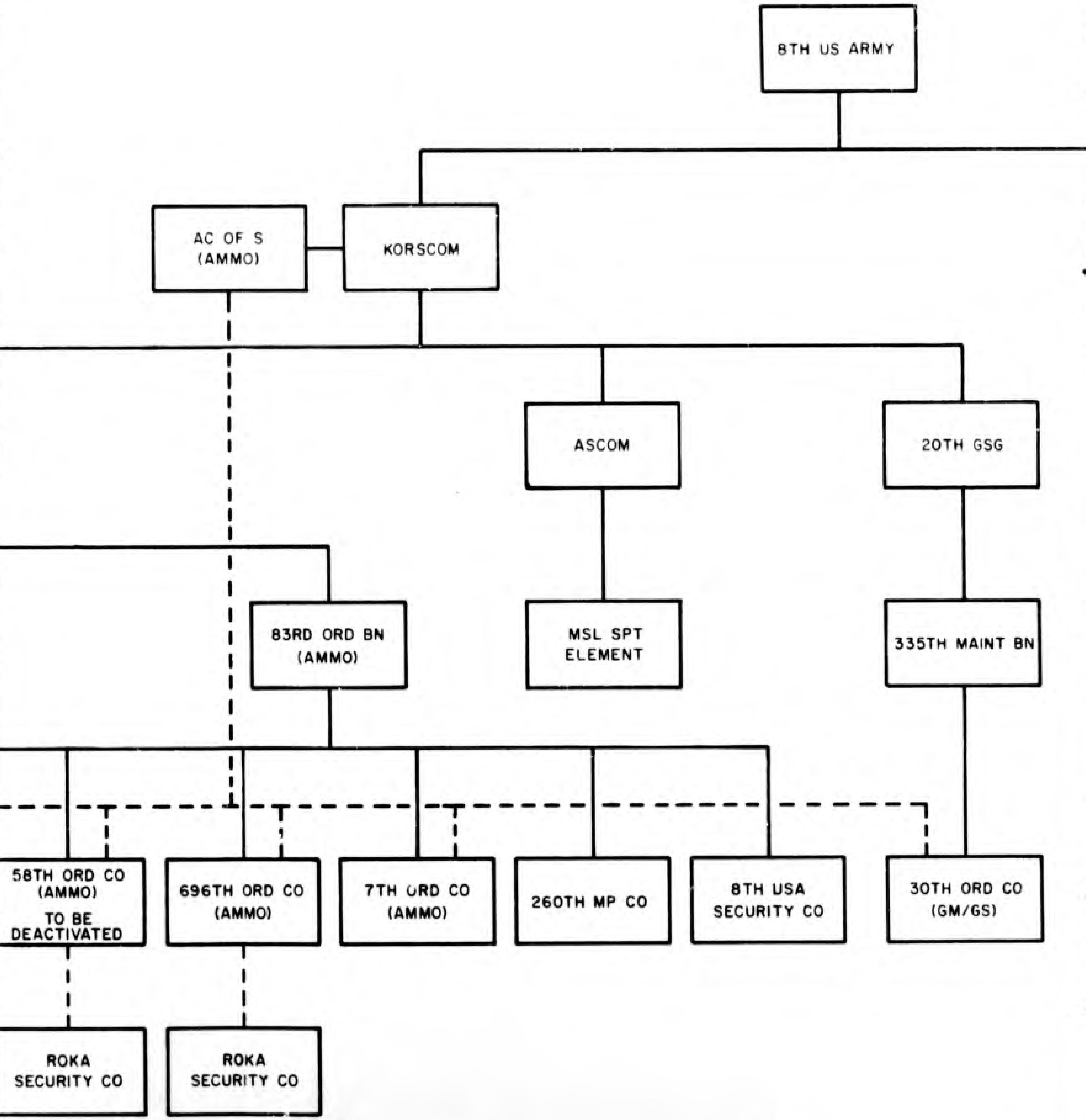
FOR OFFICIAL USE ONLY

INCL 6-3



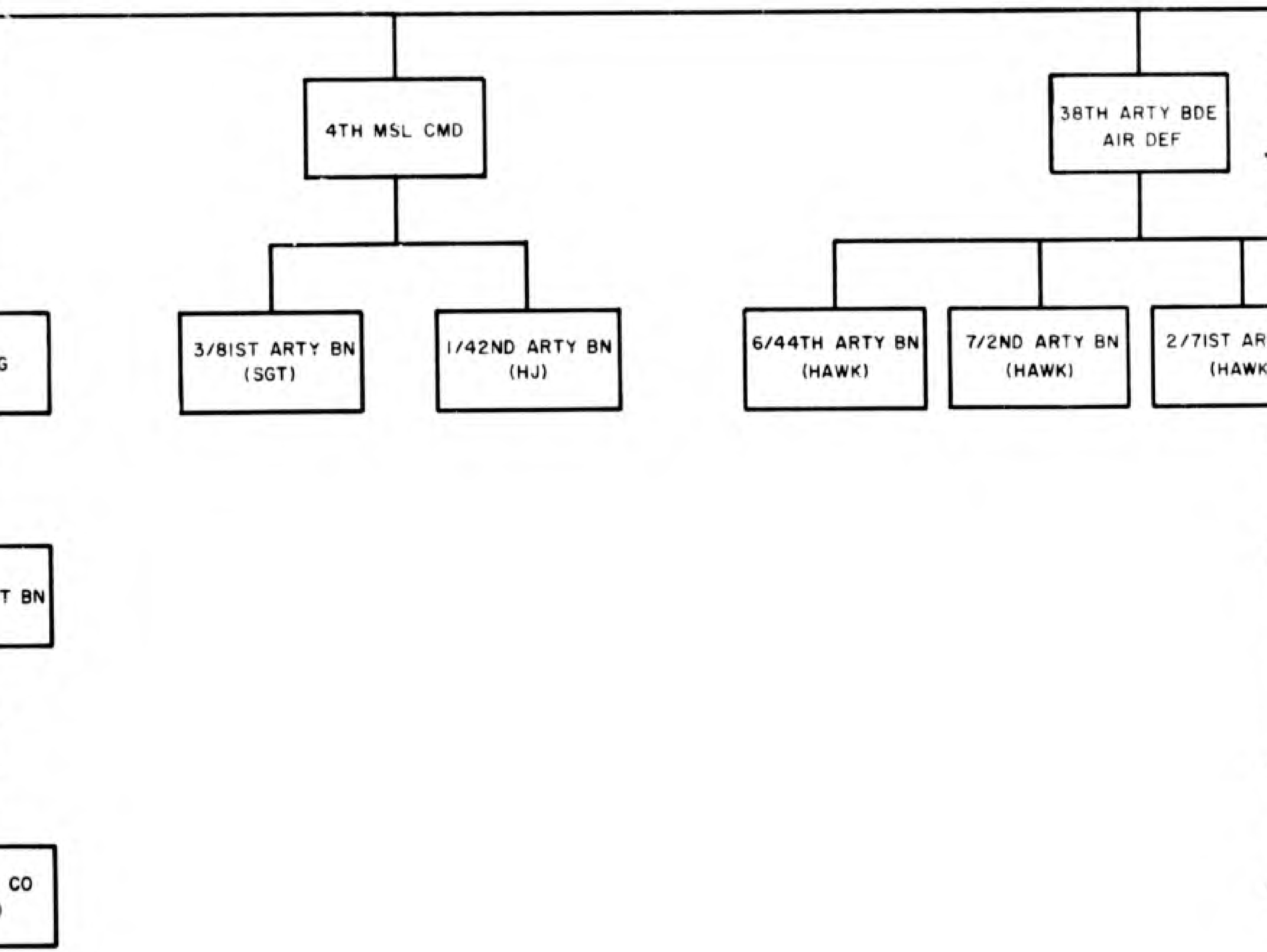
23RD DSG
6TH ORD BN (AMMO)
194TH AIR CRAFT MAINT BN
603TH ORD CO (AMMO)
833RD ORD CO (AMMO)
110TH MP CO
8TH USA SECURITY CO
55TH ORD CO (AMMO)
ROKA SECURITY CO
ROKA SECURITY CO

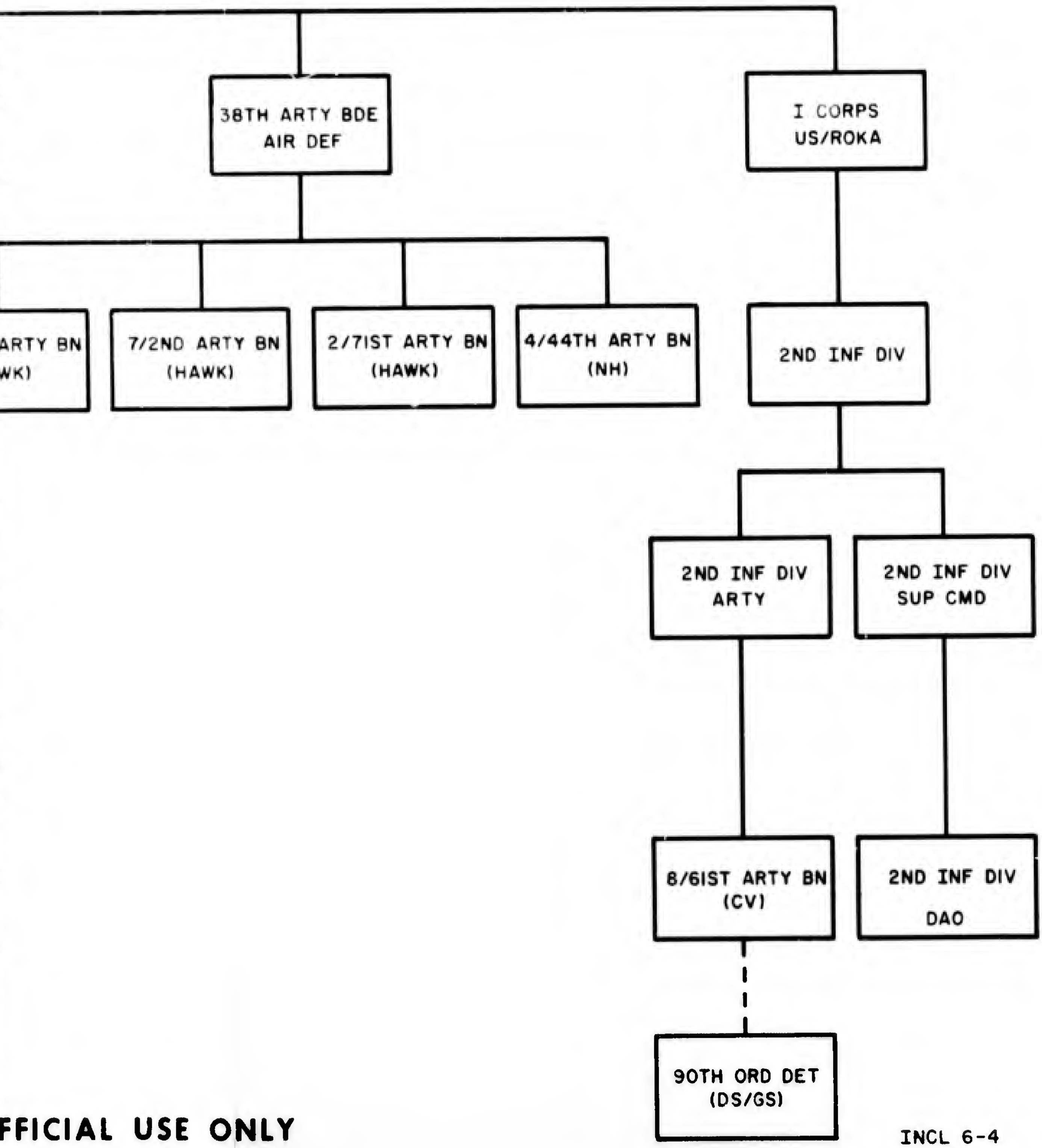
8TH US ARMY COMMAND & CONTROL STRUCTURE FOR M



2

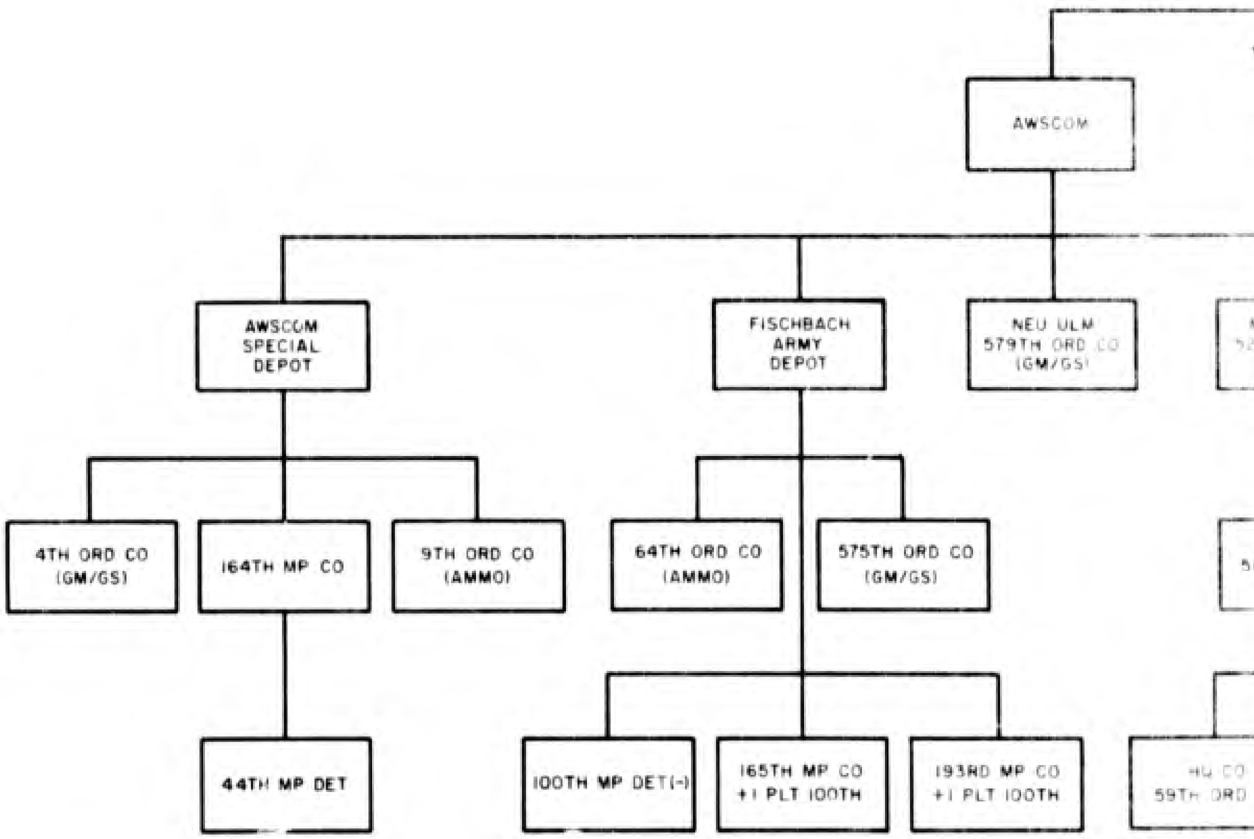
FOR MISSILES & MUNITIONS




38TH ARTY BDE
AIR DEF
I CORPS
US/ROKA
ARTY BN
WK)
7/2ND ARTY BN
(HAWK)
2/71ST ARTY BN
(HAWK)
4/44TH ARTY BN
(NH)
2ND INF DIV
2ND INF DIV
ARTY
2ND INF DIV
SUP CMD
8/61ST ARTY BN
(CV)
2ND INF DIV
DAO
90TH ORD DET
(DS/GS)

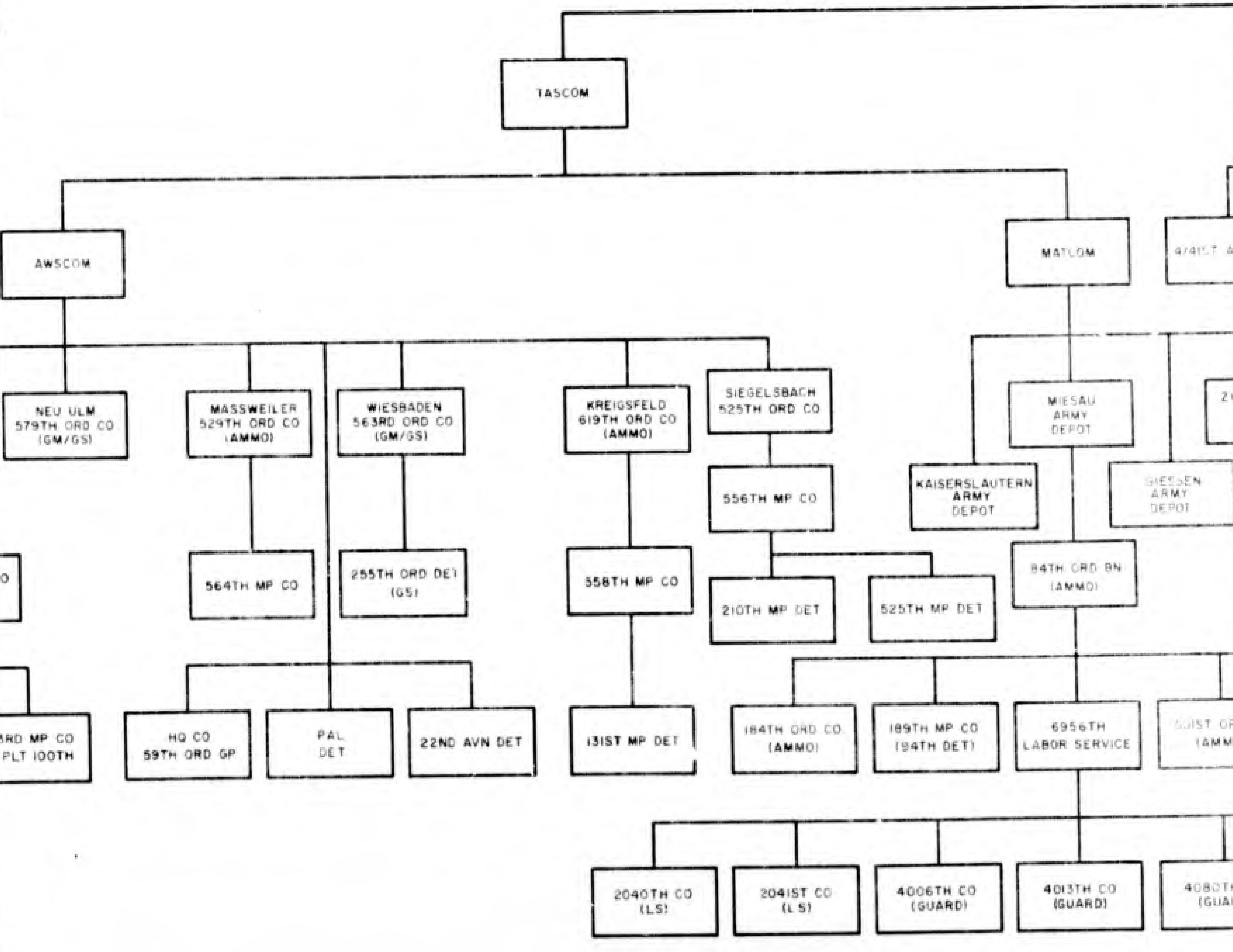
INCL 6-4

4



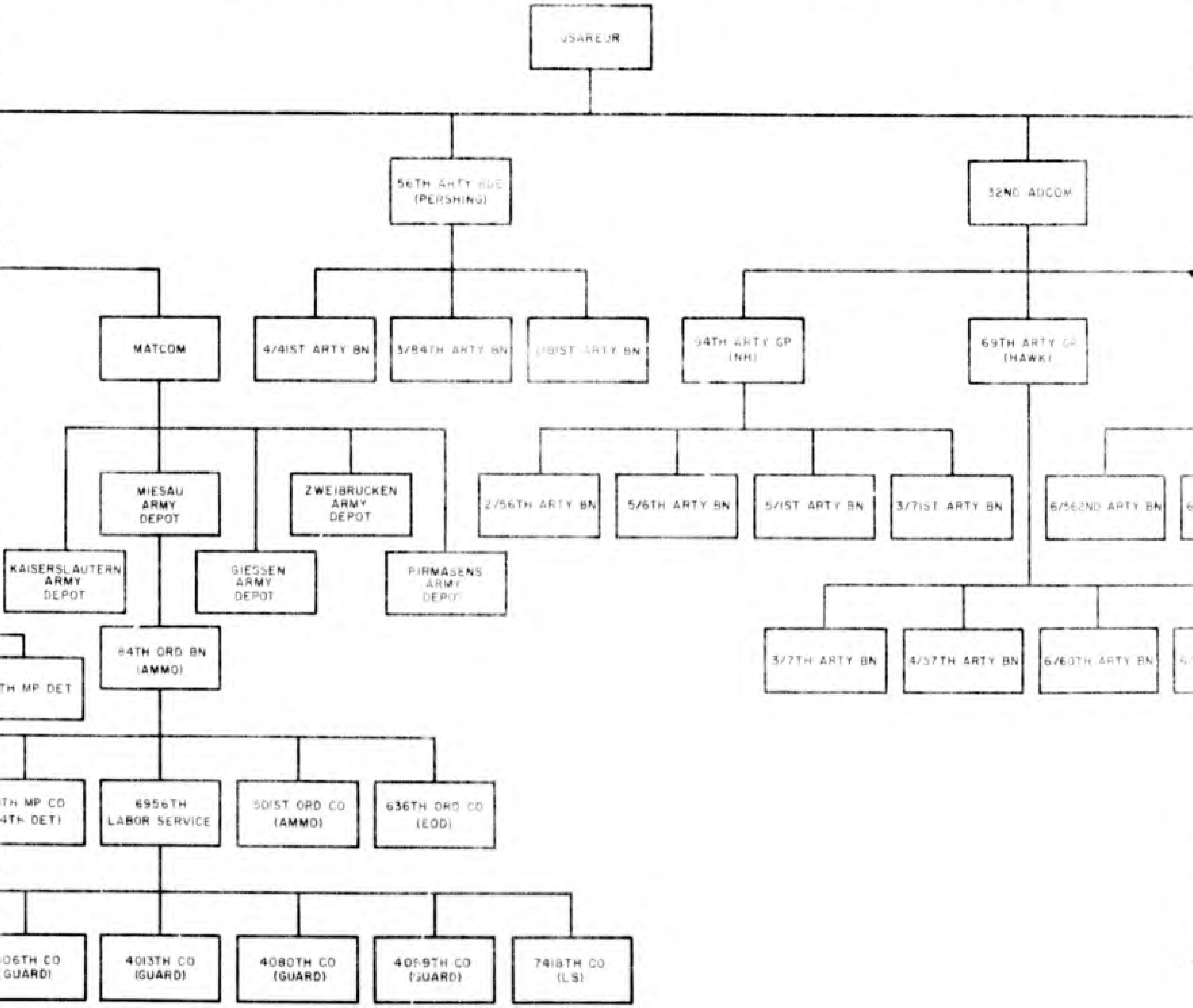
AWSCOM
AWSCOM SPECIAL DEPOT
FISCHBACH ARMY DEPOT
NEU ULM 579TH ORD CO (GM/GS)
4TH ORD CO (GM/GS)
164TH MP CO
9TH ORD CO (AMMO)
64TH ORD CO (AMMO)
575TH ORD CO (GM/GS)
44TH MP DET
100TH MP DET(-)
165TH MP CO +1 PLT 100TH
193RD MP CO +1 PLT 100TH
HQ CO 59TH ORD

US ARMY EUROPE C

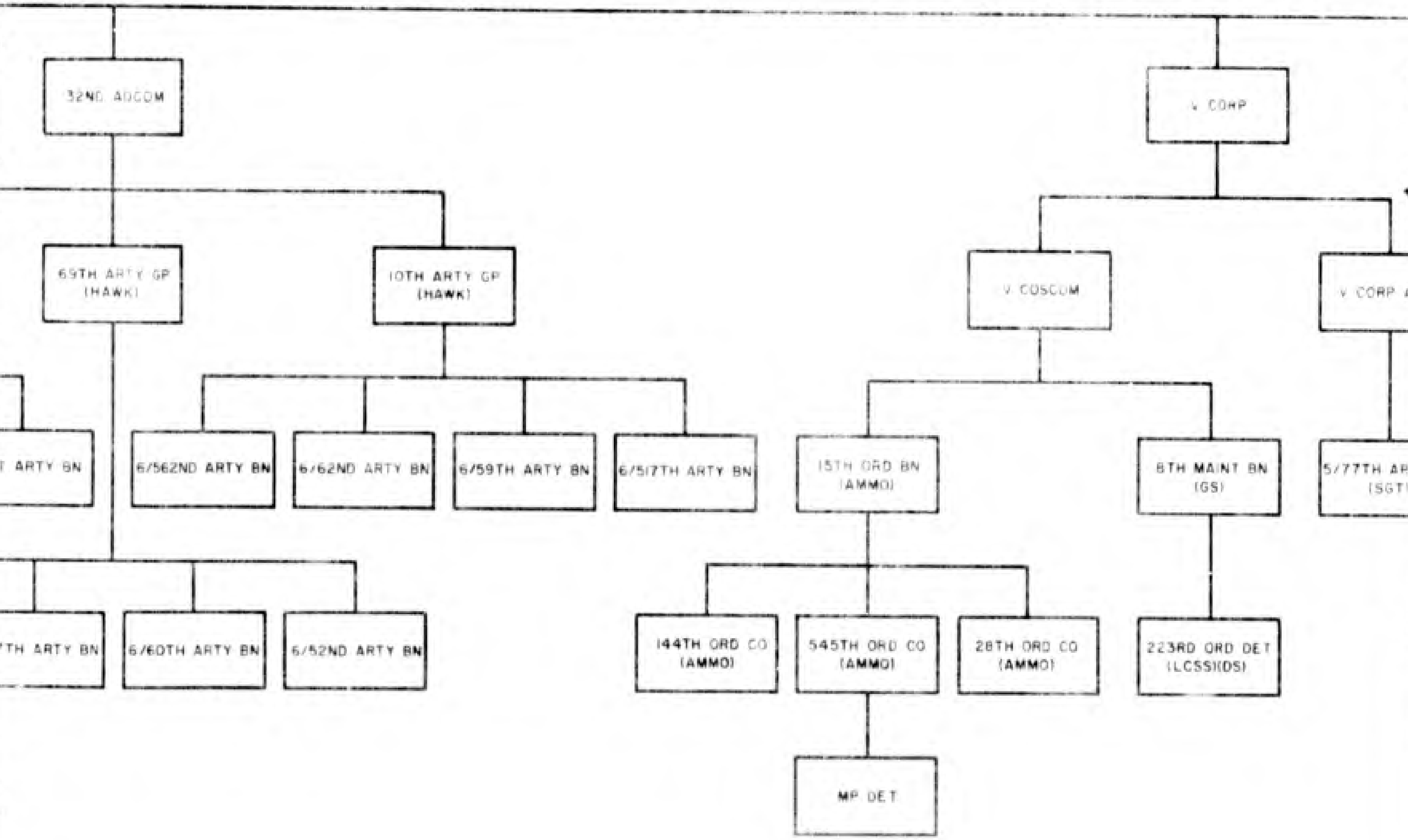


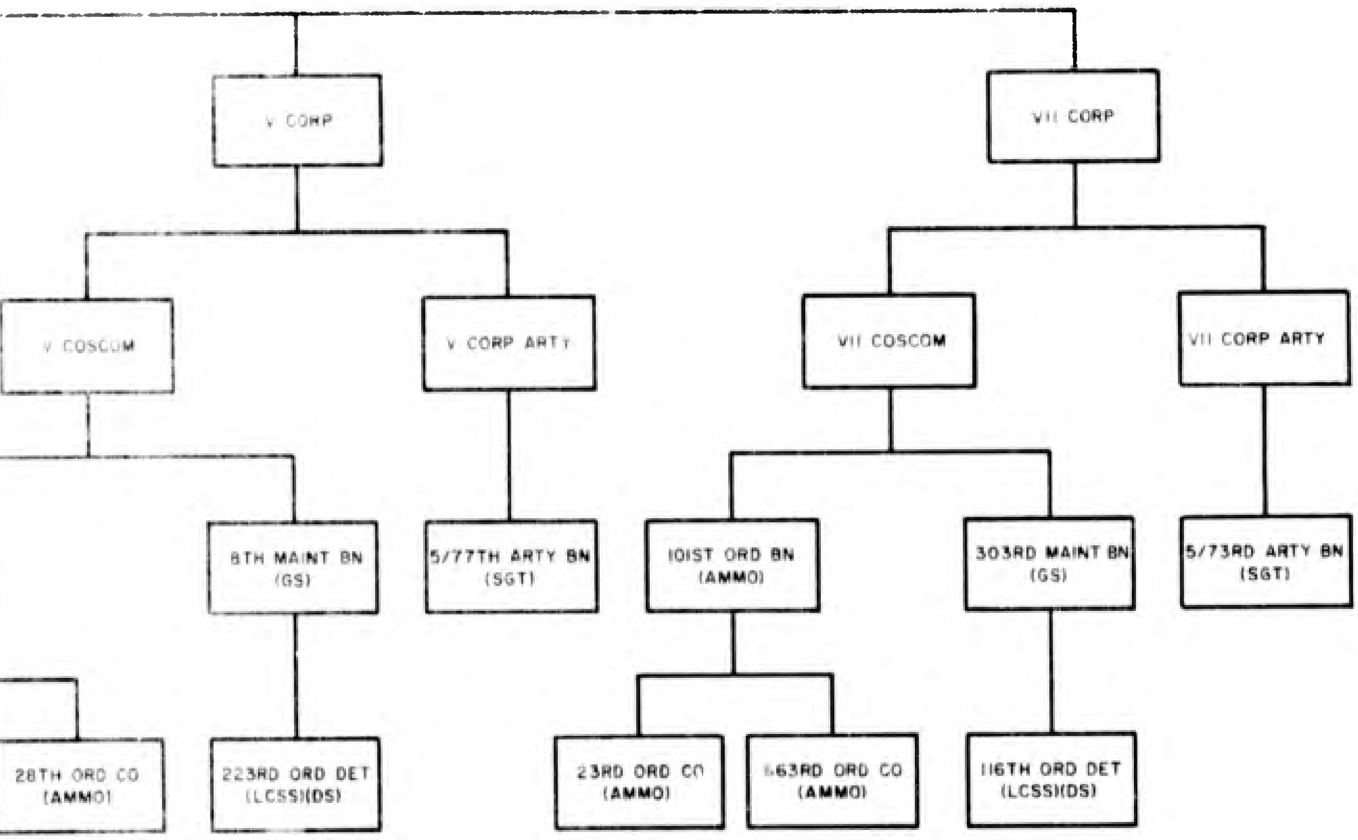
2

US ARMY EUROPE COMMAND & CONTROL STRUCTURE FOR MISSILES & MUNITIONS



3


32ND ADCOM
V CORP
69TH ARTY GP (HAWK)
10TH ARTY GP (HAWK)
V COSCOM
V CORP
ARTY BN
6/562ND ARTY BN
6/62ND ARTY BN
6/59TH ARTY BN
6/517TH ARTY BN
15TH ORD BN (AMMO)
8TH MAINT BN (GS)
TH ARTY BN
6/60TH ARTY BN
6/52ND ARTY BN
144TH ORD CO (AMMO)
545TH ORD CO (AMMO)
28TH ORD CO (AMMO)
223RD ORD DET (LCSS)(DS)
MP DET


V CORP
VII CORP
V COSCOM
V CORP ARTY
VII COSCOM
VII CORP ARTY
8TH MAINT BN (GS)
5/77TH ARTY BN (SGT)
101ST ORD BN (AMMO)
303RD MAINT BN (GS)
5/73RD ARTY BN (SGT)
28TH ORD CO (AMMO)
223RD ORD DET (LCSS)(DS)
23RD ORD CO (AMMO)
663RD ORD CO (AMMO)
116TH ORD DET (LCSS)(DS)

INCL 6-5

5