MAGTF CG PERSONNEL, TRAINING, AND ORGANIZATIONAL REQUIREMENTS (1986 - 1996)

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THE MARINE CORPS IS IN THE PROCESS OF DEVELOPING AUTOMATED SYSTEMS FOR USE BY THE FLEET MARINE FORCES (FMF). THESE SYSTEMS WILL PROVIDE SIGNIFICANT IMPROVEMENTS IN THE AREAS OF FIRE SUPPORT, NAVIGATION, COMMUNICATIONS, AIR DEFENSE AND ADMINISTRATION. HOWEVER, THEIR NUMBERS ALSO INDICATE POSSIBLE OVERLOAD ON THE FMF ABILITY TO OPERATE AND MAINTAIN THE NEW ITEMS IN ADDITION TO THEIR CURRENT INVENTORIES OF COMMUNICATIONS-ELECTRONICS EQUIPMENT. THIS ANALYSIS ASCERTAINS THE PERSONNEL, TRAINING AND ORGANIZATIONAL IMPACTS OF THE NEW SYSTEMS AND MAKES RECOMMENDATIONS REGARDING THEIR SUPPORT.

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1. The objective of this effort was to design an integrated personnel and custodial organizational support concept for the concurrent development of Marine Corps Tactical Command and Control Systems (MTACCS), TRI-TAC systems, and other computer assisted intelligence and supporting systems.

2. The objective was generally met; however, the scope, magnitude, and dynamic nature of the acquisition of these systems precluded development of more than a general concept using facts and figures as of a specified date. Termination of the Marine Integrated Fire and Air Support System (MIFASS) and modification of the Integrated Signal Intelligence System (ISIS) program are but two examples of programmatic changes which impact the study findings and recommendations. Programmatic changes must be considered when using the study.

3. The results of this study are concurred in, subject to the understanding that they are to be used only as a baseline reference and that all data is to be revalidated prior to adoption of any conclusions or courses of action.

4. A copy of this letter will be affixed inside the front cover of each copy of the subject study report prior to its distribution.

M. P. SULLIVAN
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EXECUTIVE SUMMARY

BACKGROUND

Fourteen command, control, communications, and computer (C4) systems are scheduled to be introduced into the Fleet Marine Force (FMF) during the period 1986-1996. The Automated Data Processing Equipment (ADPE-FMF) and Intelligence Analysis Center (IAC) systems are already in use. The Deployable Force Automated Systems Center (DFASC), a development model of the Marine Air Ground Task Force (MAGTF) Automated Services Center (MASC) is being evaluated. Of the fourteen systems, six have successfully passed the Marine Corps Program Decision Memorandum (MCPDM) III USMC acquisition decision. The MCPDM III decision indicates that funding and supportability issues have been addressed and resolved to a currently acceptable degree. Decisions to acquire the remaining eight systems have yet to be made. Funding and supportability for these systems remain key issues. Data for these systems is particularly susceptible to change. On 7 June 1985, Headquarters, US Marine Corps directed an analysis of the personnel, training and organizational impacts caused by the introduction of fourteen selected C4 systems into the FMF. This study report is the result.

REPORT STRUCTURE

The report contains seven sections beginning with an introduction followed by the C4 Systems Description. Section 3 reviews and analyzes custodial and organizational issues including personnel, operational, and administrative control relationships of C4 systems. Recommended and alternative custodial concepts are included. Section 4 is an analysis of data representing types and quantities of equipment. It illustrates the cumulative impact of personnel staffing requirements and their current and near term availability. Section 5 presents the FMF-End-User Computing Equipment (FMF-EUCE) analysis. It presents the FMF-EUCE maintenance concept, supply support, operator and technical training requirements, and other logistic support needs peculiar to the FMF-EUCE. The EUCE is treated separately in this study to provide certain

additional factors and analyses required by its sponsor. This is because the EUCE buy may be over 13,000 equipments and is not going through the usual acquisition process. Section 6 presents selected functional requirement considerations to assist in C4 systems integration planning. Finally, section 7 presents the findings of the study according to the twelve specific task assignments based on the statement of work. Conclusions are drawn and courses of action to be taken are recommended. Certain significant findings and recommendations are discussed below.

ORGANIZATIONAL CONSIDERATIONS

For purposes of analysis, the C4 systems were categorized as either unit or MAGTF systems. Unit systems are those distributed widely through various FMF organizations that support the unit's mission and are under the operational control of the unit commander. MAGTF systems are those specifically designed to support an overall MAGTF function. A single unit system may number in the thousands, while a MAGTF system is essentially characterized by low numbers. It was concluded that unit systems require no change to their present and anticipated custodial relationships, but that three MAGTF systems do require change. Custody of the DFASC/MASC should be moved from Service Company to Communications Company, Force Service Support Group (FSSG). In addition, and largely for more cost effective maintenance considerations, analysis indicates that the master stations of the Position Location Reporting System (PLRS), and the IAC should move to the custody, but not the operational control of Communication Battalion, FMF. Finally, the study recognized the potential increased maintenance work load which will fall on the Electronics Maintenance Company, FSSG. It found that this workload must be measured more precisely than is now possible, in order to determine exact numbers and types of personnel required. Surprisingly, the key to this personnel determination lies in the identification and validation of the EUCE lowest repairable unit (LRU).

PERSONNEL AND TRAINING

Personnel requirements are a function of equipment design and density, operational and organizational concepts, and the custodial relationships developed for each system. The study identified sixty-one Military Occupational Specialities (MOS) which are required to support the C4 systems. Five are secondary and play no key role. Near and long term officer and enlisted projections indicate a need to correct certain occupational field imbalances. Specific findings and recommendations emphasized occupational fields 25, 28, 40 and 59. Of particular note is MOS 5977-Tactical General Purpose Computer (TGPC) Technician. So many systems have been assigned to this single MOS for maintenance that to train personnel adequately on all the systems would take years. To replace this over-diversified MOS, three groups of System Level Technicians were identified. After an analysis of possible alternatives, the following grouping was recommended:

a) 28XX = IAC Systems Technician Course, PLRS Systems Technician Course, and TCC Technicians Course;

b) 5979 = TAOM Systems Technician Course; and

c) XXXX = MIFASS Systems Technician Course and the TCO Technician Course.

FMF-EUCE PROGRAM

Because of the possibility of fielding thousands of EUCEs by 1989, this program was given special attention. No additional operations personnel are needed for this system. Its impact on maintenance organizations, however, and in particular on Electronics Maintenance Company, FSSG, is expected to be significant. It was concluded that the EUCE will function most effectively within an Information Center (IC) concept to support the distributed users. Using existing Information Systems Management Officer (ISMO) personnel, the IC is to support the user in all aspects of training and product improvement. It is the library of EUCE knowledge and standard software packages. It acts as the clearinghouse for user functions and software. The study further

recommended that an Integrated Logistic Support Plan (ILSP) be prepared for the EUCE, and that all matters of supply and maintenance for it be handled through normal supply and maintenance channels. Finally, it was found that there is little to justify having both an operational ready float and a maintenance float for the EUCE. It was recommended that any functions of an operational float found necessary could be provided by the maintenance float.

CONCEPT FOR ORGANIZATIONAL, PERSONNEL AND TRAINING INTEGRATION REQUIREMENTS (COPTIR)

There is a need to bring about the integration of all C4 systems on both the operational and organizational levels. Judgements about subordinate systems which compete with one another for scarce resources should be made against known standards which are appropriate to an overall system. There appears to be a need for the definition of the overall C4 system and the development of standards which apply to all systems equally. A single manager of the overall C4 system is needed to define it and to measure its capability against known standards. Subordinate systems which require personnel and training support beyond projected capabilities of the Marine Corps should be noted prior to a production decision. Personnel and training authorities must assume an even greater role at an appropriate MCPDM, and they should consider in their deliberations both the subordinate system and the overall C4 system requirements.

SECTION 1
INTRODUCTION

1.1 Background

The Marine Corps is in the process of developing automated systems for use by the Fleet Marine Forces (FMF). Plans now exist for the 1986-1996 operational deployment of the 14 new or replacement systems identified ~~in table 1-1,~~ Selected C4 Systems, 1986-1996. When all of these systems are in place, they will add over 18,000 computer driven electronic equipments to the Marine Corps inventory with over 13,000 going to the FMF. Figure 1-1, Planned FMF Delivery Schedule, illustrates projected delivery times of all 14 systems to the FMF.

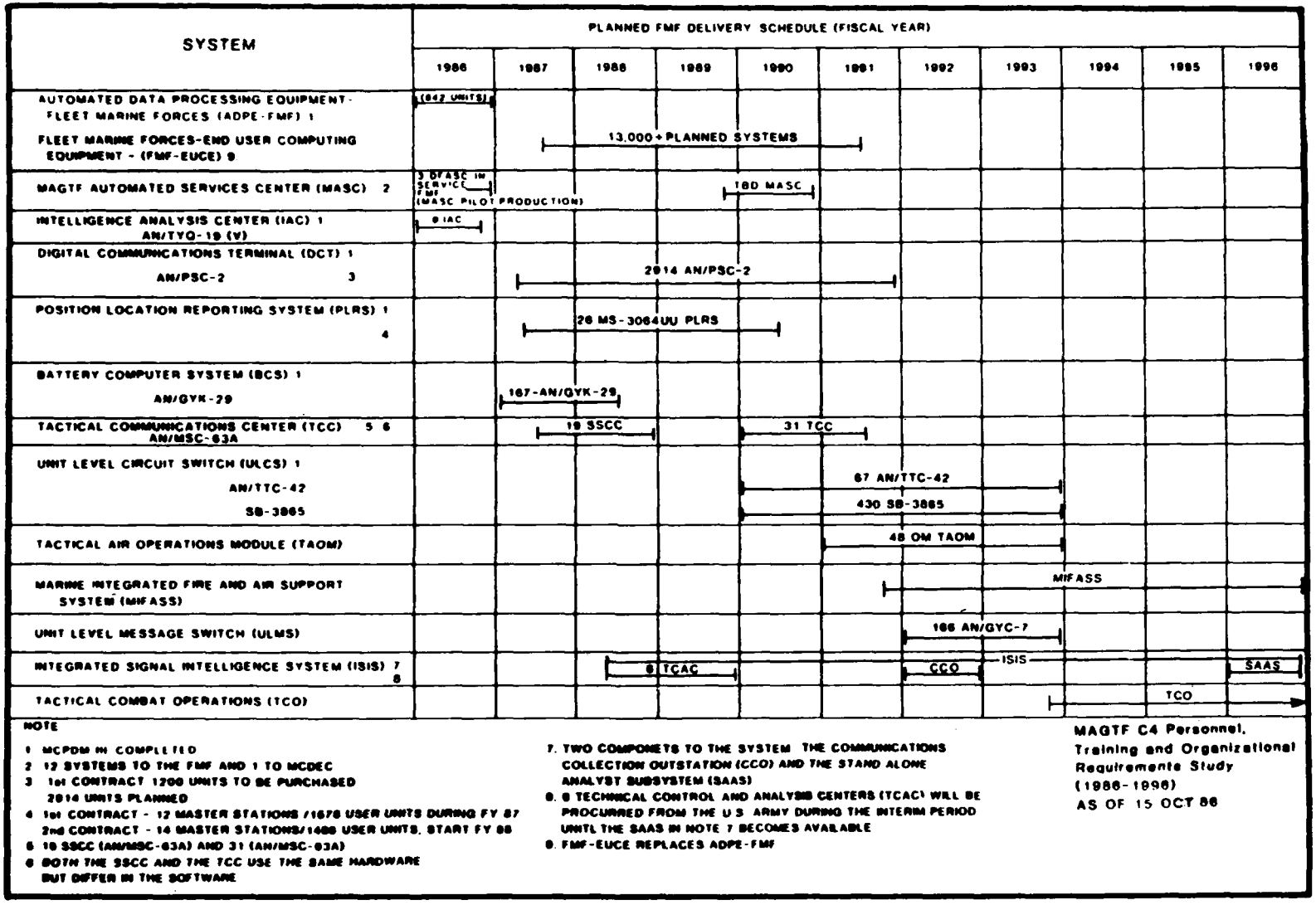
These systems will provide significant improvements in the areas of fire support, navigation, communications, air defense and administration. However, their numbers also indicate possible overload on the FMF ability to operate and maintain the new items in addition to their current inventories of communications-electronics equipments. This analysis ascertains the personnel, training and organizational impacts of the new systems and makes recommendations regarding their support.

1.1.1 **Command, Control, Communications and Computer (C4) Systems Objective.** The objective of C4 systems is to support the command, control, and communications requirements of the FMF through selective use of automation. These systems are the culmination of many years of research and development into the application of technology to the FMF combat requirements. Subsequent paragraphs review the key concept and documents underlying the systems.

1.1.2 **C4 Systems Evolution.** In an effort to coordinate the acquisition of command, control and communications equipment, the Marine Corps developed the

Table 1-1. Selected C4 Systems, 1986-1996

Automated Data Processing Equipment-Fleet Marine Force (ADPE-FMF)
Fleet Marine Forces - End User Computing Equipment (FMF-EUCE)
Marine Air Ground Task Force (MAGTF) Automated Services Center (MASC)
Intelligence Analysis Center (IAC)
Digital Communications Terminal (DCT)
Position Location Reporting System (PLRS)
Battery Computer System (BCS)
Tactical Communications Center (TCC)
Unit Level Circuit Switch (ULCS) - A TRI-TAC Subsystem
Tactical Air Operations Module (TAOM)
Marine Integrated Fire and Air Support System (MIFASS)
Unit Level Message Switch (ULMS) - A TRI-TAC Subsystem
Integrated Signal Intelligence System (ISIS)
Tactical Combat Operations (TCO)



NOTE

1. MCPDM IN COMPLETED
2. 12 SYSTEMS TO THE FMF AND 1 TO MCDEC
3. 1st CONTRACT 1200 UNITS TO BE PURCHASED
   2914 UNITS PLANNED
4. 1st CONTRACT - 12 MASTER STATIONS /1676 USER UNITS DURING FY 87
   2nd CONTRACT - 14 MASTER STATIONS/1488 USER UNITS, START FY 88
5. 18 SSCC (AN/MSC-63A) AND 31 (AN/MSC-63A)
6. BOTH THE SSCC AND THE TCC USE THE SAME HARDWARE BUT DIFFER IN THE SOFTWARE
7. TWO COMPONETS TO THE SYSTEM THE COMMUNICATIONS COLLECTION OUTSTATION (CCO) AND THE STAND ALONE ANALYST SUBSYSTEM (SAAS)
8. 6 TECHNICAL CONTROL AND ANALYSIS CENTERS (TCAC) WILL BE PROCURRED FROM THE U S ARMY DURING THE INTERIM PERIOD UNITL THE SAAS IN NOTE 7 BECOMES AVAILABLE
9. FMF-EUCE REPLACES ADPE-FMF

MAGTF C4 Personnel, Training and Organizational Requirements Study (1986-1996)
AS OF 15 OCT 86

Figure 1-1. Planned FMF Delivery Schedule

Marine Tactical Command and Control System (MTACCS) concept and the Landing Force Integrated Communications Systems (LFICS) Architecture. These concepts were described in separate publications, entitled the MTACCS Master Plan and the LFICS Architecture, initially published in the 1970s. These publications, periodically updated, served to describe the systems/equipment contained under the concepts, and provided an analytical framework of technical capabilities under various scenarios. Further, these publications provided a set of policy guidelines for systems/equipment development and acquisition which served to promote such features as system interoperability.

1.1.3 C2 Master Plan. As the development of the MTACCS and LFICS equipment progressed, their mutual relationship and interdependence became further refined. Accordingly, the MTACCS Master Plan, the LFICS Architecture and other related documents were combined and consolidated with the publication of the Marine Corps Command and Control Master Plan (C2 Master Plan) in 1983. This plan effectively brought together in one document, and under one set of policy guidelines, those systems and equipments critical to providing effective command, control and communications to the FMF. While not an acquisition document, it serves as a coordinating plan in the development, acquisition and employment of C2 systems/equipment. This fulfills a vital role under the Marine Corps system acquisition process which emphasizes a coordinated approach under the control of individual acquisition sponsors.

1.1.3.1 Master Plan Policies. Policies for development and acquisition of MTACCS and related systems cited in the US Marine Corps Command and Control Master Plan include the following extracts:

> "The need to maintain training/proficiency in manual back-up systems/ procedures due to possible non-availability of the automated systems in combat is mandatory.
>
> Marine Corps integrated logistics support (ILS) efforts will be conducted as an integral part of the acquisition process, including concept formulation. ILS planning will be pursued to ensure realistic application of ILS considerations as principal design parameters, along with cost, technical excellence, and simplicity in

operation and maintenance. Special emphasis will be placed on improving reliability and maintainability in order to reduce the requirement for personnel and high level skills in the operation and maintenance of MTACC systems. Requirements for operator and/or support personnel and requirements for personnel of higher technical groups must be identified and provided for as early as possible in the developmental process, but not later than MSARC III. Costs and time required for MOS training including student man-year requirements and the ability of existing schools to conduct the required training will be identified and refined for each MSARC review and resolved not later than Milestone/MSARC III, the production/deployment decision. Requirements should be expressed in terms of numbers by grade, skill level, and force structure."

1.1.3.2 Disparate Documentation. Notwithstanding the above, the emerging C4 systems are necessarily managed as separate acquisition programs each of which has its own wide variety of documentation. The number of documents and degree of detail therein varies widely between programs depending on variables such as when the program was initiated and the directives effective at that time, how and by whom the program is being managed, cost, and system complexity. Consequently the available personnel training and organizational documentation does not constitute a composite, thoroughly integrated approach.

1.1.4 System Impact.

1.1.4.1 Previous Forecast. Throughout the development process of these systems, concerns have been expressed over the ability to operate, maintain and move them on the battlefield. Landing Force Organizational Systems Study, LFOSS-79, dated 8 August 1980, identified certain computers, displays, printers, etc. associated with the MTACCS concept being introduced into the FMF during the 1978-1988 period. The study also noted that even more sophisticated communications equipment characterized by automation, cryptographic security and digital capability would be introduced into the inventory during the same period. Since 1980, however, several events have changed the forecast. For example, the system acquisition process resulted in cancellation of two of the eight MTACCS systems. Deletion of these systems reduced the total quantity of individual end items noted in the Marine Corps Development Center 1980 report by 28%. Offsetting and cancelling out this

reduction is the addition of the FMF-EUCE with solicitation N66032-86-R-0014 indicating that, "approximately 13,335 [EUCE] systems shall be required over the contract life." It should be noted here that all "systems" are not equivalent in their impact. Some are terminal devices, small and comparatively simple, while others are large and relatively complex assemblages. Each of the systems identified, however, are automated, require training and all require hardware and software support.

1.1.4.2 **Present Situation.** Of the fourteen systems identified within the scope of this study, six have successfully passed Marine Corps Program Decision Memorandum (MCPDM) III acquisition decision. The MCPDM III decision indicates that funding and supportability issues have been addressed and resolved to a currently acceptable degree. Decisions to acquire the remaining eight systems have yet to be made. Funding and supportability for these systems remain key issues and data for these systems is particularly susceptible to change. However, based on currently available data, this study will assess the organizational, personnel and training impacts generated by all fourteen systems.

1.2 Purpose

The purpose of this study is to determine personnel, training and organizational support concepts which will be required for the 14 systems shown in table 1-1 during the 1986 to 1996 time frame.

1.3 Study Objective

The objective of this study is to identify or design personnel and custodial organizational support concepts for the concurrent development of Marine Corps Tactical Command and Control Systems (MTACCS), TRI-TAC systems, and other computer-assisted, intelligence and supporting systems. The study will also address the training requirements for each of the stated systems. Listed below are the assumptions upon which the study is based.

1.4 Assumptions

Mission	The mission of the Marine Corps, as defined in the Marine Corps Long Range Plan (MCLRP), will remain substantially the same.
Force Structure	The Marine Corps organizational and personnel strengths as defined in the Marine Corps Mid-Range Objective Plan (MMROP) will remain consistent during the subject time frame (1986-1996).
Interoperability	Interoperability among Marine Corps and other service C3I systems will be achieved.
Communications Security	Communications Security (COMSEC) equipment will be integrated or integral to all tactical voice and data C2 systems.
Post Development Software Support (PDSS)	System software support will be provided from centralized, non-FMF support facilities.
System Documentation	Documentation prepared for system acquisition steps, including MCPDM review, will be available. Documents cited in the Statement of Work (SOW) apply to C4 systems in general. Custodial and personnel support requires specific documentation. Therefore, access to existing system acquisition

	documentation is necessary and will be available.
Configuration Management	Configuration management functions currently performed by the Information System Management Officer (ISMO) for the ADPE-FMF Program will also be performed by the ISMO for the FMF-EUCE Program.
Training	For Class I AISs that will be processed on the EUCE devices, training will be conducted by Marine Corps formal schools.
Fifth Echelon Repair	Fifth echelon repair requirements will not impact MAGTF C4 personnel and will not be considered in the scope of this study.
The FMF Information Systems Management Officer (ISMO)	The ISMO will have the staff responsibility for technical and training assistance in the FMF-EUCE Program.

1.5 Study Methodology

The four methods used to conduct the study are shown below.

1.5.1 **Research.** An extensive research effort was conducted of a variety of plans, letters, orders, directives, bulletins, Fleet Marine Force Manuals, programs, and previous studies. Annex A, Study References, identifies the material that was used in this effort.

1.5.2 **Interviews.** The interview process was used continuously to collect data and to update information. Personal interviews and meetings with

designated Acquisition Sponsor Project Officers (ASPOs) and Acquisition Project Officers (APOs) for each system under study, and with members of the Study Advisory Committee (SAC) provided an insight into current planning and decisions for system deployments. Field research visits to Marine Corps activities and commands on the East and West Coasts, especially interviews with functional managers and communications-electronics and ADP personnel at all levels of the FMF, provided data and an insight into the systems concept of operations and planning for deployment.

1.5.3 Scenario Development. The Composite MAGTF concept for the Marine Corps was the model used in this report. This provided for a common analytical base between existing and future studies. The Marine Corps Mid-Range Objectives Plan for Fiscal Years 1986-1995 (MMROP 86-95) reflects the primary Marine Corps planning document utilized for this study.

1.5.4 Systems Analysis. Previous research efforts to identify equipment arrangements over time typically aggregate the impact at the MAF level (see LFOSS-79). This study has examined the system delivery over time by individual T/E which provides a more accurate basis for assessment. Systems analyses were conducted based on data collected during this effort to determine the organizational and personnel impact that the fourteen systems under study will have on the Fleet Marine Forces. The results of those analyses have shaped the conclusions and recommendations of the study.

1.6 Report Organization

This report is organized into seven sections as shown below.

Section 1. **Introduction.** This provides a broad background for understanding how and why the study came about and the conditions under which the study was performed.

Section 2. **C4 Systems Description.** A summary description of each system is presented. The estimated delivery time to the FMF and the MCPDM III (production) decisions are also identified.

Section 3. **Organizational Employment and Custodial Relationships Within the FMF/MAGTF.** This section establishes two categories of systems - MAGTF and Unit, and their relationship within various levels of organization. Inventory objectives for each system are identified. It reviews and analyzes the custodial and organizational issues including personnel, operational and administrative control relationships of C4 systems. Recommended and alternative custodial concepts for the C4 systems are also provided.

Section 4. **C4 Systems Personnel and Training Support.** Section 4 is an analysis of data representing types and quantities of equipment associated with the systems under study including, where appropriate, the End-User Computing Equipment (EUCE) Program. It identifies and illustrates manning requirements and training implementation for system operation and maintenance. It also illustrates, over the study time-line, the cumulative impact of personnel manning requirements and the current and near term availability of the required personnel to support the employment of the stated C4 systems within the FMF/MAGTF.

Section 5. **FMF End-User Computing Equipment (EUCE) Program.** The Fleet Marine Forces-End User Computing Equipment Program requirements presents the FMF-EUCE Maintenance Concept, supply support, operator and technical training requirements, and other logistic support needs peculiar to

this program. It should be noted that the EUCE program is treated separately in this study in order to provide certain additional factors and analysis required by the sponsor.

Section 6. **C4 System Integration Planning Management Considerations.** Functional requirements are presented to assist in improving the efficiency of acquisition of C4 type systems.

Section 7. **Conclusions and Recommendations.** These are drawn from the previous sections. They present the findings of the study by discussing the specific task assignments based on the statement of work. Conclusions are drawn based on the study report and related research, and courses of action to be taken are recommended.

Annex A. **Study References.** Identifies the 58 references used in the study.

Annex B. **Planned Organizational (T/E-T/O) Allocation for C4 Systems.** Identifies and codifies the C4 systems levels of employment.

Annex C. **MAGTF C4 System Reference Data Sheets.** Provides a detailed reference to the 14 C4 systems of this study.

Annex D. **Planned Organizational (T/E-T/O) Allocation for End User Computing Equipment.** Shows the tentative allocation provided by the sponsor.

Annex E. **Personnel Requirements.** Presents the tables used in the study that were assembled to identify all

personnel needed for the operation and support of the C4 systems.

Annex F. **Systems Military Occupation Fields (OF) and Specialties (MOSs).** Contains the description of all MOSs which have been used in this study to differentiate one MOS from another.

Annex G. **Communications Security (COMSEC) Equipment Description.** Catalogs both current and projected COMSEC equipment that is to be used by the C4 systems under study.

Annex H. **Glossary.**

SECTION 2
C4 SYSTEMS SUMMARY DESCRIPTIONS AND PROGRAM STATUS

2.1 Introduction

Detailed descriptions of the systems under study are available in various forms. However, they are dated, fragmented, and they sometimes fail to include all collateral cryptographic equipment and programmatic information necessary for analysis. A summary description of each system and its status is included below, therefore, to provide a basis for subsequent organizational and personnel discussions. The production decision has a bearing on the accuracy of the projected delivery schedules which, in turn, impact personnel and training requirements. More detailed information is included in both Annex B, Planned Organizational (T/E-T/O) Allocation for C4 Systems, and Annex C, MAGTF C4 System Reference Data Sheets.

2.2 Automated Data Processing Equipment - Fleet Marine Forces (ADPE-FMF)

2.2.1 Early Introduction. The Automated Data Processing Equipment for the Fleet Marine Forces, a USMC development, was introduced into the FMF during FY81. Nicknamed the "Green Machine," this ruggedized version of the commercially available IBM Series One (modified) minicomputer was fielded as a deployable, noncombat essential, Table of Equipment (T/E) allowance item. The purposes of this equipment are to provide Class I source data automation and local computer support.

2.2.2 Distribution Substantially Completed. The initial delivery of 552 systems was made to the active forces which included all battalions/squadrons, separate companies, and selected higher headquarters. The basic system consists of the computer, video display, keyboard and printer. It was to be used to automate the input for the Marine Corps sponsored Class I AIS systems. The systems provide a means to input and retrieve data associated with major USMC Automated Information Systems (AIS) and to provide commanders

with a local processing capability. Distribution of units is complete, with final distribution of an additional 290 devices during FY86.

2.2.3 New Models. The new models have been substantially upgraded with a communications capability and an operating system to allow for the use of the many off-the-shelf software applications available for use on the commercial version. The older models are also being upgraded with the same capability. The introduction of the ADPE-FMF during FY81 provided the Marine Corps with a forerunner to the FMF-End User Computing Equipment (EUCE) program. One of the benefits of the program has been an in-depth knowledge of the actual data processing requirements in Marine Corps organizations. It has also provided a field experience baseline from which future requirements can be addressed. The follow-on FMF-EUCE program is being developed through analysis of this baseline and other documentation. The 842 ADPE-FMF devices will be replaced, starting in 1987, by up to 13,335 microcomputer systems acquired under the FMF-EUCE program.

2.3 Fleet Marine Forces-End User Computing Equipment (FMF-EUCE) Program

2.3.1 Description. The FMF-EUCE program is designed to replace the aging (by computer standards) ADPE-FMF devices with current technology. The EUCE will be used both in the garrison environment and deployed with FMF units. The systems are desktop models configured with the 80286 microprocessor, floppy and hard disk drives, dot matrix printer, monitor and transport cases. In addition to being ruggedized for field use, each EUCE will meet TEMPEST standards for the control of compromising emanations. Acquisition action has progressed to the release of an RFP for initial procurement with deliveries scheduled for late FY87.

2.3.2 Basis of Issue. The fifteen-fold increase of EUCE over ADPE-FMF is attributed to a much wider application of the systems in an AIS role and a virtual replacement of manual office systems. The ADPE-FMF was issued on a one or two per unit basis while the EUCE will be issued on a basis of one or

more per staff section. For example, at the Battalion/Squadron levels, the S-1, S-2, S-3, (S-4/Supply, Maintenance and Fiscal) sections will each have an EUCE allowance.

2.4 Deployable Force Automated Services Center/MAGTF Automated Services Center (DFASC/MASC)

The DFASC is comprised of an IBM 4341 minicomputer and associated peripherals, and an IBM series 1 mounted in two 35 foot semi-trailer vans, with an interconnecting walkway. The DFASC provides data processing capabilities in support of major deployable AISs required by a deployed/employed commander. The DFASC concluded its operational test and evaluation in April 1986 and was subsequently designated a fleet asset. Initially designated a prototype of the MASC, the DFASC is being considered for possible upgrades. Upon the conclusion of an ongoing requirements analysis, acquisition strategy for the follow-on to the DFASC, the MASC, will be developed.

2.5 Intelligence Analysis Center (IAC), AN/TYQ-19(V)

The Intelligence Analysis Center (IAC) is a key segment of the Marine Air Ground Intelligence System (MAGIS) which will provide the MAGTF commander with an improved, automation-assisted, consolidated, intelligence system. It is a tactical intelligence system which processes, disseminates and manages intelligence data. The IAC with automated data processing, communications and analyst facilities provides services at the MAF level. The IAC will process large quantities of multi-source intelligence including output from the Imagery Interpretation (II) System and the Tactical Electronic Reconnaissance Processing and Evaluation System (TERPES). The Marine Corps is scheduled to purchase eight Joint Service Imagery Processor Systems (JSIPS) to replace the Imagery Interpretation facilities at the three Force Imagery Interpretation, Training, and Software Support units. The JSIPS is a mobile ground processing facility designed to receive and exploit in near-real-time Side Looking Aperture Radar (SLAR), Infrared, and Electro-Optical (EO) systems carried

carried on reconnaissance aircraft as well as imagery received from national and theater resources. Marine Corps Program Decision Memorandum (MCPDM) III for the JSIPS is scheduled for FY89 with systems to be procurred in FY90 (2), FY91 (4), and FY92 (2). MCPDM III for the IAC was held in March 1981. Deliveries to the Fleet Marine Forces were initiated in FY85 and completed during FY86.

2.6 Digital Communications Terminal (DCT), AN/PSC-2

The Digital Communications Terminal (DCT), a USMC development, is a handheld, lightweight, microprocessor-based, programmable, digital communications, input/output, battery powered, display terminal. It will be used to compose, edit, review, store, retrieve, transmit and receive formatted or free text messages and digitized maps. It is an add-on piece of equipment used in conjunction with standard field radios. MCPDM III - 1982. Deliveries will commence during second quarter FY87.

2.7 Position Location Reporting System (PLRS)

The Position Location Reporting System (PLRS), a joint USMC/USA development, is a real-time, three-dimensional, crypto-secure, position location and identification system. Position Location Information (PLI) is provided for selected PLRS-equipped air and ground elements to assist with maneuver control, fire support planning/coordination and conflict avoidance. A PLRS platoon will be established in the Division Communications Company to operate and maintain the PLRS system. MCPDM III - 1982. Deliveries are scheduled to commence in FY87.

2.8 Battery Computer System (BCS), AN/GYK-29

The Battery Computer System (BCS), a U.S. Army development, is a battery-level artillery computer system which computes individual weapon firing data and provides a moving target prediction capability. It replaces the Army Field

Artillery Digital Automatic Computer (FADAC) system as a stand alone system in the Marine Corps, but interfaces with, and is integral to, the Army Tactical Fire Direction (TACFIRE) system. By using digital transmission and automated display vice voice transmission, the BCS provides improved data transmission between the Fire Direction Center (FDC) and the individual weapons. In addition to firing data computations, major BCS functions include data storage, fire mission data display, communications interface, message composition and editing and self-testing. MCPDM III - 1984. Deliveries are scheduled to begin in FY88.

2.9 Tactical Communications Center (TCC), AN/MSC-63A

The Tactical Communications Center (TCC), a USMC development, is a high capacity, semi-automated record message processing system. It will receive, store, transmit, format, error check, reproduce and distribute record messages primarily at MAF/MAB headquarters levels as well as at major ground, air, and logistic support command elements. The TCC will replace the current AN/TGC-37 and AN/TYC-5A equipment. The TCC uses the AN/MSC-63A hardware suite with changes to the operational software to allow processing of general service message traffic. The Reproduction/Distribution Facility (R/DF) is a second shelter to the TCC that will provide message reproduction and distribution services. The AN/MSC-63A was initially designed as a Special Security Communications Control (SSCC) equipment with 19 units being procurred in FY87 for that purpose. The TCC, a parallel program, will acquire 31 additional systems for general service communications use. The AN/MSC-63A/TCC acquisition is programmed for FY89, with distribution to the FMF in FY90. MCPDM III - FY87.

2.10 Unit Level Circuit Switches (ULCS), AN/TCC-42 and SB-3865

The Unit Level Circuit Switches (ULCS), a TRI-TAC development, encompass the AN/TTC-42 and the SB-3865 digital circuit switches. The AN/TCC-42 is an S-280 shelter-mounted, 150 line, telephone central office with integrated COMSEC

equipments. The SB-3865 is a team-transportable, 30 channel telephone switchboard, with a KG-93 trunk encryption device added if trunk security is required. The switches provide automatic digital switching service to and from a variety of digital and analog loops and trunks. MCPDM III - 1985. Deliveries are scheduled to begin in FY90.

2.11 Tactical Air Operations Module (TAOM)

The Tactical Air Operations Module (TAOM) is a joint USMC/USAF development with the Marine Corps as the lead service. The TAOM with associated radars and communications support equipment is a real-time, airspace management system, capable of coordinating and controlling both interceptor aircraft and surface-to-air weapons. This land-based, transportable system replaces command and control elements of the Tactical Air Operations Center (TAOC). TAOM executes the MAGTF anti-air warfare plan, provides positive airspace management services and control of surface-to-air missile units, and specified management tasks. MCPDM III - FY87. Deliveries to the FMF are planned during FY91-FY93.

2.12 Marine Integrated Fire and Air Support System (MIFASS)

The Marine Integrated Fire and Air Support System (MIFASS), a USMC development, is a real-time display and information processing system designed to assist the MAGTF commander and his staff in employing supporting arms more efficiently. It consists of equipment, a staff organization, and operating procedures selectively applied to integrate tasks and functions of the MAGTF ground combat element's Fire Support Coordination Center (FSCC), the aviation combat element's Direct Air Support Center (DASC), and some functions of the supporting artillery's Fire Direction Center (FDC). An FMF evaluation of the MIFASS developmental equipment will be conducted during FY87. MCPDM III - TBD. Deliveries are scheduled to begin in FY91.

2.13 Unit Level Message Switch (ULMS)

The Unit Level Message Switch, a TRI-TAC development with the USMC as lead developer, is a team-transportable 12 line message switch. The AN/GYC-7 switches digital data on a real-time basis and is capable of interfacing with synchronous subscriber data terminal equipment employing tactical message formats. MCPDM III - TBD. Deliveries are scheduled to begin in FY92.

2.14 Integrated Signals Intelligence System (ISIS)

The Integrated Signals Intelligence System (ISIS), a USMC development, is a MAGTF, semi-automated, tactical, signal intelligence (SIGINT), collection, radio direction finding (RDF), processing, analysis and reporting system. A complete ISIS system will be located in the Radio Battalion and will support a MAF. The system requires comprehensive communications connectivity including access to the SPINTCOMM/CRITICOMM network. The components of the system include the Communications Collection Outstation (CCO), which conducts communications-collection and direction-finding, and the Stand Alone Analyst Subsystem (SAAS), which conducts signals-intelligence analysis. MCPDM III - TBD. Deliveries are planned to begin in FY92 for the CCO and FY96 for the SAAS. The Marine Corps, however, will buy a total of six U.S. Army Technical Control and Analysis Centers (TCAC), AN/TSQ-130(V), as an interim capability for the SAAS. Deliveries of the TCAC to the FMF are planned for FY88-FY89 with 3 units going to each of the two Radio Battalions.

2.15 Tactical Combat Operations (TCO) System

The Tactical Combat Operations (TCO) System, a USMC development, is a semi-automated, on-line, interactive, secure, tactical command and control system. It provides data input, storage, retrieval and processing for real-time support of the G-2/S-2 and G-3/S-3 functions of planning, intelligence and operations. Equipment for TCO implementation is currently under review.

Final equipment configuration is subject to review of TCO test bed results. MCPDM IIA - late FY-87. Deliveries are scheduled to begin in FY93.

2.16 Summary

The C4 systems described above are scheduled to be issued to the FMF during the 1986-1996 period or shortly thereafter. Table 2-1, C4 Systems With MCPDM III Decisions, identifies the six systems that have been approved at the MCPDM III acquisition/production decision level and indicates the anticipated IOC dates. Table 2-2, C4 Systems Without MCPDM III Decisions, shows the remaining systems.

Table 2-1. C4 Systems With MCPDM III Decisions

SYSTEM	IOC
Automated Data Processing - Fleet Marine Force (ADPE-FMF)	FY-81
Intelligence Analysis Center (IAC)	FY-85
Digital Communications Terminal (DCT)	FY-87
Position Location Reporting System (PLRS)	FY-87
Battery Computer System (BCS)	FY-87
Unit Level Circuit Switch (ULCS)	FY-90
Tactical Air Operations Module (TAOM)	FY-91

Table 2-2. C4 Systems Without MCPDM III Decisions

SYSTEM	IOC
Fleet Marine Force-End User Computing Equipment (FMF-EUCE)	FY-87
MAGTF Automated Services Center	FY-89
Tactical Communications Center (TCC)	FY-90
Marine Integrated Fire and Air Support Systems (MIFASS)	FY-91
Unit Level Message Switch (ULMS)	FY-92
Integrated Signals Intelligence System (ISIS)	FY-92
Tactical Combat Operations (TCO)	FY-93

SECTION 3
ORGANIZATIONAL EMPLOYMENT AND CUSTODIAL RELATIONSHIP ANALYSIS WITHIN THE FMF/MAGTF

3.1 Introduction

3.1.1 **Purpose.** The purpose of this section is to examine custodial relationships of the fourteen subject systems by determining their concept of employment, examining the levels of organizational employment and defining custodial unit responsibilities to determine what the collective impact of these systems will have on the FMF in terms of operational and administrative effectiveness.

3.1.2 **Different Control Relationships.** The systems under study are distributed throughout all echelons of a MAGTF from headquarters elements down to separate battalions, companies, batteries, groups and squadrons. In accordance with Marine Corps equipment acquisition and material management policy, the C4 systems are allocated to specific standard Table of Equipment (T/E) units. Through the T/E, the unit commander becomes the custodian of specific equipment being provided to support the unit's function or mission. The diversity of the systems under study, both with respect to their functions and their distribution throughout the MAGTF units, render generalization based on custody alone impractical. However, the various control (i.e., custodial) relationships such as administrative and operational for each system can be analyzed and, where warranted, alternative and recommended concepts for organizational support can be derived. Each of the systems is analyzed with respect to their administrative and operational control relationships. The result is summarized in table 3-1, C4 Systems Control Relationships.

3.1.3 **Latest Considerations.** Annex B presents the Planned Allocations of C4 Systems by Table of Equipment (T/E) and Organization (T/O). Annex D, Planned Organizational (T/E-T/O) Allocation for End User Computing Equipment, identifies similar information for the EUCE. These annexes provide the reader

Table 3-1. C4 Systems Control Relationships

SYSTEM	PERSONNEL	OPERATIONAL	ADMINISTRATIVE
ADPE-FMF and FMF-EUCE	A stand-alone device manned by assigned unit personnel (no necessarily as a primary duty) in battalion/squadron, separate company and above units. Personnel may be of any rank or MOS as designated by unit commander.	Usually two or more devices per unit; supports commanders input requirements to Class 1 AIS and for local unit processing; using unit commander exercises operational control.	Using unit exercises administrative control of device; [illegible] of device(s) to unit in accordance with T.O.
DFASC/ MASC	Each unit requires 3 officers and 30 enlisted; on T/O of SERVICE Co., H&S Bn, FSSG; primarily OF 40; some augmentation required when deployed.	Considered a MAGTF commander's asset; operational control currently exercised by MAGTF commander through MAGTF logistic element commander to Director DFASC.	Service Co., H&S Bn, FSSG but responsive to ADP requirements of functional systems managers (i.e., SASSY, NIMCS). * See para. 3.3.1.4.3 for alternative recommendation.
IAC	Each unit requires 9 officers and 34 enlisted; on T/O of HQS Co., HQBN, DIVISION. Primarily OF 02 with OF 40, 59, 26 represented. See figure 5-6.	Considered as MAGTF (MAF/MAB) commanders intelligence system; operational control exercised by MAGTF commander through G-2.	HQT Co., HQSBN, DIVISION provides administrative control of organic equipment and personnel. * See para. 3.3.2.4.3 for alternative recommendation.
DCT	Operated primarily by OF 25 operators, but not limited to this skill. Operators as designated by unit commander.	Allocation of DCTS at the direction of unit commander. DCTs allocated throughout the MAGTF in quantity.	Normally, administrative control is exercised by using unit's communications organization.
PLRS	MS/AMS MS/AMS requires 1 officer and 30 enlisted; on T/O of COMM Co., HQBN, DIVISION as PLRS Platoon; primarily OF 25 with representation from OF 28 and 59. Operates/maintains, MS/AMS for MAGTF.	Considered a MAGTF (MAF/MAB) commanders location and navigation systems; MAGTF commander responsible for planning and employment of system. Physical location of MS/AMS is flexible.	COMM Co., HQBN DIVISION provides administrative control of PLRS Platoon containing the MS/AMS. * See para. 3.3.5.4 for alternative recommendation.
	UU User units in various configuration in MAGTF are operated by designated personnel as directed by unit commander. No specific MOS/grade required.	UU under direction of unit commanders.	UUs administrative control exercised by communications/avionics organization of using unit.
BCS	FDC section consists of 1 officer and 7 enlisted. BCS operates at battery level; all personnel are OF 08.	Artillery battery unit commander's operational system.	Normal administrative control of system by battery personnel. Maintenance support provided by ARTY, REGT Maintenance Section.

Table 3-1. C4 Systems Control Relationships (Continued)

SYSTEM	PERSONNEL	OPERATIONAL	ADMINISTRATIVE
TCC	Personnel from OF 25 are assigned to units communication organization (COMM Bn, DIVISION, WING, FSSG) System is part of communication system for unit's HQS.	Direct operational control exercised by communications unit commander implementing communications system of supported commander	Provided by communications unit having custody of system (COMM Bn, DIVISION, WING, FSSG).
ULCS -AN/TCC-42 -SB-3865	Personnel from OF 25 are assigned to unit's communications organization. System is part of communication network.	Direct operational control exercised by communications unit commander/OIC implementing communications network (primarily voice).	Provided by communications organization/unit having custody of switches.
TAOM	30 officers and 49 enlisted Marines in OF 72 assigned to MACS T/O for operation. 1 officer and 6 enlisted in OF 59 assigned to MACS T/O for maintenance.	TAOM supports air space management functions of Tactical Air Commander (TAC) for the MAGTF commander.	Marine Air Control Squadron, MACG, WING, provides administrative control of organic equipment and personnel.
MIFASS	Personnel organic to using unit operate MIFASS equipment; personnel primarily in OF 08, 72, 25.	MIFASS supports fire support coordination function of unit commander at all levels in a MAGTF.	Normally using units' FDC/ FSCC/communications section.
ULMS	Personnel in OF 25 on T/O of using unit.	ULMS supports tactical C^2 data switching requirement of a MAGTF unit commander as part of communications system.	Communications organization/section of using unit.
ISIS	OF 26 personnel found on the T/O of RADIO BN are required to operate a MAF sized ISIS.	RADIO BN unit commander directs ISIS employment in support of MAGTF commander and major subordinate units; staff cognizance exercised by MAGTF G-2.	ISIS equipment and personnel organic to RADIO BN.
TCO	Operated by unit G-3/S-3 and/or G-2/S-2 personnel. Usually in OF 02, 03, 08, 70, 72, 75 supported by OF 25.	System supports the unit commander at all MAGTF levels; G-3/S-3 and/or G-2/S-3 exercising staff cognizance.	Using unit provides administrative control normally under communications organization of unit.

with a detailed view of the planned distribution of C4 systems with quantities and projected delivery dates. While this information will obviously change as the programs mature, it represents one of the first collective views of the distribution of all automated systems. The information presented in the allowance annexes was derived from available logistics planning documents including Letters of Adoption and Procurement (LAP), Integrated Logistic Support PLans (ILSP) and Advance Logistics Orders (ALO). That information was updated and confirmed by contact with the various Acquisition Sponsor Project Officers (ASPO) or their equivalent. The allocations represent all current considerations on equipment custody and on the operational control of C4 assets.

3.2 Organizational Implications

3.2.1 **Mid-Range Objectives.** Optimum custody of C4 resources depends on the organizational structure of the command and control elements, in both their garrison and MAGTF configurations. The objective is to minimize the impact of C4 equipment on garrison to MAGTF transitions. The Marine Corps Mid-Range Objectives Plan for Fiscal Years 1986-1995 (MMROP, 86-95) is the primary planning document for the mid-range period. It provides the planning framework for the attainment of force structure and levels required to support national security objectives. Like many similar documents, the MMROP seeks to translate goals and objectives of the organization into a rational plan for achieving these objectives. In doing so it takes into account requirements levied on the organization and availability of resources. This obviously includes command and control requirements and the C4 resources necessary to meet them.

3.2.2 **Time and Mobility.** One of the fundamental goals of the Marine Corps is to maintain a force that is ready, responsive, and capable of combat whenever called upon. Inherent in this goal is the requirement to secure an objective area rapidly, which in turn is a function of time and mobility. In the contemporary environment, USMC operating forces "lean into" probable

objective areas through a combination of forward deployments, land and Maritime Prepositioning System (MPS) of supplies and equipment, and a general readiness to deploy in amphibious or commercial shipping as well as military or commercial airlift.

3.2.3 MAF Significance. Internally, the USMC has recognized that a Marine Amphibious Force (MAF) continues to be the required Marine Air-Ground Task Force (MAGTF) for most contingency missions and for sustained operations. However, the time required to move a MAF indicates that a force of a MAF size will most likely be assembled using a combination of existing forward deployed MAGTFs, MPS assets, fly-in echelons and combinations of other available FMF assets. To further reinforce the ability to assemble a credible size force for employment to probable objective areas, certain actions including establishment of permanent MAGTF headquarters (i.e., a total of 3 nucleus MAF and 6 complete Marine Amphibious Brigade (MAB) headquarters) have been taken. Additionally, evolving MAGTF concepts such as the composite MAGTF are being developed and implemented.

3.2.4 Composite MAGTF. The composite MAGTF concept reflects the understanding that achieving a MAF structure for sustained operations will most likely be accomplished through the "compositing" of FMF MAGTFs existing at the time of deployment and varying in size from a Marine Amphibious Unit (MAU) to a MAB. The smooth and rapid transition of these MAGTFs (i.e., compositing) into a MAF is an important issue that is currently being addressed within the Marine Corps. Detailed treatment of compositing and related subjects are found in references (1), (2), and (3) of Annex A.

3.2.5 Additional Restructuring. It is in the environment of the "compositing world" with its array of MAGTFs and MAGTF headquarters that the C4 systems custodial and organizational relationships must be examined. One should also note that, in addition to the establishment of the MAGTF headquarters, some recent internal restructuring is taking place to enhance the ability of various units to support the "compositing" concept. Two

restructuring actions are provided as illustrations. Within the Headquarters Battery of the Artillery Regiment, the maintenance section is being modified to create a capability to provide maintenance support for two separately deployed MABs and one non-deployed battalion. Secondly, the proposed reorganization of the Force Communications Battalion creates two Communications Companies, each designed to support a MAB headquarters. These internal restructurings are but a part of the Marine Corps efforts to enhance operating force responsiveness and can be viewed as further implementation of the compositing concept. They also establish precedents for the distribution and control of C4 resources.

3.2.6 Two Categories. For purposes of organizational analysis, the C4 systems are divided into two categories or levels of systems - MAGTF and Unit level categories. MAGTF level systems are those systems allocated to only one type standard FMF unit and which generally support a MAGTF as a whole; for example, the Intelligence Analysis Center (IAC) assigned to the Headquarters Company, Headquarters Battalion, Marine Division. Unit level systems are those systems with multiple distributions throughout various FMF organizations which enhance the standard organization's capability, for example, the Digital Communications Terminal (DCT). Paragraph 3.3 addresses the MAGTF systems and paragraph 3.4 covers the unit level systems. Both use the following format:

a) System identification with summary description;

b) Concept of Employment;

c) Levels of Employment;

d) Custodial Responsibility; and

e) Analysis.

3.3 MAGTF Systems

MAGTF level systems, as previously defined include:

a) MAGTF Automated Services Center (MASC);

b) Intelligence Analysis Center (IAC);

c) Tactical Air Operations Module (TAOM);

d) Integrated Signals Intelligence System (ISIS); and

e) Position Location Reporting System (PLRS) Master Stations.

3.3.1 **Deployable Force Automated Services Center/MAGTF Automated Services Center (DFASC/MASC).** The MASC is conceptually an independent complex of commercial automated data processing equipment (ADPE) integrated into MILSTD semi-trailer vans to provide central processor/mass storage and ADP operations support for MAGTF ADP requirements in a deployed environment.

3.3.1.1 **Concept of Employment.** The MASC will provide the MAGTF commander with essential data processing support for brigade size or larger units which are on extended deployment or in combat. It will support existing and planned manpower and logistic applications. The current concept of employment is under review but it is anticipated that the MASC will be employed at the MAGTF command post level under this concept. The equipment and personnel will be attached to the MAGTF Headquarters from FSSG.

3.3.1.2 **Levels of Employment.** The MASC will be under the operational control of the MAGTF commander and will be employed at MAF or MAB level. In a MAF employment the MASC may be further employed down to the Division, Wing FSSG level.

3.3.1.3 Custodial Responsibility. There are no current acquisition plans for the MASC and no Inventory Objective (IO) has been set. An economic analysis is under consideration to determine the feasibility of upgrading the current DFASC. Custodial responsibility for the MASC will remain as for the DFASC unless some change is directed.

3.3.1.4 Analysis. The DFASC/MASC operates under the direct supervision of a director (e.g., OIC) who is primarily responsive to the data processing needs of the CG FSSG and secondarily to the AIS users within the MAGTF. The nature of DFASC/MASC operations indicates that the physical location must be in a relatively secure area with other support type units. Since the DFASC/MASC operates comparatively autonomously, custody alternatives based on operations and maintenance considerations can be developed. Skills required include computer systems analysis, software design, and computer peripheral equipment operator functions in support of Marine Corps information systems. Computer operators must attend the Basic Operators Course or complete six months of managed on-the-job training in computer operations. In that the DFASC/MASC must process electronically data received from internal and external sources, it acts, in large measure, like a communications terminal. Two alternatives other than Service Co., H&S Bn, FSSG are shown below:

3.3.1.4.1 Alternative #1. The DFASC/MASC configuration consists of a complex of ADP equipment integrated into two MILSTD semitrailer vans which supports MAGTF ADP requirements, requiring generator power and, for mobility, a prime mover. The configuration can be compared to heavy duty communications equipment. Further, the DFASC/MASC has a requirement to pass data via electronic means externally and internally with respect to the AOA. Security would be enhanced by placing it in the vicinity of other secure facilities requiring a security force, and costs of cabling could be reduced by shortening the communications lines needed. These factors suggest that organizational efficiency could be gained by placing the DFASC/MASC in the Communications Company, H&S Bn, FSSG.

3.3.1.4.2 **Alternative #2.** For similar reasons relating to equipment configuration and the requirement to pass data electronically, the DFASC/MASC custody could be passed to the Force Communications Battalion. The Support Company of the proposed Communications Battalion reorganization contains heavy equipment, characterized by its low density, and third/fourth echelon maintenance. Further, the Communications Battalion is operationally responsive to the MAGTF commander and the DFASC/MASC is designed to support MAB/MAF operations. The disadvantage of this alternative is that it would remove the DFASC/MASC from its daily primary users in the FSSG.

3.3.1.4.3 Finding. The custody of the DFASC/MASC should remain in the FSSG but be assigned to Communication Company, H&S Bn, FSSG for more positive operational and maintenance support, as indicated in alternative #1.

3.3.2 Intelligence Analysis Center (IAC), AN/TYQ-19(V). The IAC is a segment of the Marine Air Ground Intelligence System (MAGIS). It consists of personnel, equipment, software and procedures that support all-source intelligence activities for the MAGTF.

3.3.2.1 Concept of Employment. The IAC is to be employed by the FMF, operating independently or in concert with other MAGIS segments, normally at the senior MAGTF Headquarters established ashore. It will receive an initial tape update from the shipboard Navy Intelligence Processing System upon establishment ashore to allow commencement of independent operations. Information and intelligence exchange will continue between the IAC and the Joint Intelligence Center (JIC) aboard ship as long as the amphibious task force remains in the AOA. Intelligence generated within the IAC will be distributed to lower echelons via the TCO or special intelligence channels. Conversely, information from lower echelons will be funneled through TCO to the IAC.

3.3.2.2 **Levels of Employment.** The IAC will be under the operational control of the MAGTF commander and will be employed at MAF or selected MAB levels. Direct day-to-day operational control will be exercised by the unit's G-2.

3.3.2.3 **Custodial Responsibility.** The IO for the IAC is six units distributed as indicated below. Systems assigned to HQ Bn of the divisions are planned to be transferred to HQ Co., MAF upon establishment of a permanent T/E for that unit.

a) One IAC to Tactical Intelligence Systems Integration Facility (TISIF), MCLB, Barstow, CA;

b) One IAC to Headquarters Battalion, 3rd Marine Division for deployment with III MAF;

c) One IAC to Headquarters Battalion, 2nd Marine Division for deployment with II MAF;

d) One IAC to Headquarters Battalion, 1st Marine Division for deployment with I MAF;

e) One IAC to NMITC, Dam Neck, Virginia; and

f) One IAC to MCLB, Barstow, California.

3.3.2.4 **Analysis.** The planned inventory objective of six IACs was completed during FY86. The IAC provides a capability for direction and management of the intelligence collection effort and the dissemination of intelligence information.

3.3.2.4.1 **Personnel Considerations.** Each unit requires a total of nine officers and thirty-four enlisted operational and maintenance personnel. The unit will consist primarily of Occupational Field 02 with Occupational Field 40, 59, and 26 represented. There are sufficient numbers of intelligence personnel in the G-2 sections who, with additional training, will be capable of operating an IAC system. The two specific MOSs affected by the introduction of the IAC are MOS 4034 and MOS 5977. The total number of new personnel required is 33 or 20-MOS 5977 and 13-MOS 4034. This information was extracted from the POM 83 program request/justification sheets.

3.3.2.4.2 **Operational Considerations.** Headquarters Company, Headquarters Battalion, Marine Division is currently tasked by T/E and T/O to provide administrative control of the IAC equipment and personnel until the MAF is activated for operations. Then both the organic equipment and personnel are reassigned as a MAF asset. The IAC is considered a MAF commander's asset with operational control of the system being exercised through his Assistant Chief of Staff, G-2. The IAC system is currently assigned to the Headquarters Battalion, Marine Division. Operationally, the system is considered a MAGTF asset. However, the MAGTF commander may not necessarily be the Division Commander. MABs building to MAF size MAGTFs appear as the likely initial employment mode particularily in view of contemporary compositing concepts for MAGTF formation.

3.3.2.4.3 **Findings.** In view the above factors, the alternative which suggests itself for the system is custody by the Force Communications Battalion. The Communications Battalion is operationally responsive to the MAGTF commander and the IAC is designed to support MAF operations. Specifically, the IAC lends itself both operationally and logistically to custody of the Support Company, Force Communications Battalion.

3.3.3 **Tactical Air Operations Module (TAOM) AN/TYQ-23(V)1.** The TAOM is being developed as an element of the Marine Air Command and Control System

(MACCS). Under the MACCS concept it will replace present command and control (C2) elements of the Tactical Air Operations Center (TAOC).

3.3.3.1 **Concept of Employment.** The TAOMs will function as a Tactical Air Operations Center (TAOC) for Marine Air-Ground Task Forces (MAGTFs) up to Marine Amphibious Force (MAF) size. The TAOC may vary from one to four TAOMs with two TAOMs being considered the minimum and four TAOMs being the normal to perform real-time air C2 functions. Each MAF will have the capability of deploying two TAOCs, each with its own primary air sector of responsibility. The TAOM operating as a TAOC will interface with other TAOCs, Direct Air Support Centers (DASC), Tactical Air Command Center (TACC), Tactical Combat Operation Centers (TCO), HAWK firing units and other Marine Corps agencies such as MIFASS. It will provide versatility to permit the Tactical Air Commander to deploy the air control capability required to defend rapidly against the enemy air threat.

3.3.3.2 **Levels of Employment.** The TAOM will be employed at the MAF and MAB level.

3.3.3.3 **Custodial Responsibility.** The TAOMs will be assigned to the Marine Air Control Squadron (MACS), Marine Air Control Group (MACG), of the Marine Aircraft Wing (MAW). The IO for the TAOM is forty-eight distributed to the following organizations:

a) Marine Corps Comm-Elect School, 29 Palms, California - 8;

b) Marine Corps Tactical System Support Activity (MCTSSA), Camp Pendleton, California - 4;

c) 1st Marine Aircraft Wing (MACS-4) - 4;

d) 1st Marine Brigade (MACS-2) - 4;

e) 2nd Marine Aircraft Wing (MACS-5, MACS-6) - 8;

f) 3rd Marine Aircraft Wing (MACS-1, MACS-7) - 8;

g) 4th Marine Aircraft Wing (MACS-23, MACS-24) - 8; and

h) Operational Readiness Float (ORF) - 4.

3.3.3.4 Analysis. The TAOM is essentially the long-awaited modernization of the current Marine Air Command and Control System (MACCS), a 60s vintage suite of equipment. The TAOM will be allocated to the Marine Air Control Squadron (MACS), Marine Air Control Group (MACG), in the Marine Aircraft Wing. Since the function of the TAOM is to support the anti-air warfare activities of a MAGTF, a MACS mission, custodial arrangements for this system remain as for the replaced system, i.e., the TAOC suite of equipment. The TAOM as fielded represents a significant decrease in weight and cube over the current MACCS C^2 System. Additionally, because the equipment is new and because increased reliability is inherent in the TAOM configuration, a projected decrease in maintenance personnel in the MACS has resulted. Current planning calls for a decrease of 19 maintenance personnel in the MACS when TAOM is fielded. Since TAOM replaces existing equipment and since no change to the MACS mission is expected by introduction of the TAOM, the study finds no reasons to change the personnel, administrative or operational control relationships currently planned for the system. These relationships should remain as summarized in table 3-1.

3.3.4 Integrated Signal Intelligence System (ISIS). The ISIS is a communications-collecting, radio direction finding, and signals intelligence (SIGINT) analysis system. It is composed of twelve Communications Collection Outstations (CCO) for collection and direction finding and seven Stand Alone Analyst Subsystems (SAAS) which conduct signals intelligence analysis.

3.3.4.1 Concept of Employment. ISIS is a signal intelligence system and, as such, its concept of employment is classified.

3.3.4.2 Levels of Employment. ISIS will be employed by the Radio Battalion in support of MAGTF operations.

3.3.4.3 Custodial Responsibility. The inventory objective for the ISIS has not been determined. However, the systems will be identified and located in the Radio Battalions. Sufficient numbers of components will be identified in each of the two Radio Battalions to support three MAFs. The Marine Corps will buy a total of six U.S. Army Technical Control and Analysis Centers (TCAC), AN/TSQ-130(V), as an interim capability for the SAAS. Deliveries of the TCAC to the FMF are planned for FY88 - FY89 with three units going to each of the two Radio Battalions.

3.3.4.4 Analysis. The description of the ISIS that was identified earlier in Section Two of the study may change. Current developments in this restructuring include the field testing of the TCAC and a revalidation of the CCO. The system is organic to the Radio Battalion and is operated and maintained primarily by personnel in Occupational Field 26. Each Radio Battalion will be equipped with an ISIS system to support a MAF. In operational use, 2-4 interactive SAASs will support the MAGTF from the command post area. Additional SAASs may be deployed with divisions or regiments depending on the size and mission of the MAGTF. The Radio Battalion T/O will be adjusted to include personnel (TBD) dedicated to ISIS hardware and software support. There is no requirement for new operator MOSs for the ISIS system. Maintenance personnel requirements are to be analyzed based on skill levels required for the restructured CCO and the yet-to-be-determined SAAS. It is anticipated that a new maintenance MOS will be required in addition to those now reflected in the T/O. Since the Radio Battalion, as a unit, is normally under the operational control of the MAGTF commander, there is no feasible alternative for assigning the ISIS system custody to other than the Radio Battalion.

3.3.5 Position Location Reporting System (PLRS). The PLRS is an automated tactical data system which produces real-time position location and identification information for selected PLRS-equipped air and ground elements and vehicles. A PLRS consists of two major elements, the Master Station (MS) and the User Unit (UU). The Master Station is a sheltered multiprocessor system which performs centralized network management functions, automatic processing of position, navigation, and identification information for each user and provides real-time display for command and control functions and coordination purposes. The second element consists of User Units. Each UU is individually identifiable to the MS and performs reception, transmission, range measurement, and various signal and message processing functions necessary for position location and communications operations within the system. For purposes of this report the master station is treated as a MAGTF system and user units as unit systems.

3.3.5.1 Concept of Employment. The Master Station will be employed to provide position and navigation service to a community of users. It will provide precise position location to a using unit. This information will also be made available to MIFASS, TCO, TACC, DASC and the TAOM through automated interfaces. Position information can be used by both ground and air equipped units for navigation purposes.

3.3.5.2 Level of Employment. The Master Station will be employed at the MAGTF headquarters with an Alternate Master Station (AMS) employed with the alternate CP. The AMS will monitor the MS operation and assume system control when directed or upon MS failure.

3.3.5.3 Custodial Responsibility. The planned inventory objective for the PLRS MS/AMS is 26, to be distributed as follows:

a) Comm Co. HQ Bn. 1st MAR DIV - 6;

b) Comm Co. HQ Bn. 2nd MAR DIV - 6;

c) Comm Co. HQ Bn. 3rd MAR DIV - 6;

d) Comm Co. HQ Bn. 4th MAR DIV - 6;

e) MCTSSA - 1; and

f) MCCES - 1.

3.3.5.4 Analysis

3.3.5.4.1 **The Compositing Effect.** The PLRS MS equipment is part of the PLRS Platoon of one officer and 30 enlisted personnel planned for the Communications Co. Headquarters Battalion, Infantry Division. This platoon operates and maintains (to 3rd echelon) the PLRS Master Station and Alternate Master Station. As noted in the concept and level of employment for this system, the MAGTF commander is responsible for operation of this system. Under current FMF employment concepts for MABs and MAFs, the MAGTF commander is not necessarily the Division commander. This creates the situation where one commander, the Division commander, is responsible for operating and maintaining a system in garrision for another commander, i.e., the MAGTF commander, who is responsible for the system during a MAGTF operation. This suggests that the PLRS Platoon and the PLRS MS system should be organizationally located to conform to the operational concept. The Communications Battalion, FMF, is designed to support a MAGTF commander's C2 requirements at the MAB/MAF level.

3.3.5.4.2 **Maintenance Considerations.** Comm. Bn, FMF, is a unit which is capable of maintaining low density, complex communications-electronics equipment similar to the PLRS MS. Accordingly, the study finds that the PLRS Platoon be allocated to the Communications Battalion in order to conform to the level of employment and the operational employment concepts stated for the PLRS MS. It should be noted that distribution of the User Units should remain as planned. The need to determine the locations of the Master and

Alternate Stations during garrison and training, and the schedule of operation of the Master Station and Alternate Master Station to accommodate the training requirements of Division and Wing units will require substantial, but not unusually difficult, coordination among all affected operations and communications personnel.

3.4 Unit Systems

Unit systems are those with multiple distributions throughout various FMF organizations. For this analysis, C4 systems considered as unit level systems are:

a) Digital Communications Terminal (DCT);

b) Automated Data Processing Equipment - Fleet Marine Force (ADPE-FMF);

c) Fleet Marine Force-End User Computing Equipment (FMF-EUCE);

d) Battery Computer System (BCS);

e) Tactical Communications Center (TCC);

f) Unit Level Circuit Switches (ULCS);

g) Marine Integrated Fire and Air Support System (MIFASS);

h) Unit Level Message Switch (ULMS);

i) Tactical Combat Operations (TCO) System; and

j) Position Location and Reporting System (PLRS) User Units.

3.4.1 Digital Communications Terminal (DCT), AN/PSC-2. The DCT is a hand-held programmable input/output unit used for composing, editing, transmitting, receiving, and displaying messages in conjunction with standard military radios. The terminal enables the user to transmit/receive messages in short digital bursts. It provides point-to-point and netted communications between mobile and static stations over a variety of military radios and COMSEC equipment.

3.4.1.1 Concept of Employment. The DCT is to be used as a communications terminal device by both mobile and static subscribers in the FMF to provide source data entry for data or record traffic. It will be used primarily as a device for entry of data into tactical data systems to avoid the delays, errors, and EW vulnerability inherent in voice origination or relay of data inputs. Tactical Data Systems (TDS), such as MIFASS and TCO, require the use of a digital communications terminal to ensure their effective performance. Maintenance, from organizational through 5th echelon, will be conducted by the Marine Corps. An Integrated Logistic Support Plan has been prepared which provides an IOC of 459 items in FY86.

3.4.1.2 Level of Employment. The planned inventory objective of the DCT is 2,914 units. The units will be employed throughout the MAGTF at all echelons down to and including platoon and separate sections such as Forward Observer teams. Annex B, Planned Organizational (T/E-T/O) Allocation for C4 Systems, lists specific units that will maintain and employ the DCT.

3.4.1.3 Custodial Responsibility. The using unit will maintain custody of the DCT.

3.4.1.4 Analysis. As a high density, user operated and maintained commodity device the DCT will be a unit T/E item. As such, custody of the equipment will be with the employing units and special custody or employment arrangements will not be involved. It will not require additional personnel or formal training for operator personnel in the using units. However, on-the-

job training is required for operator personnel and formal training has been scheduled for MOS 2841, 2861, and 5911 personnel who will perform the 2nd through 5th echelon maintenance. Since the 2,914 DCTs will be spread across rifle company and higher units, and will not require additional personnel in those units, the impact appears to be minimal. However, the impact on the user may be significant in that the DCT adds an additional logistics load to tactical communications teams that are already heavily burdened. The 4.2 pounds of equipment included by a DCT with its accessories and batteries represents an increase over the already substantial pound load of a PRC-77 with its associated KY-38 and batteries. Based on a reasonable and sustainable load in combat, it is evident that the addition of the DCT can change a radio operator to a radio team requirement. Depending on the situation, the following accessories may be added to the operator's load:

a) Map Generation Unit, 25 lbs., 1 cu. ft.;

b) AC/DC Power Converter, 11 lbs., 1000 cu. in.;

c) DC/DC Power Converter, 12.5 lbs., 168 cu. in.;

d) Audio Frequency Coupler, 8 lbs, 93 cu. in.; and

e) Up to 11 various interface cables.

3.4.2 **Automated Data Processing Equipment-Fleet Marine Force (ADPE-FMF).** The ADPE-FMF system (Green Machine) is a ruggedized IBM Series 1 data processing equipment. It includes a CPU/display, printer/keyboard, paper tape punch and magnetic tape drive. It is a general purpose, stand alone system that provides deployable capability for input to existing Automated Information Systems (AIS).

3.4.2.1 Concept of Employment. The ADPE-FMF has been operational since 1981 and is in both garrison and deployed environments as an entry device for Class I and II AISs down to the battalion/squadron level. It also provides a local processing capability for the unit commander. The system performs a supporting role in the unit's administrative/management process.

3.4.2.2 Level of Employment. The IO for the ADPE-FMF is 842 units. The units are employed at MAF/MAB level down to individual squadrons/battalions. Annex B lists specific units that maintain and employ the ADPE-FMF.

3.4.2.3 Custodial Responsibility. ADPE-FMF equipments are normally on the T/E of the H&S Company of the units and have become established as organic equipment. They are managed by the Information Systems Management Officer (ISMO) and operated by the users, i.e., no special personnel are assigned. In units without an ISMO, an Information Systems Coordinator (ISC) is assigned on an additional-duty-basis to manage the system and serve as liaison to the ISMO. The ADPE-FMF equipments are normally deployed with the headquarters elements and no special custodial requirements exist.

3.4.2.4 Analysis. Introduced over 5 years ago in the FMF, the ADPE-FMF device is now considered a mature system and will shortly be replaced by the FMF-EUCE system. It was originally fielded to provide a source data automation capability for 60 battalions, squadrons and separate companies as well as to provide a local data processing capability for small units. The system has proven useful in garrison and during deployments. In addition to its originally fielded capabilities, additional applications and uses have been developed by the FMF. Many of these applications serve as justification for applications planned for the FMF-EUCE program. At the unit level, these systems have been operated by personnel in the functional areas of administration and supply. Since these systems are allocated throughout the FMF by T/E, they are administered basically as unit property and allocated within the units staff sections as the commander directs. In view of their functions within the unit, the study finds no reasons to change the current

custodial relationship policies with respect to the ADPE-FMF. These custodial relationships are summarized in table 3-1.

3.4.3 Fleet Marine Forces-End User Computing Equipment (FMF-EUCE). The FMF-EUCE system will replace the existing ADPE-FMF systems with modern technology. The standard system will include a 80286 microprocessor, industry's currently fielded MS-DOS microprocessor. It will also feature floppy and hard disk drives, a monitor, printer and carrying cases. It is a stand-alone, ruggedized system with TEMPEST features for the control of electromagnetic emanations. In addition to replacing the ADPE-FMF system, additional EUCE systems will be fielded in order to provide a standard system for end user computing requirements.

3.4.3.1 Concept of Employment. The employment concept for FMF-EUCE is similar to that of the ADPE-FMF. The increased numbers of FMF-EUCE are required to support the newly developing Automated Information Systems that will replace those ADPE-FMF systems currently supported.

3.4.3.2 Level of Employment. The planned inventory objective for FMF-EUCE is 13,335. These systems will be employed at echelons down to and including battalion/squadron level. The systems will be resident in staff offices, supply, administration, and other supporting sections.

3.4.3.3 Custodial Responsibility. Custodial responsibility for the FMF-EUCE will be the same as for ADPE-FMF. Annex D, Planned Organizational (T/E-T/O) Allocation for End User Computer Equipment, lists units by T/E that will have custody.

3.4.3.4 Analysis. The FMF-EUCE system is billed as the replacement for the ADPE-FMF system. The study notes that the 13,335 FMF-EUCE system makes it the largest program, in number of units, of any of the 14 systems studied. The ADPE-FMF maintenance was performed by a commercial vendor. Current plans indicate FMF-EUCE maintenance will be performed by the USMC, after initial

warranty period expiration. From an operational perspective, the systems can be employed by using units with minimum perturbation. That is, these systems represent a minimum impact on custodial units. However, the current maintenance plans indicate that the Electronics Maintenance Company, FSSG will have the responsibility for FMF-EUCE maintenance through 3rd/4th echelon. It can be anticipated that the maintenance workload on this unit will be significant, particularly when combined with the workload represented by the introduction to the FMF of the DCT and PLRS(UU). The study recommends no change to the custodial relationships planned for the FMF-EUCE as depicted in table 3-1. However, in recognition of the additional maintenance workload represented by the cumulative addition of the FMF-EUCE, DCT and PLRS(UU) the study recommends that the workload on the Electronics Maintenance Company, FSSG be closely monitored concurrently with these systems' fieldings and that appropriate adjustments to this unit's structure be made accordingly.

3.4.4 Battery Computer System (BCS), AN/GYK-29. The BCS is a computer-based system which provides for technical information, recording, processing, computation, manual entry, display, control, and digital transmission of tactical and/or technical firing data from the Fire Direction Center (FDC) to the individual weapons.

3.4.4.1 Concept of Employment. The BCS will replace the FADAC, M-18, currently used in the artillery battery FDC beginning in FY87. The BCS will provide an improved capability to compute firing data and interface with MIFASS via tactical radio or wire. It will also provide a direct link (radio or wire) to the weapons for the transmission of fire commands thereby improving response times by the elimination of voice transmissions and manual recording of firing data.

3.4.4.2 Level of Employment. The BCS will be employed at the Fire Direction Center and at the firing batteries. The inventory objective for BCS is 167.

3.4.4.3 Custodial Responsibility. Custody of the BCS will be at the firing batteries of both Direct and General Support battalions.

3.4.4.4 Analysis. The BCS is an important component of the artillery battery commander's command and control system. It is also a modernization and replacement for the obsolescent FADAC system. This improved capability will be operated solely by the artillery personnel in the firing battery Fire Direction Center (FDC). Maintenance beyond battery capability is furnished by the Headquarters Battery, Artillery Regiment whose electronics-maintenance section is being restructured to accommodate the BCS introduction. Existing MOS 2885, FADAC repairer, will be converted to BCS repairer. Two additional 2885 personnel will be added to the electronics-maintenance section to accommodate the requirement to support two MABs and a remaining artillery unit. Since the BCS is replacing a current system, and no change in the operational mission of the artillery is contemplated, the study finds that the personnel, administrative and operational cost and relationships currently planned for the BCS should remain unchanged, and as reflected in table 3-1.

3.4.5 Tactical Communications Center (TCC). The TCC is a replacement for the current AN/TYC-5, Data Communications Terminal, and the AN/TGC-37, Communications Central. Operationally it will form part of a higher headquarters record traffic communications system within a MAGTF.

3.4.5.1 Concept of Employment. The TCC will be employed to process record message traffic at those command echelons receiving, transmitting or relaying high numbers of messages on a daily basis.

3.4.5.2 Level of Employment. The TCC will be employed at the MAB/MAF headquarters element and at the Division, Wing and FSSG Command Posts or Alternate Command Posts.

3.4.5.3 Custodial Responsibility. The inventory objective of the TCC is 31 systems. Systems will be allocated to the Communications Battalion, Division Communications Company, Wing Communications Squadron and FSSG Communication Company. Annex B lists specific unit holders.

3.4.5.4 Analysis. From a logistics supportability perspective, the TCC provides the FMF significant advantages. It will completely replace two currently fielded systems, the AN/TYC-5 and the AN/TGC-37. This will reduce not only the weight and cube lift requirements for the MAGTF, but will also reduce the repair parts requirement. Additionally, the technician MOSs required for the current two systems can be combined into one MOS thereby reducing the training requirements. The TCC system will primarily support the record traffic requirements of the MAGTF and will be integrated into the overall MAGTF communications system. Therefore, it is appropriate that the custodial relationship currently planned be retained. The study finds that these TCCs should be allocated as planned to the Wing, Division, Communications Battalion communications units.

3.4.6 Unit Level Circuit Switches (ULCS). The ULCS program consists of two tactical telephone switchboards, the AN/TTC-42(V), and the SB-3865( )(P)/TCC. The AN/TTC-42 is a 150 line, sheltered telephone central providing automatic switching service and subscriber service functions to the TRI-TAC family of four-wire, digital subscriber and non-secure voice terminal telephone instruments (DSVTs and DNVTs) and to four-wire digital trunks. It will also provide limited service to four-wire analog telephone instruments. It will be interoperable with the Switchboard, Telephone, Automatic SB-3865, and other inventory digital and analog switching equipment. The SB-3865 is a digital, 30 line, team transportable, automatic switchboard, stackable to 90 lines. It will provide service to digital telephones (DSVT and DNVT) and limited service to four-wire analog telephones.

3.4.6.1 Concept of Employment. The ULCS will be used at all echelons down to and including the regimental/group level to provide switching capability

for general purpose voice and data subscribers and selected point to point subscribers. Trunking between senior and subordinate and adjacent units will be via the ULCS.

3.4.6.2 Level of Employment. The AN/TTC-42 will be employed at MAF, MAB, Division, Wing, FSSG and Artillery Regimental levels. The SB-3865 will interface with the AN/TTC-42 and will primarily be used at regimental/group level and above. The inventory objective for the AN/TTC-42 is 67; for the SB-3865, 430.

3.4.6.3 Custodial Responsibility. Communications organizations within using MAGTF units will have physical custody of the ULCS. Annex B lists the specific holders.

3.4.6.4 Analysis

3.4.6.4.1 ULCS. The ULCS program encompasses two separate circuit switches, the AN/TTC-42 and the SB-3865. The major operational differences are in their relative mobility and in their distribution within the MAGTF. Both systems constitute an important element in a unit's communications network, providing the MAGTF, in conjunction with appropriate transmission systems, a voice network for command and control purposes.

3.4.6.4.2 AN/TCC-42. The AN/TCC-42 will be operated and maintained by a Call Service Attendant (MOS-2512) and a Supervisor/Maintainer (MOS 2515) created for the fielding of the equipment. The Supervisor/Maintainer will be responsible for initial installation, initialization, organizational maintenance and proper operation of the COMSEC equipment. All duties and tasks are performed using the facilities of the Switch Maintenance Supervisor position. There is an approved manpower initiative to add thirteen E-7s, twenty-five E-6s, and fifteen E-5s to MOS 2515 to support the AN/TTC-42. Formal school training will be held at Ft. Gordon, Georgia or at a school to be identified by the U.S. Air Force.

3.4.6.4.3 SB-3865. The SB-3865 Call Service Attendant function will be performed by MOS 2512 with no formal school training required. The Installer/Maintainer, MOS 2514, created for the fielding of the SB-3865, will be responsible for initial installation, initialization, organizational maintenance, and proper operation of the COMSEC equipment. Formal schooling is required and will be held at Ft. Gordon, Georgia. A manpower initiative to add 13 E-5s to the FMF for the support of the SB-3865 has been approved.

3.4.6.4.4 Findings. The ULCS are allocated to the communication organizations within the MAGTF units. They are primarily operated by Occupational Field 25 personnel and are under the cognizance of the communications officer. Maintenance support billets for the ULCS program at each FSSG (electronic maintenance company) have been identified:

MOS	BILLET
2811	Telephone Technician
2822	Electronic Switching Equipment Technician
2881	COMSEC Equipment Technician
5911	Micro-miniature Circuit Repairman
1342	Engineer Equipment Mechanic

3.4.7 Marine Integrated Fire and Air Support System (MIFASS). MIFASS is a real-time display/information processing system which is being designed to provide selective automation of command and control functions required for integrated employment of supporting arms available to the MAGTF commander.

3.4.7.1 Concept of Employment. The MIFASS suite of equipment will be task organized to support functions of the Fire Support Coordination Center (FSCC), Fire Direction Center (FDC), and Direct Air Support Center (DASC). MIFASS receives data from position location systems, digital message devices, or radio in order to generate either a dynamic situation display or hard copy.

MIFASS centers will be the command and control agencies for all supporting arms. These agencies or centers are:

a) MAGTF Fire Support Information Center (FSIC);

b) Division Fire Support Coordination Center (FSCC);

c) Regimental FSCC;

d) Battalion FSCC;

e) Regimental Fire Direction Center (FDC);

f) Battalion FDC; and

g) Direct Air Support Center (DASC).

3.4.7.2 Level of Employment. MIFASS, in various configurations, will be employed down to and including the battalion level.

3.4.7.3 Custodial Responsibility. MIFASS is held at the using unit level. Annex B shows specific distribution.

3.4.7.4 Analysis. The planned inventory objective for MIFASS is five MAF systems. Each MAF system will incorporate seven MIFASS centers (identified in paragraph 3.4.7.1) which are the command and control agencies for all supporting arms. Each agency or center will be equipped with a suite of MIFASS equipment that will replace the current manual system. It should be noted that a 5th MAF equivalent of MIFASS equipment will be distributed for training support, operational readiness float, and prepositioned war reserve. Each MAF system will consist of the following number of operational centers:

a) One MAGTF FSIC;

b) One DASC;

c) One Division FSCC;

d) Three Regimental FSCCs;

e) Nine Battalion FSCCs;

f) One Regimental FDC; and

g) Five Battalion FDCs.

Until the results of MIFASS field testing are determined, the scope and identification of MIFASS equipment and its distribution remains uncertain. There is not sufficient support data available to assess further personnel, training and organizational issues.

3.4.8 Unit Level Message Switch (ULMS), AN/GYC-7. The AN/GYC-7 is a 12-line automatic message switch capable of near real-time service for digital data traffic. Configured for three, two man transportable packages, this switch is capable of forming independent networks or operating with other TRI-TAC equipments.

3.4.8.1 Concept of Employment. The ULMS provides a digital data message switching facility for tactical command and control (C2) traffic. Operationally, it forms part of the MAGTF communications system supporting C2 systems traffic. The concept of employment for the ULMS is currently under review.

3.4.8.2 Level of Employment. The ULMS will be distributed throughout the MAGTF at the Infantry Regiment/Artillery Battalion level and above.

3.4.8.3 Custodial Responsibility. The ULMS will be in the custody of the communications organization of the using unit. Annex B lists specific units that will have assigned custody.

3.4.8.4 Analysis. The Unit Level Message Switch (ULMS) has been identified as the primary switch for providing secure switching of digital data for the Tactical Data Systems such as MIFASS, TAOM and TCO. The undetermined status of both MIFASS and TCO makes any analysis of the ULMS essentially speculative lacking a definite concept of employment. However, current plans call for the ULMS to be implemented as a tactical command and control device for a MAGTF unit commander to provide a capability to switch real-time and near-real-time digital data during FY92 and FY93. The function of the ULMS is currently being redefined by the Marine Corps. The introduction of 13,000 plus FMF-EUCEs into the Marine Corps is anticipated to have a significant impact on Marine Corps command and control capability. The utilization of the ULMS as a means to switch and transfer digital data from the FMF-EUCE would increase the operational capability of the MAGTF and is a concept which should be explored at the earliest time.

3.4.9 Tactical Combat Operations (TCO) System. TCO is being developed to provide an automated display/information processing system to support staff G3/G2 and S3/S2 functions.

3.4.9.1 Concept of Employment. TCO will be employed within the existing force structure to assist the commander by providing automation to the information processing cycle in the Combat Operations Center.

3.4.9.2 Level of Employment. The system will be located at Combat Operations Centers (COC) and Tactical Air Command Centers (TACC) of the MAGTF and will provide a focal point where a commander can obtain operational information and disseminate command decisions. The equipment suites have yet to be determined for TCO. Recently the Marine Corps has established a test bed using commercial hardware and software to determine specific requirements

and functions for planning and execution of operations. An inventory objective is in the planning stage. However, indications are that distribution will be made down to the battalion/squadron level. Estimated delivery to the FMF will be during 1993-1996.

3.4.9.3 Custodial Responsibility. Annex B lists planned custodial responsibility.

3.4.9.4 Analysis. The TCO will provide combat information support for G-3 and S-3 functions at all echelons of a MAGTF from battalion/squadron level up. Operators will come from Occupational Field 02, 03, 08, 70, 72, 75 or from other personnel normally assigned to a unit's G-3/S-3 sections. They will be supported by personnel from Occupational Field 25. Further analysis of the TCO is not possible at this time. Available information indicates that an evolutionary and different approach to TCO requirements is in progress. Adoption of this new approach will have a significant impact on the TCO program as it is now structured. Because of the early developmental stage of TCO, supporting data in terms of manpower, personnel training, and organizational issues are not available.

3.4.10 Position Location and Reporting System (PLRS) User Units. (See paragraph 3.3.5 for a description of PLRS).

3.4.10.1 Concept of Employment. There are five types of User Units: the Manpack Unit (MPU), the Surface Vehicle Unit (SVU), the Auxiliary Ground Unit (AGU), and two Airborne Unit (AU) configurations. The User Unit will be employed by air and ground elements to provide the user with position location information and navigation information under all conditions of visibility, weather, terrain and during night operations.

3.4.10.2 Level of Employment. The User Unit may be employed down to the lowest maneuver element of a MAGTF.

3.4.10.3 **Custodial Responsibility.** Annex B lists planned custodial responsibility.

3.4.10.4 **Analysis.** The PLRS User Unit will provide the commander accurate, real time position location and navigation information. Planning for distribution of the UU has been thorough, however, once employed by the FMF a reevaluation of requirements should be accomplished.

SECTION 4
C4 SYSTEMS PERSONNEL AND TRAINING SUPPORT

4.1 Introduction

This section addresses personnel and training concepts for the C4 systems, except EUCE which is treated separately in section 5 because of the nature and scope of the program. Subsequent paragraphs review personnel requirements to include identifying personnel required by occupational field and military operational specialty, training, skills, and grade necessary to install, operate, and maintain C4 systems in the FMF/MAGTF. Emphasis is placed on net changes in strength due to system introduction. Requirements are then reviewed to identify occupational specialties associated with the C4 systems. Training is identified by MOS, grade, and the requirement for either formal schooling or on-the-job training. Manpower projections for both user and C4 systems MOSs identify current and near-term availability of personnel to support the systems. A comparison of the personnel requirements, identified by system and MOS, with current projections of personnel availability during the 1986-1996 time frame is also included. Finally, personnel support deficiencies and shortfalls are addressed.

4.2 Identification of C4 Systems Personnel Requirements

This paragraph identifies personnel required by MOS, training, and grade to install, operate, and maintain C4 systems in the FMF/MAGTF. The requirements were identified through a review of the acquisition documentation. Individual systems were analyzed in terms of the personnel required in the following categories:

a) Custodial Unit;

b) MAGTF Non-Custodial (Support) Units;

c) Post Deployment Software Support;

d) Schools; and

e) Maintenance.

The detailed results are presented in Annex E, Personnel Requirements, which contains a work sheet for each system. Figure 4-1, C4 Systems Personnel Support, presents the overview of FMF system requirements by rank, MOS and projected acquisition schedule completion. The personnel shown have already been planned for in ILSPs, ALOs, etc., except where indicated. Annex F, Systems Military Occupational Fields and Specialties, contains a description of those MOSs which have been used in this study to distinguish characteristics of one MOS from another.

4.2.1 C4 System Personnel Requirements. In addition to the overview of personnel support discussed above, Annex E shows the level of personnel effort necessary for both operation and maintenance activities. Each system is portrayed individually and includes personnel and MOS requirements for both the using, or custodial, unit and the non-custodial maintenance support (normally the FSSG). Post Deployment Software Support (PDSS) requirements and locations are also provided based on available information. Training has been identified by MOS, school, and location. For example, table E-6, Systems Personnel Requirement - PLRS, depicts the custodial unit's personnel support for both operations and maintenance. As illustrated, numerous personnel billets will also be required in the Electronic Maintenance Company, FSSG in various MOSs, i.e., 2818, 2841, 2861, 2881, and 1161. MCTSSA is the designated PDSSA responsible for software maintenance. Depot Maintenance will be the responsibility of the US Army at Tobyhanna, PA. While MCCES has been designated as the training site for PLRS maintenance (and MS operation as well), the training curriculum and the instructor criteria are still being developed and were not available.

C4 SYSTEMS PERSONNEL

SYSTEM	1986	1987	1988	1989	1990
AUTOMATED DATA PROCESSING EQUIPMENT FLEET MARINE FORCES (ADPE-FMF)	ADPE-FMF		MINIMUM IMPACT-OPERATOR ANY RANK/MOS - NOT FULL TIME DUT ISMO STAFF - PROVIDES MANAGEMENT SUPPORT		
MAGTF AUTOMATED SERVICES CENTER (MASC)	(DFASC) (1) MAJ 4002, (1) CAPT-4002, (1) LT/WO-4010 (1) MGYSGT-4038. (7) MSGT-SGT-4038,(2) MSGT-GYSGT-4069, (12) CPL-LCPL-4034, (1) GYSGT-4071, (3) SGT-CPL-4063 (1) SGT-	3 OFF/30 ENL			3 OFF/30 ENL
INTELLIGENCE ANALYSIS CENTER (IAC) AN/TYQ 19 (V)	(3) CAPT/LT-0202 (8) GYSGT/LCPL-0231,(1) GYSGT/SSGT-2629, (1) SSGT/CPL-4034 (1) SSGT/SGT-5977 FOR 8	3 OFF/11 ENL PER SHIFT, 9 OFF/33 ENL PER SYSTEM 5 DEPLOYABLE SYSTEMS REQUIRE 15 OFF/55 PER SHIFT OR 45 OFF/165 ENL PER 24 HOUR PERIOD			
DIGITAL COMMUNICATIONS TERMINAL (DCT) AN/PSC 2	MINIMUM IMPACT -ADDITIONAL RESPONSIBILITY-OPERATORS ARE NOT REQUIRED FOR FU MAINTENANCE IS AN ADDITIONAL RESPONSIBILITY THROUGH ALL ECHELONS				
POSITION LOCATION REPORTING SYSTEM (PLRS)	MASTER STATION BASIC USER UNIT	1 OFF/30 ENL PER PLRS PLT, 3 OFF/90 ENL REQUIRED TO MAN FMF MASTER STATIONS, REQUIRED TO MAN 4TH MARDIV MASTER STATION (1) LT 2502, (3) SSGT-2537, (18) SGT/CPL 2531 REQUIRED TO OPERATE 3 MASTER ST (3) SGT-2861, (3) CPL-2841, (3) SGT-5977 REQUIRED TO MAINTAIN THE MASTER/ALTE MINIMUM OPERATOR IMPACT-ANY RANK/MOS-NOT FULL-TIME DUTY SGT/LCPL 2841 AND MSGT/SGT-2861 WILL PROVIDE 2nd THROUGH 3RD ECH MAINT PLRS MAINTENANCE TECHNICIANS ARE IDENTIFIED ON T/O 3253 F ((1) SSGT-2861, (USER UNIT MAINTAINERS ARE IDENTIFIED ON T/O 3253S ((1) SSGT-2861 (3) CPL2 USER UNIT MAINTAINERS ARE IDENTIFIED ON T/O 3253N ((1) SSGT-2861 (3) CPL-2			
BATTERY COMPUTER SYSTEM (BCS) AN/GYK 29		(1) WO-2830,(4)-MSGT/SSGT-2889, (3) CPL-2885 (6) SGT/LCPL 285_ (3) SG MOS 2885 WILL MAINTAIN THE BCS WITH NO REQUIREMENT TO MODIFY EXISTI	(1)-LT-0802, (7) SSGT/PVT-0844/0848 PER FDC S		
TACTICAL COMMUNICATIONS CENTER (TCC) AN/MSC 63A		1SSGT/SGT 2549 (1) CPL/PFC-2542 PER SHIFT = (3) SSGT/SGT-2549, (3) CPL/PFC-2542 1SSGT/SGT 2827 (TACTICAL DATA TERMINAL SYSTEMS TECH) PER SHIFT (3) SSGT/SGT 2			
UNIT LEVEL CIRCUIT SWITCH (ULCS) AN/TTC 42 SB 3865				(3) LCPL/PVT-2512 (1) (1) GYSGT/SGT 251_-2 (3) LCPL/PVT 2512 (1) (1) SGT/CPL 2514 28	
TACTICAL AIR OPERATIONS MODULE (TAOM)	TAOM OPERATION (1) MAJ 7210 (5) CAPT 7210 (13) LT/WO-7210, (1) MGYSGT-7236 (27) GYSGT PFC-7234			TAOM MAINT (1) WO 5970 (1) GY	
MARINE INTEGRATED FIRE AND AIR SUPPORT SYSTEM (MIFASS)			(1) CAPT/LT-XX02, (1) MGYSGT XX__ (1) M SYSTEMS = 192 OFF/960 ENL FULL TIME SUPP TO BE RETRAINED FROM CURRENT __ ATE_		
UNIT LEVEL MESSAGE SWITCH (ULMS)					
INTEGRATED SIGNAL INTELLIGENCE SYSTEM (ISIS)		TCAC 1 OFF/4 ENL (1) LT WO-2602 (1) MGYSGT-2691, (1) GYSGT/SGT (1) GYSGT-SGT-2644 (1) GYSGT SGT-2643 (1) MSGT/CPL 2644 TCACS REQUIRE 6 OFF 30 ENL PER SHIFT MAINTE PERSONNEL TBD		TCAC	
TACTICAL COMBAT OPERATIONS (TCO)					

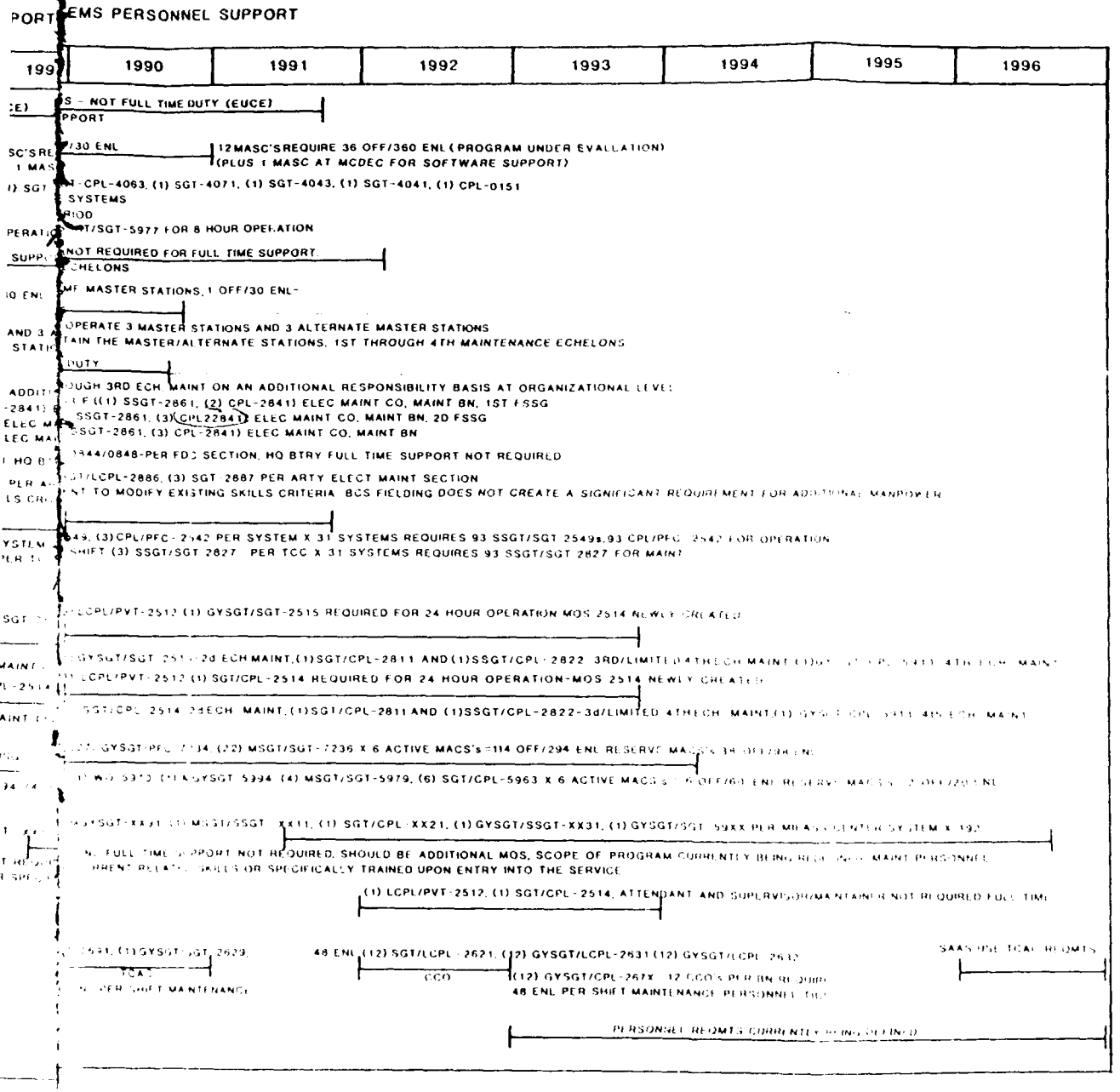


Figure 4-1. C4 Systems Personnel Support

4.2.2 Subsystem Implications. Previous sections have provided descriptions of each of the fourteen systems. Annexes B and C, previously mentioned, further provide a detailed description of system characteristics and logistic data. In researching system composition it was noted that the increased complexity is largely due to the embedded computers and communications security (COMSEC) components. Given the density of these elements throughout the C4 systems the study team conducted an examination of the quantities and types of computers and COMSEC devices. The results are discussed below.

4.2.2.1 Computers. The common thread throughout the systems is their reliance upon computer-based technology. System computers will perform control functions, maintain data bases, and provide communications access processing, drive dynamic situation displays and printers, perform computation, execute system programs, and provide for report generation and self-testing of both hardware and software. Figure 4-2, Tactical Computer Resource Applications, quantifies the numbers of computers, both stand-alone and embedded, which are required in a typical system configuration. It also aggregates these numbers to show the impact on individual FMF units and on the Marine Corps as a whole. The table also shows the FMF allocation of AN/UYK-7 and AN/UYK-20 computers to the ground combat, aviation combat, and combat service support elements. Finally, Post Deployment Software Support Activities (PDSSA) and the program language are displayed to round out the system computer background. This information was developed to establish a basis for projecting computer growth and the resultant personnel and training requirements.

4.2.2.1.1 MAGTF Systems Computer Growth. Figure 4-3, MAGTF Systems Computer Growth Profile, shows the introduction and growth of computer based MAGTF systems from 1986 to 1996. For example, commencing in 1987 the PLRS system will be fielded, providing an initial increment of six AN/UYK-7, eight AN/UYK-20, and four AN/UYK-44 computers. During 1988, the PLRS computer density will increase to twelve AN/UYK-7, eight AN/UYK-20A and four AN/UYK-44 computers. Those eight AN/UYK-20A computers will be replaced by AN/UYK-44s

SYSTEM	COMPUTER TYPE	TOTAL COMPUTERS TYPICAL CONFIGURATION	USMC TOT REQMT	TOT FMF	1ST MARDIV	2ND MARDIV	3RD MARDIV	1ST MARBDE	4TH MARDIV	1ST MAW	2ND MAW	3RD MAW	4TH MAW	1ST FSSG	2ND FSSG	3RD FSSG
AUTOMATED DATA PROCESSING EQUIPMENT-FLEET MARINE FORCES (ADPE-FMF)	IBM SERIES I (4110)	1	842	728	52	52	35	46	28	75	108	85	58	51	61	50
END USER COMPUTING EQUIPMENT	-TBD-	1	13,335	TBD												
MAGTF AUTOMATED SERVICES CENTER (MASC)	IBM 4341 (DFASC)	1	13	12										3	3	3
INTELLIGENCE ANALYSIS CENTER (IAC)	AN/UYK-7 AN/UYK-20	1 4	7 28	4 12	1 4	1 4	1 4									
DIGITAL COMMUNICATIONS TERMINAL (DCT)	NSC-800 MICRO PROC 128K MEMORY	1	2914	2763	405	405	283	114	398	151	178	178	146	34	34	34
MASTER STATION POSITION LOCATION REPORTING SYSTEM (PLRS)	AN/UYK-7 AN/UYK-20(A)	1 2	26 52	24 48	6 12	6 12	6 12		6 12							
BATTERY COMPUTER SYSTEM (BCS)	AN/GYK-29	1	167	108	26	26	23	6	24					3	3	3
TACTICAL COMM CENTER (TCC)	AN/UYK-44	2	80	40	2	2	2	4	2	2	2	2	2	2	2	2
SPECIAL SECURITY COMMUNICATIONS CENTRAL (SSCC)		2	64	32	2	2	2			2	2	2	2	2	2	2
AN/TTC-42 UNIT LEVEL CIRCUIT SWITCH (ULCS) SB 3865	8080A MICROPROCESSOR	1	67	59	3	3	3	3	3	3	3	3	3	4	4	4
			433	341	33	33	27	18	23	27	27	27	27	11	11	11
TACTICAL AIR OPERATION MODULE (TAOM)	AN/AYK-14	2	45	34			4		4	10	10	10	10			
MARINE INTEGRATED FIRE AND AIR SUPPORT SYSTEM (MIFASS)	AN/AYK-14	2-6	266	172	17	28	28	11	23	5	5	5	5	11	11	11
UNIT LEVEL MESSAGE SWITCH (ULMS)	Z80A MICROPROCESSOR	1	163	114	9	9	12	6	4	8	12	8	8	4	4	4
COMM COLLECTION DUPLICATION (CCD)	SECS-86 MICROPROC	4	32													
INTEGRATED SIGNIT SYSTEM (ISIS)	APM-400	1	24													
TECHNICAL CONTROL AND ANALYSIS CENTER (TCAC)	PDP-11/70 LSI-11	2 3	12 18													
TACTICAL COMBAT OPERATIONS (TCO)	-TBD-	1	195	195	21	21	19	14	13	20	12	23	18			

T SG	2ND FSSG	3RD FSSG	4TH FSSG	MAF COMM BNs				RADBN LANT PAC	FMF LANT HQ	OTHER FMF	PDSSA OFF MANPOWER ENL REQMTS CIV	PDSSA	LANGUAGE
				I	II	III	IV						
	61	50	7	2	1	5	1	1 1	1	7	N/A	MCCDPA	COBOL(EDX 4.1)
											N/A	MCCDPA	-TBD- SEE SECTION 5
	1	3	3								N/A	MCCDPA	COBOL
									4		TBD	NSWC DAHLGREN	JOVIAL (J3) ULTRA-32 CMS-2M ULTRA-32
	34	34	34	12	12	6	12			268	TBD	MCTSSA	INTERACTIVE
											TBD	MCTSSA	COBOL FORTRAN DATAMICRO
		3	3								N/A	MCTSSA	CMS-2M
	2	2	2	4	4	2	2				TBD	MCTSSA	CMS-2M INTERACTIVE
		2						6 6			TBD		ULTRA-32 WHETSTONE
	4	4	4	5	5	2	5				TBD	CECOM FT MONMOUTH	INTERACTIVE
		13	13	15	15	15	15	2 2			TBD		
											TBD	MCTSSA	CMS-2M
		10	10	2	2	2	2				TBD	MCTSSA	CMS-2M
	4	4	4	1	1	1	1				TBD	MCTSSA	INTERACTIVE
								48 48 12 12			TBD	MCTSSA	INTEL FORTRAN INTERACTIVE DATA GENERAL MICRO ASSEMBLY
								6 6 9 9			TBD	TBD	DEC FORTRAN
				1	1	1	1	1 1			TBD	MCTSSA	TBD

Figure 4-2. (U) Tactical Computer Resource Applications

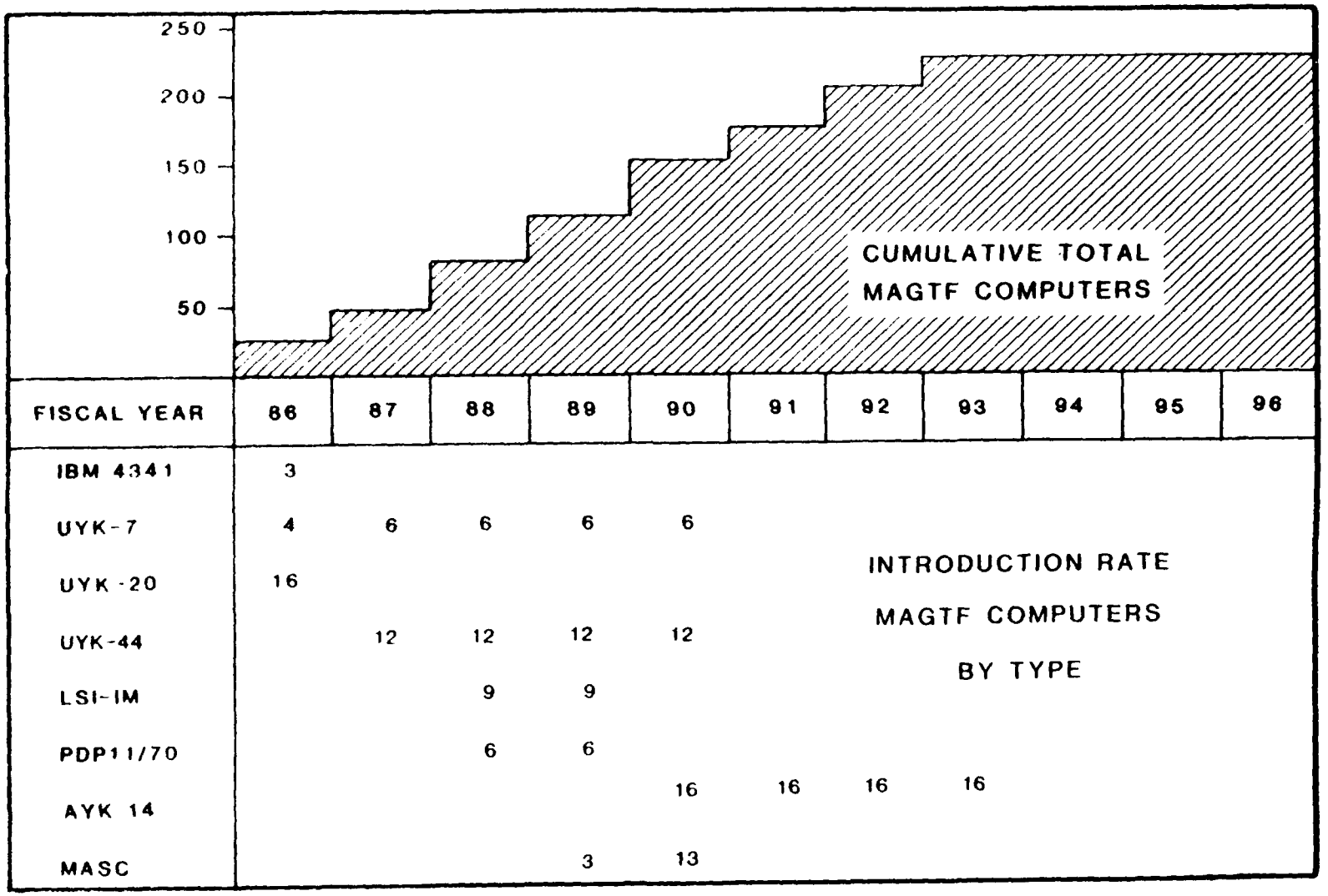


Figure 4-3. MAGTF Systems Computer Growth Profile

when available. This illustrates projected increases in systems and computers and indicates a significant impact upon computer processor and peripheral maintenance for units which perform first through fourth echelon maintenance. The profile shows an order of magnitude growth over the mid-range period from a 1986 inventory of 23 computers to a 1996 count of over 200 in the low density or MAGTF level category. Systems in this group have been, or are being, subjected to Integrated Logistics Support Planning efforts. Consequently, the personnel and training requirements are developed to varying levels of detail which will be reflected in subsequent discussion. The computer is typically selected as the central component for purposes of example and evaluation. However, it must be remembered that the systems in this category are, in fact, major systems consisting of peripherals, power units, shelters, and interconnecting cables as well as the computer. As such they will have impacts on collateral support areas including prime movers and electric power engineering support. The systems, in most cases, will use the same or similar support equipment and will require similar personnel skills for operational, and in particular, maintenance support. The potential exists for reducing system operation and support costs through the use of common equipment, a standardized maintenance concept, system level technicians, standardized training and common system groupings. These considerations will be discussed later in this section.

4.2.2.1.2 Unit Systems Growth Profile. The growth in unit level, computer based systems is shown graphically in figure 4-4, FMF Unit Systems Cumulative Computer Growth Profile, and numerically in the accompanying table 4-1, Unit Systems Computers. As noted in section 1, a previous deletion of two of the previous MTACCS systems (MIPS AND MILOGS) temporarily lowered the projected number of total systems or computers. However, that reduction has been more than offset by the addition of a potential 13,335 EUCE systems. Consequently, the new projection shows a total of over 18,000 units composed of the systems shown in the table. The majority of the increase is in the form of the EUCE and that system is treated separately in section 5 because of its size and significance relative to the other FMF units.

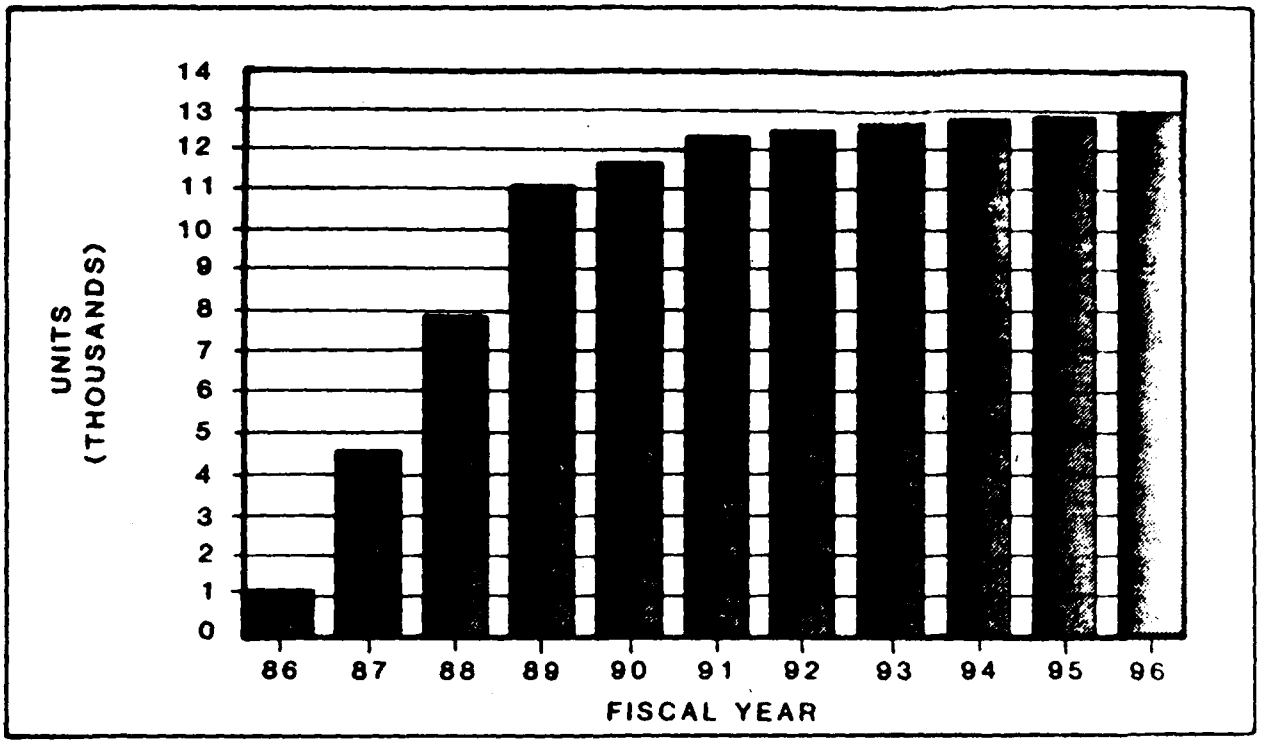


Figure 4-4. FMF Unit Systems Cumulative Computer Growth Profile

Table 4-1. Unit Systems Computers

C4 System	IO[1]	Fiscal Year 86	87	88	89	90	91	92	93	94	95	96
ADPE-FMF	728	728										
EUCE	8400		2800	2800	2800							
DCT	2753	459	459	458	458	458	461					
BCS	166		83	83								
ULCS	391	0	0	0	0	98	98	97	97			
TCC	31					16	15					
MIFASS	192						12	36	36	36	36	36
ULMS	114						57	57				
TCO	190								46	48	48	48
Total	12965	1187	3342	3341	3258	572	643	191	179	84	84	84

(1) FMF Allocations

4.2.2.1.3 Mixed Systems. During the process of the study, it became apparent that the grouping being studied is essentially a mixture ranging from high density small systems, such as the DCT, to low density large systems such as the TAOM and MASC. While the personnel and training implications obviously change with the system size and complexity it is essential that they be aggregated to ascertain the overall impact. The grouping shown in table 4-1 is therefore a mixture of both small and large systems. For example, the DCT is essentially a user-operated communications terminal rather than a "System," in the context of complex command and control and computer configurations. The MASC, on the other hand, represents a major system with a dedicated crew of 3 officers and 30 enlisted.

4.2.2.2 Communications Security (COMSEC) Resources. In addition to the heavy reliance of these C4 systems upon computer resources, there is also a significant demand for communication security (COMSEC). As shown in figure 4-5, FMF COMSEC Resource Applications, nine of the thirteen systems use COMSEC equipment. This equipment is usually ancillary or additional components installed in shelter-mounted racks. However, some are integrated or embedded in the system. Annex G, Communication Security (COMSEC) Equipment Description, catalogs both current and projected COMSEC equipment that is to be used by the C4 systems under study. At this time only the PLRS Basic User Unit (BUU) and SB-3685 have embedded COMSEC. However, there is a growing trend towards the integrated approach. This introduction of COMSEC into the systems creates a number of personnel and training issues including numbers of operators/technicians and the management of equipment which may be classified because of integrated COMSEC. There is also a question regarding additional cryptographic protection for circuits involved with the systems for which COMSEC has not yet been designated.

4.2.2.2.1 FMF COMSEC Resource Allocations. The number of COMSEC devices required in a typical system configuration have been identified and these numbers have been expanded to depict the impact on the FMF. For example, the PLRS Master Station does not possess integrated COMSEC. Nevertheless, it does

SYSTEMS	TYPE DEVICE	CRYPTO TYPE	TYPICAL CONFIGURATION	TOTAL HQ OMTS	TOTAL FMF	1ST DIV	2ND DIV	3RD DIV 1ST MAR BDE	4TH DIV	1ST MAW	2ND MAW	3RD MAW	4TH MAW	1ST FSSG	2ND FSSG	3RD FSSG	4TH FSSG	[illegible] DIV MAR BDE
AUTOMATED DATA PROCESSING EQUIPMENT FLEET MARINE FORCE (ADPE-FMF)	INTEGRATED COMSEC	NONE																
	ASSOCIATED COMSEC	NONE																
MAGIS AUTOMATED SERVICES CENTER (MASC)	INTEGRATED ASSOCIATED	NONE																
	ASSOCIATED COMSEC	NONE																
[illegible] ANALYSIS [illegible]	INTEGRATED COMSEC																	
	ASSOCIATED COMSEC	[illegible]	[illegible]	42 10	28 12	02 03	[illegible]	[illegible]										
DIGITAL COMMUNICATION TERMINAL (DCT)	INTEGRATED COMSEC	NONE																
	ASSOCIATED COMSEC	[illegible]																
[illegible] STATION AN/[illegible]	INTEGRATED COMSEC																	
	ASSOCIATED COMSEC	[illegible]	[illegible]	26	24	[illegible]	[illegible]	[illegible]	[illegible]									
POSITION LOCATION REPORTING SYSTEM (PLRS)																		
[illegible] UNITS [illegible]	INTEGRATED ASSOCIATED	[illegible]	[illegible]		2556	412	[illegible]	[illegible]	[illegible]	64	230	254	64	24	24	[illegible]		[illegible]
BATTERY COMPUTER SYSTEM (BCS)	INTEGRATED COMSEC																	
	ASSOCIATED COMSEC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]					03	03	[illegible]		[illegible]
TACTICAL COMMUNICATIONS CENTER (TCC)	INTEGRATED COMSEC	NONE																
	ASSOCIATED COMSEC	[illegible]	08 02	248 62	160 40	08 02	[illegible]	[illegible] 16 [illegible]	08 02	08 02	08 02	08 02	08 02	08 02	08 02			[illegible]
UNIT LEVEL CIRCUIT SWITCH AN/TTC-42	INTEGRATED COMSEC	NONE																
	COMSEC ASSOCIATED COMSEC	[illegible]	[illegible]	736 184 [illegible]	480 120 [illegible]	48 [illegible] [illegible]	[illegible]	[illegible]	48 06 36	48 06 36	48 06 36	48 06 36	48 06 36	64 08 48	64 08 48	[illegible]	[illegible]	[illegible]
	INTEGRATED COMSEC	[illegible]	[illegible]	430	311	[illegible]	[illegible]	[illegible]	20	20	20	22	22	13	13	[illegible]	[illegible]	
	ASSOCIATED COMSEC	NONE																
TACTICAL AIR OPERATIONS MODULE (TAOM)	INTEGRATED COMSEC	NONE [illegible]	02 [illegible] [illegible]	96 96 96	64 64 64			06 06 06		08 08 08	16 16 16	16 16 16	16 16 16					
	ASSOCIATED COMSEC	[illegible]	14 [illegible] 04	672 48 192	448 32 128			56 04 16		56 04 16	112 08 32	112 08 32	112 08 32					
MARINE INTEGRATED FIRE AND AIR SUPPORT (MIFASS)	INTEGRATED COMSEC	NONE [illegible]	100															
	ASSOCIATED COMSEC	[illegible]																
UNIT LEVEL MESSAGE SWITCH (ULMS)	INTEGRATED COMSEC	NONE																
	ASSOCIATED COMSEC	[illegible]	09	1304	912	120	120	[illegible]	72	72	96	96	80	32	32			[illegible]
INTEGRATED COMM SYSTEM: COMM COLLECTION DISTRIBUTION (CCDS)	INTEGRATED COMSEC																	
	ASSOCIATED COMSEC	[illegible]	[illegible]															
TECHNICAL CONTROL CENTER (TCC)	INTEGRATED COMSEC																	
	ASSOCIATED COMSEC	[illegible] KW	03 06	03 06	03 06													
TACTICAL COMBAT OPERATIONS (TCO)	INTEGRATED COMSEC	NONE	100															
	ASSOCIATED COMSEC	NONE																

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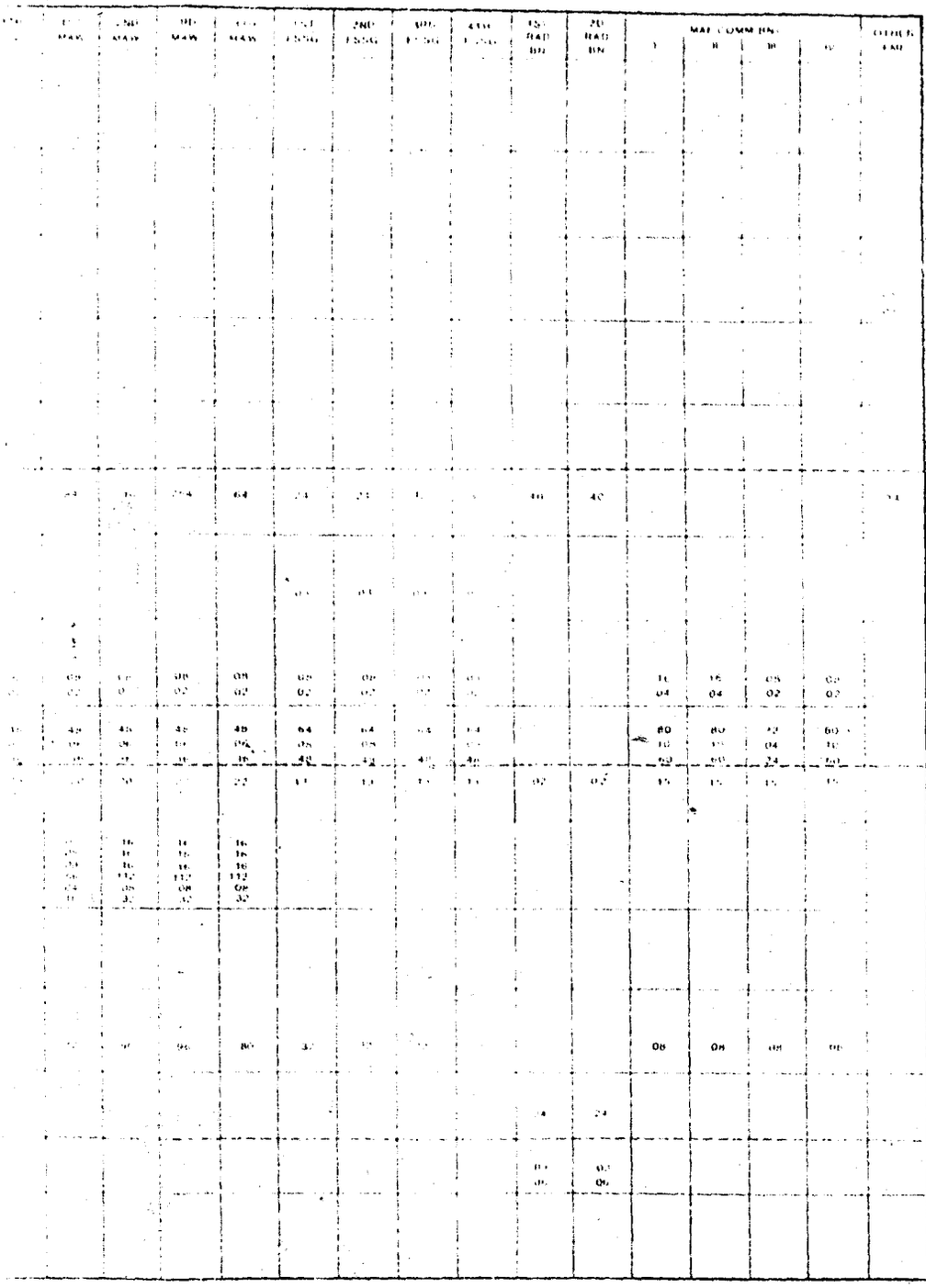

Figure 4-5. FMF COMSEC Resource Applications

contain associated COMSEC, i.e., TSEC/KY-58. The standard configuration is one per Master Station. The total Marine Corps requirement is twenty-six TSEC/KY-58s. Of these, twenty-four KY-58s are allocated throughout the FMF. The BUU contains integrated COMSEC within the guidelines of the study definition. A typical configuration includes one KGV-6 per BUU. The total Marine Corps requirement is 3,074 KGV-6s of which 2,556 devices are allocated throughout the FMF as indicated in figure 4-5, FMF COMSEC Resources Applications.

4.2.2.2.2 Cryptographic Personnel and Training Requirements. Only specifically authorized and trained personnel are permitted to operate certain cryptographic devices. Only specifically certified personnel are authorized to perform maintenance on cryptographic equipment and then only at specifically authorized places. Some changes to the above are being considered in order to relax the burden these policies place on lower level combat operations. The significance of this issue is still in a process of evolution and cannot be definitively resolved or estimated until the total density of separate cryptographic equipments is determined. It is more of an issue with those systems which involve separate cryptographic systems since training on embedded systems will be part of the training for the basic equipment. Although the trend is for embedded cryptographic capability, most of the 14 systems are already designed or are off-the-shelf commercial items which will use separate cryptographic equipment.

4.2.2.2.3 National Policy Implications. The national policies for security on all communications lines and on the protection of sensitive information in automated systems will cause some or all of the communications associated with the ADPE-FMF/EUCE and DFASC/MASC programs to be secured. Note that these systems already call for TEMPEST security which indicates processing of classified information. The EUCE with 8,000-13,335 potential terminals is a significant issue which remains to be resolved. Certain systems identified with COMSEC in figure 4-5 may also require additional training for operator personnel in the functional integration of the basic equipments and their

associated cryptographic equipments. In the cases of ancillary equipments, this training will require separate instruction on operation of the cryptographic system. Training for operation of embedded cryptographic equipment will be part of the basic operator instruction and therefore not create a separate training requirement.

4.2.2.2.4 National Policy Exemptions. Exemption from the national policy to encrypt circuits which process classified matter is being sought by elements of the development community in those instances where costs and perishability are great and national interests are low such as an engaged infantry battalion. There is movement to encrypt telephone trunks rather than each telephone, since the cost to do the latter is prohibitive and the opportunities for clandestine interception within an engaged battalion CP are extremely low. These discussions are on-going. When finally resolved, in a new statement of national policy, further review will be required.

4.2.3 C4 Operational Support Factors. The following paragraphs discuss operational support factors which are inherent to each of the systems under study. This information is necessary for accomplishment of all aspects of planning required with the employment of the system during garrison, operational deployment or combat operations. The information contained in figure 4-6, Systems Supporting Data, includes identification of equipment to be replaced, maintenance support levels, and logistical planning data. Analysis indicates that the systems, in most cases, use the same or similar support equipment and will require similar personnel skills for maintenance. The potential exists for reducing system operation and support costs through the use of common equipment, a standardized maintenance concept, system level technicians, standardized training, and common systems groupings.

4.2.3.1 Mobility. The mobility factors as depicted in figure 4-6 reflect various modes of mobility such as team pack, semi-trailer, or shelters mounted on vehicles. The mobility source encompasses both personnel and unit levels. Power requirements vary from 3.9 volt lithium batteries to 100 KW mobile

SYSTEM	TAMCN	TYPICAL CONFIGURATION WT	CU	REPLACED SYSTEM TAMCN	WT	CU	MOBILITY FACTOR	MOBILITY SOURCE
AUTOMATED DATA PROCESSING EQUIPMENT FLEET MARINE FORCES (ADPE-FMF)	A0000	239 lbs	16 ft³	N/A			TEAM PACK	[illegible]
MARINE AUTOMATED COMMAND CENTER [illegible]	[illegible]	15,000 lbs/VAN (2 VANS/SYSTEM)	1080 ft³/VAN	[illegible] DATA PROCESSING SET, PLATFORM RELOCATABLE			[illegible]	[illegible]
INTELLIGENCE ANALYSIS CENTER [illegible]	[illegible]	42,082 lbs (1 ADP/COMM PROC, 2 ANALYST SHELTERS)	[illegible] ft³	N/A			SHELTER [illegible]	[illegible]
DIGITAL COMMUNICATIONS TERMINAL (DCT)	A[illegible]	42 lbs	100 [illegible]	N/A			MAN PACK	NO [illegible]
POSITION LOCATION REPORTING SYSTEM [illegible] MASTER STATION	A1224	1,800 lbs	873 ft³	N/A			SHELTER [illegible]	[illegible]
[illegible]	[illegible]	600 lbs	[illegible]	[illegible]	[illegible] lbs	24 ft³	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]

MOBILITY FACTOR	MOBILITY SOURCE	POWER [illegible]	POWER SUPPLIER	[illegible] REQMT	MAINTENANCE SUPPORT CONCEPTS
TEAM PACK	[illegible] UNIT	[illegible] KW	[illegible]	N/A	COMMERCIAL CONTRACT
SEMI TRAILER	[illegible] (ST TRACTOR)	[illegible] KW	[illegible]	SHELTER MOUNTED	COMMERCIAL FOR ADP; MILITARY FOR OTHER COMPONENT
SHELTERS [illegible]	[illegible] UNIT	[illegible] KW	[illegible]	[illegible] SHELTER MOUNTED	[illegible] MAINT [illegible] DEPOT [illegible]
MAN PACK	NO [illegible] PERSONNEL	[illegible] AND [illegible] BATTERIES	[illegible]	N/A	1 [illegible] ORGANIZATIONAL 2 INTERMEDIATE [illegible] 3 DEPOT [illegible]
SHELTER [illegible] 200	[illegible] (ST TRUCK)	10 KW	[illegible] UNIT	[illegible] MOUNTED	[illegible] MAINT [illegible] MAINT [illegible]
TEAM PACK	[illegible] UNIT	[illegible] BATTERIES [illegible]	[illegible]	N/A	[illegible] ORGANIZATIONAL [illegible] 2 INTERMEDIATE [illegible]
SHELTER [illegible]	[illegible] UNIT	[illegible]	[illegible]	[illegible] MOUNTED	[illegible]
SHELTER [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TEAM PACK	[illegible] UNIT	[illegible]	[illegible]	N/A	[illegible]
SHELTER [illegible]	[illegible] UNIT	[illegible]	[illegible]	[illegible]	[illegible]
SHELTER [illegible] SHELTER [illegible]	[illegible] UNIT [illegible]	[illegible] KW [illegible] KW	[illegible]	[illegible]	[illegible]
TEAM PACK	[illegible] UNIT	[illegible] BATTERIES [illegible]	[illegible] UNIT	N/A	[illegible]
TEAM PACK	[illegible] UNIT	[illegible] KW [illegible]	[illegible] UNIT	N/A	[illegible]
SHELTER [illegible] 250)	[illegible]	[illegible] KW [illegible] KW	RADIO [illegible]	N/A	[illegible]
SHELTER [illegible]	[illegible]	[illegible] KW	[illegible]	[illegible] MOUNTED	[illegible]
SHELTER [illegible]	[illegible] UNIT	[illegible]	[illegible] UNIT	[illegible] MOUNTED	[illegible]

Figure 4-6. Systems Supporting Data

electrical power generation equipment. As analyzed, these systems have been designed to operate using electrical power provided by ship, commercial source, batteries, or tactical generators. Generally, the equipment components of these systems are capable of operating under field conditions without the requirement for environmentally controlled shelters. When shelters are required the equipment will have been designed for installation within standard shelters.

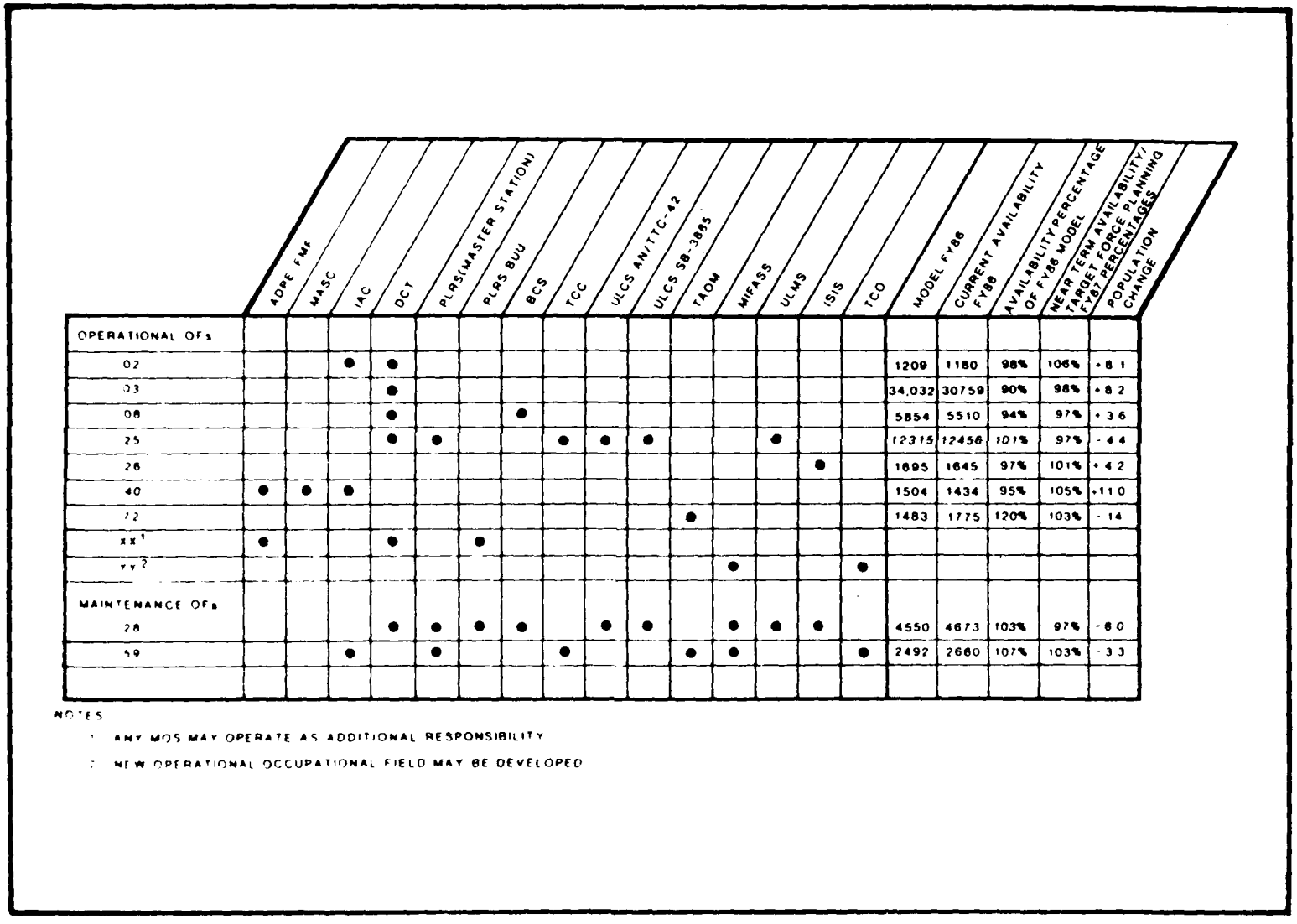
4.2.3.2 Maintenance. Maintenance concepts for these systems are predicated upon reducing the maintenance and logistical burden placed on the MAGTF or unit commander to the minimum required to maintain a responsive combat ready posture and maximize the utilization of available equipment and maintenance personnel assets. Maintenance concepts have been influenced by inherent design which has simplified and affected preventive maintenance, calibration, mean time between failure, servicing, and training.

4.2.3.2.1 Improvements. Built-in-test equipment (BITE) has improved the capability for rapid fault identification, isolation, and diagnosis. Because of this, maintenance tasks have been simplified to permit their accomplishment by operator personnel requiring little or no school-level maintenance training, e.g., fault diagnostics, pull-and-replace components. Increased emphasis is on simplification of both organizational and intermediate level maintenance. Figure 4-6 illustrates organizational maintenance being accomplished by the using unit. Operators form the first echelon of maintenance by using BITE indicators or failure messages to isolate faults to individual modules and, in some cases, printed circuit cards. Organizational maintainers provide the second echelon of support. At the intermediate level, generally the FSSG, repair and return of defective modules is accomplished thereby centralizing maintenance tasks that cannot be performed at the operational site or unit. MAGTF systems such as PLRS, IAC, TAOM, MIFASS and TCC lend themselves to organizational maintenance encompassing first through fourth echelon.

4.2.3.2.2 Finding. These systems feature enhanced reliability and maintainability and utilize practically identical maintenance skills for shared maintenance. They exhibit a strong case for development of a system level technician.

4.3 Current and Near-Term Availability Personnel Projections. This paragraph discusses the current and near-term availability of personnel required to support C4 systems in the FMF/MAGTF. These systems are supported by personnel, in a variety of occupational fields (OF), who perform the operational and maintenance tasks. A broad-based research effort was conducted utilizing current manpower data to identify the OFs and specific MOSs necessary for system operation and maintenance. Target strength models, availability projections as well as analysis of existing and planned structure documents (i.e., T/Os) were used in the determination of personnel availability.

4.3.1 Occupational Fields (OF) Analysis. Figure 4-7, Systems Manning by Occupational Field, depicts those OFs which are affected by the fielding of the MAGTF systems under study. Figure 4-7 further categorizes the OFs into those required for system operation and those required for system maintenance. In this limited set of OFs, nine are identified, with the prime responsibility of system operation. Most impacted by system operations is that of OF 25, Operational Communications, with responsibilities for six of the systems. Those impacted in the maintenance category include OF 28, Data/Communications Maintenance, and OF 59, Electronics Maintenance, which supply the skill levels and experience necessary to maintain these systems in a state of readiness. All identified systems require either the OF 28 or OF 59 skills or a combination of the two. The data in figure 4-7 reflects the Target Force Planning Model numbers for FY86, the current availability for FY86 (in numbers and as a percentage), the Target Force Planning numbers for FY87 and the percentage change predicted for FY87 for each of the affected OFs. The Target Force 86 and 87 statistics were used in this study only to provide a baseline to measure the trends within OFs an MOSs. The FY87 projections show trends with respect to providing an assessment of near term availability. It should



	ADPE FMF	MASC	IAC	OCT	PLRS(MASTER STATION)	PLRS BUU	BCS	TCC	ULCS AN/TTC-42	ULCS SB-3865	TAOM	MIFASS	ULMS	ISIS	TCO	MODEL FY86	CURRENT AVAILABILITY FY86	AVAILABILITY PERCENTAGE OF FY86 MODEL	NEAR TERM AVAILABILITY/ TARGET FORCE PLANNING FY87 PERCENTAGES	POPULATION CHANGE
OPERATIONAL OFs																				
02			●	●												1209	1180	98%	106%	+8 1
03				●												34,032	30759	90%	98%	+8 2
08				●			●									5854	5510	94%	97%	+3 6
25				●	●			●	●	●			●			12315	12456	101%	97%	-4 4
26														●		1695	1645	97%	101%	+4 2
40	●	●	●													1504	1434	95%	105%	+110
72											●					1483	1775	120%	103%	-14
XX[1]	●			●		●														
YY[2]												●			●					
MAINTENANCE OFs																				
28				●	●	●	●		●	●		●	●	●		4550	4673	103%	97%	-8 0
59			●		●			●			●	●			●	2492	2660	107%	103%	-3 3

NOTES

1 ANY MOS MAY OPERATE AS ADDITIONAL RESPONSIBILITY

2 NEW OPERATIONAL OCCUPATIONAL FIELD MAY BE DEVELOPED

Figure 4-7. Systems Manning by Occupational Field

be recognized that these numbers are not stable and are subject to the dynamics of the manpower planning process.

4.3.1.1 Systems Operations - OF Analysis. The systems operation OFs data shows that the FY86 percentage available against the FY86 Target Force Planning Model for each OF to be a minimum of 90%. The most affected OF, OF 25, shows 101% availability in FY86 but with a 4.4% decline predicted in FY87. Likewise OF 72 shows a 120% FY86 availability with a 14% decline predicted for FY87. All other OFs are predicted to show an increase in FY87.

4.3.1.2 Systems Maintenance - OF Analysis. OFs 28 and 59 showed greater than 100% availability for FY86 against the FY86 Target Force Planning Model although population decreases of 6.0% and 3.3% respectively were predicted for FY87. Even with the FY87 population decreases the numerical strength of the OFs was projected to be 4393 for OF 28 and 2573 for OF 59.

4.3.1.3 OF Analysis - Findings. An evaluation of all affected OFs required for systems operation and maintenance reveals that, even with projected FY87 population decreases in certain OFs, all OFs will provide near term availability in FY87 that is not significantly different than FY86. It would appear that all affected OFs will provide at least 90% of projected requirements in FY87.

4.3.2 Military Occupational Specialty (MOS). The preceding analysis and findings indicated that those OFs required for system operations and maintenance were generally considered adequate through FY87, i.e., the near term. However, OFs contain within their structure a multitude of related Military Occupational Specialties (MOSs). Figure 4-8, MAGTF C4 Systems MOS Requirements, contains the list of specific MOSs contained within the OFs discussed earlier in this section. Numerically there are sixty-two primary MOSs, three secondary MOSs, and four planned MOSs (XX02, XX21, etc.) considered, most of which were included in the figure. It is the MOS level which receives detailed attention by manpower planners. Continuous action is

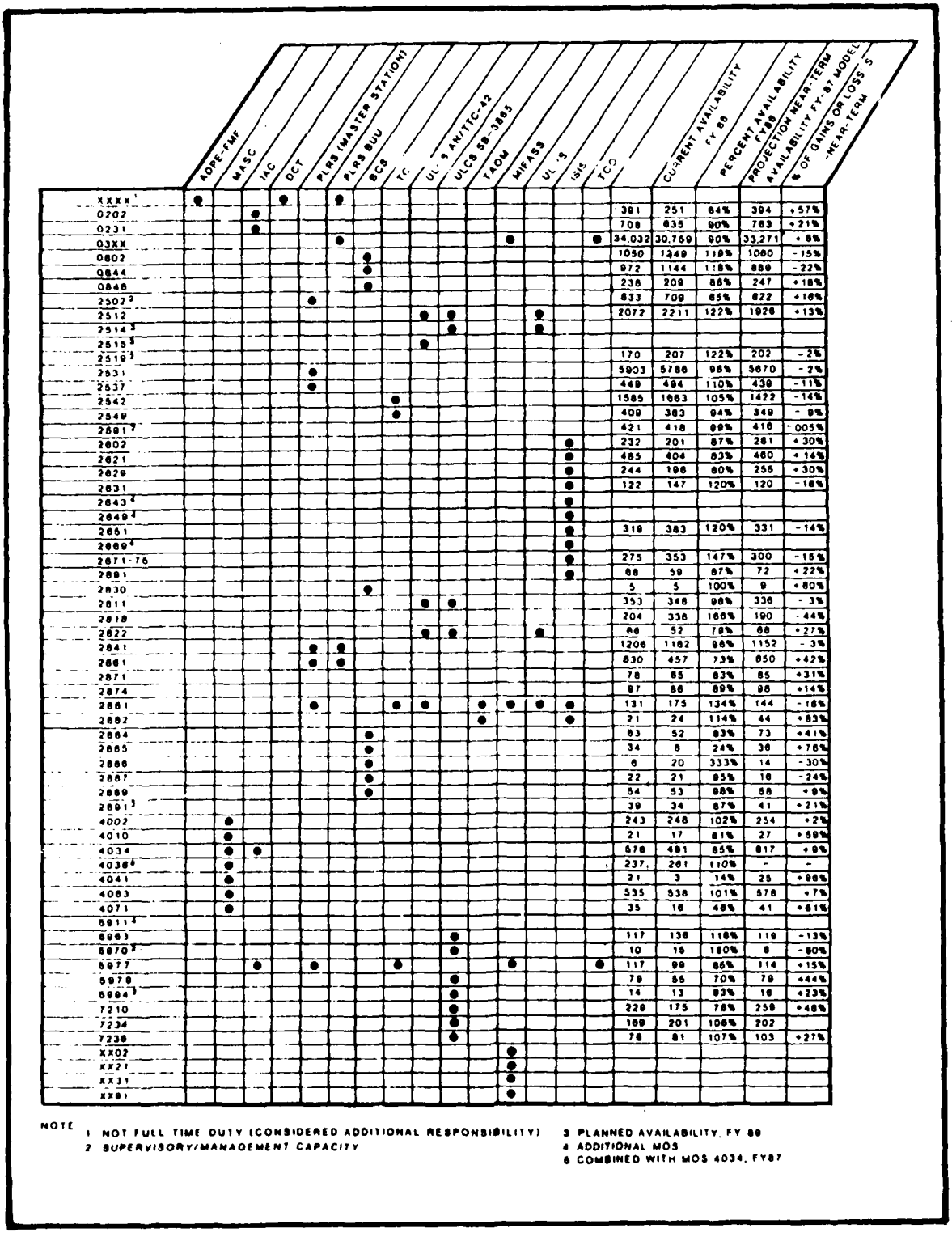
ongoing to insure that requirements are properly determined and that their availability with respect to numbers and rank is in consonance with current staffing goals. For an MOS to be considered "balanced," it should be within 95 to 105 percent of the current Target Force Planning Model. Below 85 percent, the MOS is depicted as critically short and is subject to appropriate manpower actions to redress the shortage.

4.3.2.1 Systems Operations and Maintenance MOSs - Analysis. Figure 4-8, MAGTF C4 Systems MOS Requirements, depicts those MOSs which are affected by the fielding of the MAGTF systems under study. The data in figure 4-8 reflects the Target Force Planning Model for FY86 (in numbers and as a percentage), the Target Force Planning numbers for FY87 and the percentage change predicted for FY87 for each of the MOSs. Of the MOSs listed in figure 4-8, there are 13 MOSs whose availability in FY86 was less than 85%. These MOSs are 0202, 2621, 2629, 2822, 2861, 2871, 2884, 2885, 4010, 4041, 4071, 5979, and 7234. All of the other MOSs had an 85% availability or better. For those 13 MOSs with less than 85% availability in FY86, projections for near term availability in FY87 indicate that manpower actions are underway to achieve a 95% availability or better.

4.3.2.2 MOS Analysis - Findings. An evaluation of the MOSs required for systems operation and maintenance reveals that in FY86, 13 MOSs had an availability of less than 85% of the Target Force Planning Model. However, the projected near term availability of these MOSs in FY87 indicates a minimum availability of 95% for the 13 MOSs. Of the other MOSs, only two thinly populated MOSs, 2887 and 5970, are projected to fall to less than 85% availability. It would appear that all affected MOSs (less 2887 and 5970) will provide at least 85% of projected requirements in FY87.

4.4 Personnel Support Requirements 1986-1996 - Analysis.

Previous sections have analyzed those OFs and MOSs affected by systems under study. The analysis found that projections of OF and MOS near term



NOTE
1 NOT FULL TIME DUTY (CONSIDERED ADDITIONAL RESPONSIBILITY)
2 SUPERVISORY/MANAGEMENT CAPACITY
3 PLANNED AVAILABILITY, FY 88
4 ADDITIONAL MOS
5 COMBINED WITH MOS 4034, FY87

Figure 4-8. (U) MAGTF C4 Systems MOS Requirements

availability through FY87 are generally favorable. A review of planned fielding dates reveals that ADPE-FMF, IAC, DCT, PLRS, and BCS will either be fielded by FY87 or that fielding will commence in FY87. It is of interest then to review the FMF personnel impact of these systems and specifically the status of manpower planning actions for these systems. Table 4-2, System Manpower Planning and Actions, shows that for these five systems, their manpower impact has been assessed throughout the acquisition process and the necessary manpower planning actions have been completed. Completion is defined as insuring that any FMF structure adjustments required have been accomplished through the Table of Organization (T/O) process. For these systems, the required T/O actions have been taken. This signifies that these systems have been incorporated into the approved manpower structure. For those remaining systems, i.e., those with a planned fielding date after FY87, table 4-2 provides a summary view of the manpower impact on the structure and the status of manpower planning actions. In general, the manning requirements for these systems, to be fielded post-FY87, do not appear to require an increase in personnel (i.e. structure). However, it is clear that new MOSs and/or new requirements upon existing MOSs, will be required for both systems operations and maintenance. Discussion of specific MOSs in this category is continued in succeeding paragraphs.

4.4.1 **Personnel Support Requirements 1986-1996 - Findings.** Certain individual systems (e.g., PLRS, IAC) have required additional personnel which has added structure spaces to FMF T/Os. However, PLRS, IAC, BCS, ADPE-FMF and DCT, which are either fielded or are due for FY87 fielding, have been accommodated in the approved manpower structure, as evidenced by their recognition in the appropriate FMF T/Os. As for the remaining systems, the current evidence suggests that additional personnel increases (additions to FMF structure) incidental to system fielding will be minimal. However, these systems will require the creation of some new MOSs and/or a revision to a selected current MOSs.

Table 4-2. System Manpower Planning and Actions

System	Planned FMF First Fielding	Potential Manpower Impact Assessment	Status of Manpower Planning Actions
ADPE-FMF	Fielded	N/A	Completed
MASC	FY89	Reallocation of current DFASC personnel planned to man MASC - No FMF personnel increase anticipated- T/O adjustments required	Ongoing
IAC	Fielded	N/A	Completed - Personnel requirements reflected in manpower structure. T/O 1986N DIV HQCO, HQBN MARDIV
DCT	FY87	Operation and Maintenance provided by existing personnel on additional duty basis. No FMF increase in personnel required.	None required
PLRS	FY87	PLRS Platoon (1/30) added to MARDIV. Maintenance added to Electronics Maintenance Co. (ELMACO) - FSSG	Completed - Personnel requirements reflected in manpower structure. T/O 1883M - COMM CO MARDIV T/O N1253, N2253, N3253, N4253. ELMACO - FSSG
BCS	FY87	Operations provided by existing personnel in Arty. Battery - no increase. Maintenance provided by HQS Battery Arty. Rgt. Increase required.	Completed - Maintenance personnel (MOS 2885) reflected in manpower structure. T/O 1197C HQS BTRY - ARTY REGT

Table 4-2. System Manpower Planning and Actions (Continued)

System	Planned FMF First Fielding	Potential Manpower Impact Assessment	Status of Manpower Planning Actions
TCC	FY 90	TCC to replace 2 T/E items. Reduced operations/maintenance personnel requirements anticipated. Current MOS 2827 and MOS 2829 combined with MOS 2827 redesignated for TCC. MOS 2549 and 2542 reductions anticipated. T/O adjustments required.	Ongoing - MCPDM - Milestone III approved 1/7/87
ULCS	FY91	-	-
TAOM	FY92	Reorganization of MACS Squadron to reflect new system. T/O adjustment required.	Completed - TAOM reflected in MACS-MAW T/O 8630
MIFASS	FY92	Restructuring of affected organizations. Fire Support/Coordination Sections required. Maintenance personnel required. Increase/decrease TBD.	Ongoing- Acquisition decision pending to determine scope of system.
ULMS	1992	-	-
ISIS	1988	Program restructured; testing of TCAC as partial interim solution ongoing. Readjustments to T/O likely pending results of testing. Personnel increase/decrease to be determined.	Pending
TCO	1993	Program currently structured to initially use EUCE hardware. Personnel increase/decrease currently under review.	Pending

4.4.2 MOS 2514/2515. During 1990, both the AN/TTC-42 and the SB-3865, which comprise the Unit Level Circuit Switch (ULCS) program, will be fielded. Two new MOSs, 2514, Installer/Maintainer for the SB-3865, and 2515, Supervisor/Maintainer for the AN/TTC-42, will be introduced to provide supervisory skills for operation of this equipment. Two years later, the AN/GYC-7, the Unit Level Message Switch (ULMS), will be fielded requiring the use of MOS 2514 supervisory skills. Although an analysis of the MOS 2512, Field Wireman, population indicates that it will remain balanced, Target Model Strength projections for FY90 and FY91 fall short of providing adequate feeder personnel to fill MOS 2514 and 2515 billets. The forecast for FY90 projects a quantity of seven 2514 billets and two 2515 billets while the FY91 target model projects a quantity of eleven 2514s and nine 2515s. ULCS/ULMS fielding growth will rapidly exceed the availability of qualified supervisor/maintainer personnel in the early 1990s. To alleviate this deficiency it is recommended that the specialist for OF25 and the ULCS/ULMS program sponsors coordinate a plan to increase the 2514 and 2515 populations to meet systems delivery.

4.4.3 MOS 2827/2829. Although not elsewhere identified as such, MOSs 2827, Mobile Data Terminal Technician, and 2829, Mobile Communication Central Technician, currently provide system maintenance support for the AN/TYC-5A Data Communications Terminal and the AN/TGC-37, Communication Central, respectively. With the fielding of the Tactical Communications Center, AN/MSC-63A, it is suggested that the MOS 28 specialists and the program sponsors utilize the expertise of the MOSs 2827 and the 2829 to form the nucleus of TCC maintainers after appropriate computer and peripheral training.

4.4.4 MOS 2841/2861. Although MOS 2841, the Ground Radio Repairer, is balanced during FY86, it is forecasted to decrease by 1.9 percent (23 personnel) in FY91. MOS 2861 is critically short in FY86 and management actions to correct this deficiency are exhibited by the forecasted increase of 43.5 percent in FY91. The fielding of the MAGTF C4 systems will impact heavily upon these two MOSs at the FSSG maintenance level. It is recommended that the MOS 28 specialist and program sponsors adjust for this impact upon

the Electronic Maintenance Company FSSG and MCLB Albany, Depot Tables of Organization.

4.4.5 MOS 2885. During the time frame 1987-1988 the BCS will be fielded and will require the MOS 2885 to provide maintenance support through the fourth echelon. Eight personnel are available in FY86 (critically short) with a FY91 target strength of thirty-seven. It is recommended that personnel management actions by the MOS 28 specialist and program sponsor be initiated to ensure that this critical shortfall is reduced to ensure adequate manning.

4.4.6 MOS 5977. An analysis of MOS 5977, Tactical General Purpose Computer Technician, indicates that the FY86 target strength model has a population goal of 117 personnel assigned an MOS of 5977. The current on board strength is ninety-nine, indicating a continued shortfall. Estimates depict a FY91 target strength total of 111 MOS 5977, which is six below the FY86 goal. This MOS (5977) has long been identified in the acquisition and maintenance support concepts as the solution to the systems technician dilemma facing the Marine Corps maintenance community today. MOS 5977 population shortfalls have been the rule, not the exception for many years. The majority of the C4 systems task the 5977 MOS for support through fourth echelon maintenance. Alternatives to resolve the continuing shortfall are necessary and are discussed below for consideration.

4.5 Systems Level Technician

4.5.1 Introduction. A heavy dependence has already been placed upon the utilization of MOS 5977, Tactical General Purpose Computer Technician, with the actual and prospective fieldings of the Position Location Reporting System (PLRS), Intelligence Analysis Center (IAC), the Tactical Communications Center (TCC), the Marine Integrated Fire and Air Support System (MIFASS), and the Tactical Combat Operations System (TCO). The 5977 specialty was developed primarily for the technician assigned to maintain computer equipment associated with the Marine Air Command and Control Systems. Now personnel of

this MOS are also designated to maintain the tactical general purpose computer equipment within the Fleet Marine Forces. These technicians receive the requisite computer and electronics training which qualifies them to perform maintenance up to and through tne fourth echelon level on both the AN/UYK-7 and AN/UYK-20 general purpose computers and their associated peripherals. The fielding of new C4 systems has increased the quantities of peripheral equipment for which the MOS 5977 technician is also responsible. A discussion of several approaches to providing system level technicians is addressed below.

4.5.2 Computer Growth. By evaluating systems delivery over time throughout the FMF, an analysis of computer growth was accomplished as shown in figures 4-2 through 4-5. Analysis indicates that by 1989 the aviation combat elements will no longer be the dominant user of computer based equipment. A greater density of computer based systems will become resident within the ground combat element of the Fleet Marine Forces as shown in figures 4-4 and 4-5.

4.5.3 Training Approaches. Although designated as components or elements of the IAC, PLRS, TCC, MIFASS, and TCO, the general purpose computers are either identical or similar in comparison. However, the peripherals and other on-line components do not share this commonality. They are diverse and have a variety of applications. An examination of Marine Corps unit Tables of Organization (T/O) of those units which are designated to receive these systems and maintenance support concepts indicate that T/O modifications have been completed or are in the process of adding MOS 5977 as the solution to system maintenance requirements. The current training track of the tactical general purpose computer technician, MOS 5977, plus three alternative concepts which provide definition, scope, and objectives for systems level technician training, are discussed herein.

4.5.4 Current Training Track. It is quite conceivable that if MOS 5977 remains as the candidate MOS for maintenance of these C4 systems, the training pipeline will significantly increase based upon a multitude of maintenance training requirements. For example, to become eligible for the 5977 MOS, the

prerequisites require a Marine to possess an MOS in Occupational Fields 28, 59, or 63, and to have successfully completed the Technician Theory Course (16 weeks). The current Tactical General Purpose Computer Technician Course is thirty-two training weeks. The training cycle must then be further extended to provide specific systems level training in the IAC, PLRS, TCC, MIFASS, and TCO. The system level course would encompass an additional period of time (IAC system level training is currently ten weeks). From this discussion one can readily visualize that the Marine Corps will have invested a minimum of fifty-eight weeks in providing career-level systems technician training for the MOS 5977. It is conceivable that MOS 5977 personnel who satisfactorily complete a lengthy training block would be assigned to support the specific system for which he has been certified, and then receive a follow-on assignment providing system level maintenance for systems with which he is both unfamiliar and not properly trained to maintain. This situation would require additional systems level training or a lengthy on-the-job training period, thus impacting the operational readiness of the unit.

4.5.5 *Alternatives for Systems Level Technician.* It has been recognized in the preceding paragraphs that the fielding of C4 systems and the attendant increase of computers and associated peripheral equipment will require over diversification of the 5977 MOS, Tactical General Purpose Computer Technician. To alleviate this situation three alternatives are discussed below.

4.5.5.1 **Alternative A.** Candidates for systems level technician, as shown in figure 4-9, Alternative A-Systems Level Technician, would be starting on a second or subsequent enlistment (career designated), and possess an MOS from either of the following three Occupational Fields, 28, 59, or 63. After satisfactory completion of the Technician Theory or a Computer Fundamentals course, all systems level candidate technicians would be selected and channelled to either of two computer training modules. It should be recognized that in the future, the AN/UYK-44 training module would be substituted upon replacement of the AN/UYK-20 by the newer AN/UYK-44 Data Processing Set.

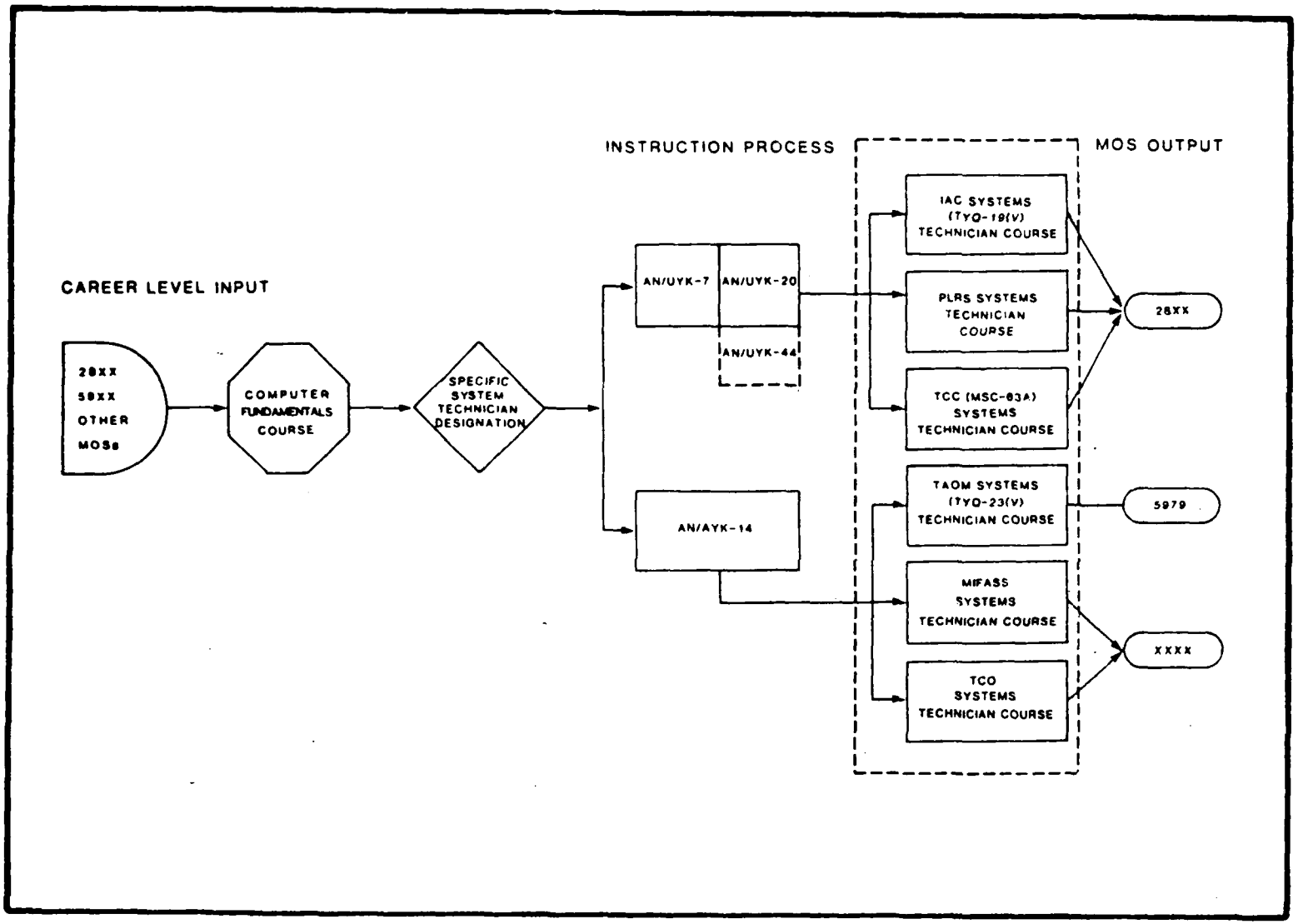


Figure 4-9. (U) Alternative A-Systems Level Technician

After completing one of the modules and based upon the needs of the FMF, the qualified computer technicians would flow to specific systems, i.e., IAC, PLRS, and TCC, or MIFASS and TCO, or TAOM for an in-depth systems training program prior to being awarded a systems MOS. The impact of this approach is reflected in three MOS communities fostering a much larger, however, more technically proficient MOS population trained initially on one of three systems in which a common computer is resident. The result depicted in figure 4-9 is a 28XX Systems Technician trained initially on either the IAC, PLRS, or TCC systems and one who would become eligible for a follow-on schooling on one or the other systems of this grouping after completion of one tour. By combining the current structure for MOSs 5977 and 5979, TAOM systems technicians would continue career progression as before without alteration to the training block. MIFASS and TCO systems technicians would complete the AN/AYK-14 computer course, participate in MIFASS/TCO systems training (separately or combined) and receive an identical systems level MOS in order that the MOS population possess enough width to support vertical or promotional growth. The application of Alternative A would increase annual student through-put at the Marine Corps Communications/Electronics Schools, at Twenty-nine Palms, CA, and provide three MOS populations with optimum growth opportunities. It is recognized that changing MOS 5977 into separate MOSs will require retraining of some of the Marines who currently hold the MOS. Additionally, MOS 5979 Marines will require training. With the advent of new computer systems retraining will have to occur for those Marines in any event.

4.5.5.2 **Alternative B.** As illustrated in figure 4-10, Alternative B-Systems Level Technician, candidates for systems level technician training would be career designated and possess an MOS from OF 28, 59, or 63. After completing a Technician Theory or Computer Fundamentals course, all systems level technicians would progress through three consecutive computer maintenance training modules; AN/UYK-7, AN/UYK-20, and AN/AYK-14. Upon completion of the peripherals course, all systems level technicians would receive operational familiarization training in six system training modules and receive a systems MOS. This approach increases the MOS population base

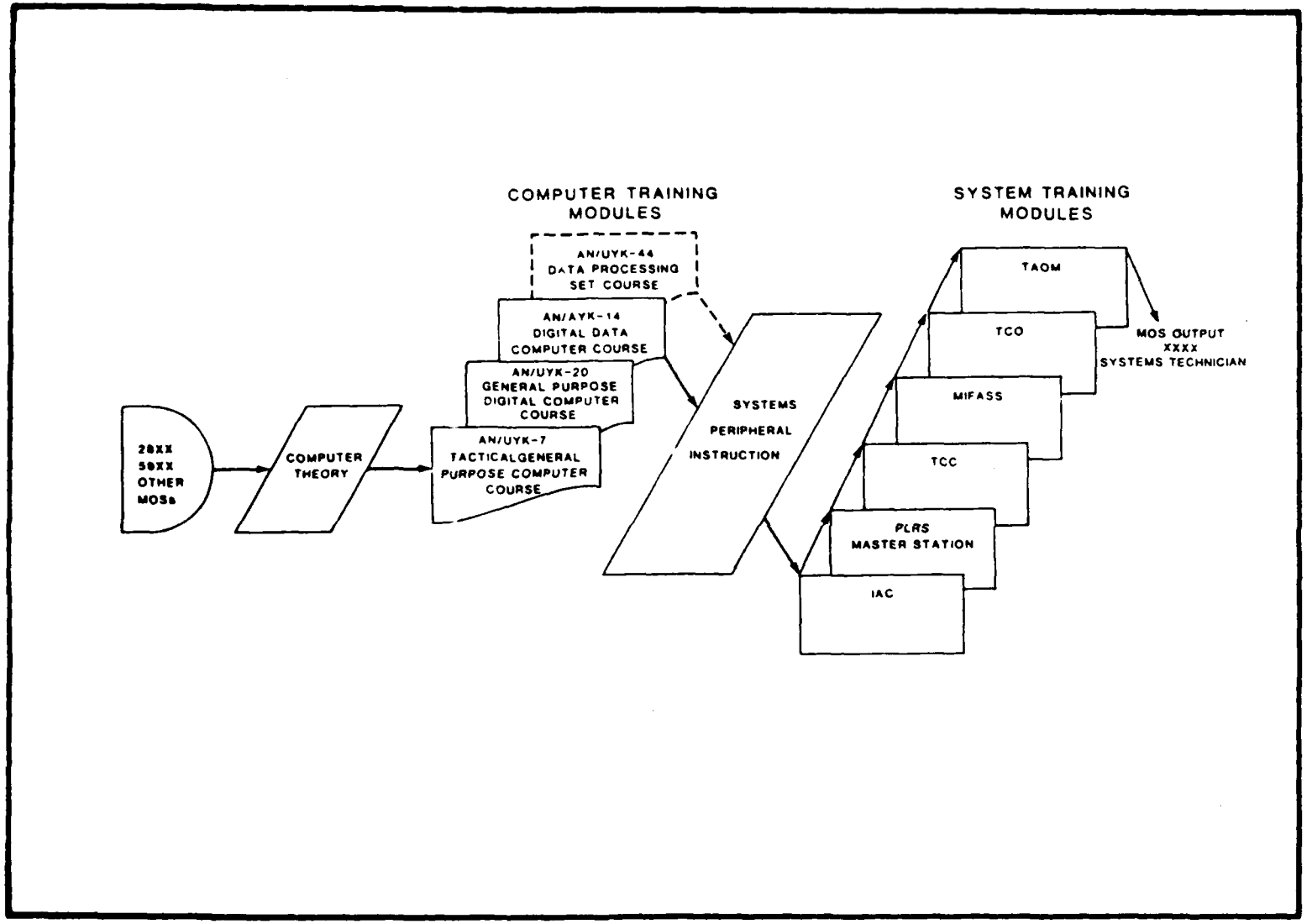


Figure 4-10. (U) Alternative B-Systems Level Technician

for promotional opportunities. Although not specifically oriented to one system, the technician has been provided with sufficient training in computer maintenance and associated peripherals. The study team's discussions with FMF maintenance supervisory personnel have emphasized two important concepts concerning systems. First, the school environment should provide an adequately trained technician, well grounded in the latest technical theory and computer maintenance. Second, MAGTF organizations which will be hosts to these systems already possess both an inherent capability to perform first through fourth echelon maintenance and an assortment of experienced technicians. These factors together provide a positive environment for the further growth of the newly arrived systems technician.

4.5.5.3 **Alternative C.** Career system level technician candidates as illustrated in figure 4-11, Alternative C-Systems Level Technician, will possess an MOS from Occupational Field 28, 59, or 63. Upon satisfactory completion of a Technician Theory or Computer Fundamentals course, these candidates are to be designated for specific systems level training prior to the computer repair training module. Students complete specific computer repair modules and then receive individual system level instruction from which they receive a system MOS. This alternative provides a qualified systems level technician in the least amount of time. It also allows greater annual student through-put. However, the initiation of five systems level MOSs provides a small population, limited in its ability to provide attractive promotional opportunities over the course of a twenty year career pattern.

4.5.5.4 **Findings.**

a. Growth and density of computer based systems will continue to increase.

b. Alternatives to the present training of a computer technician are possible.

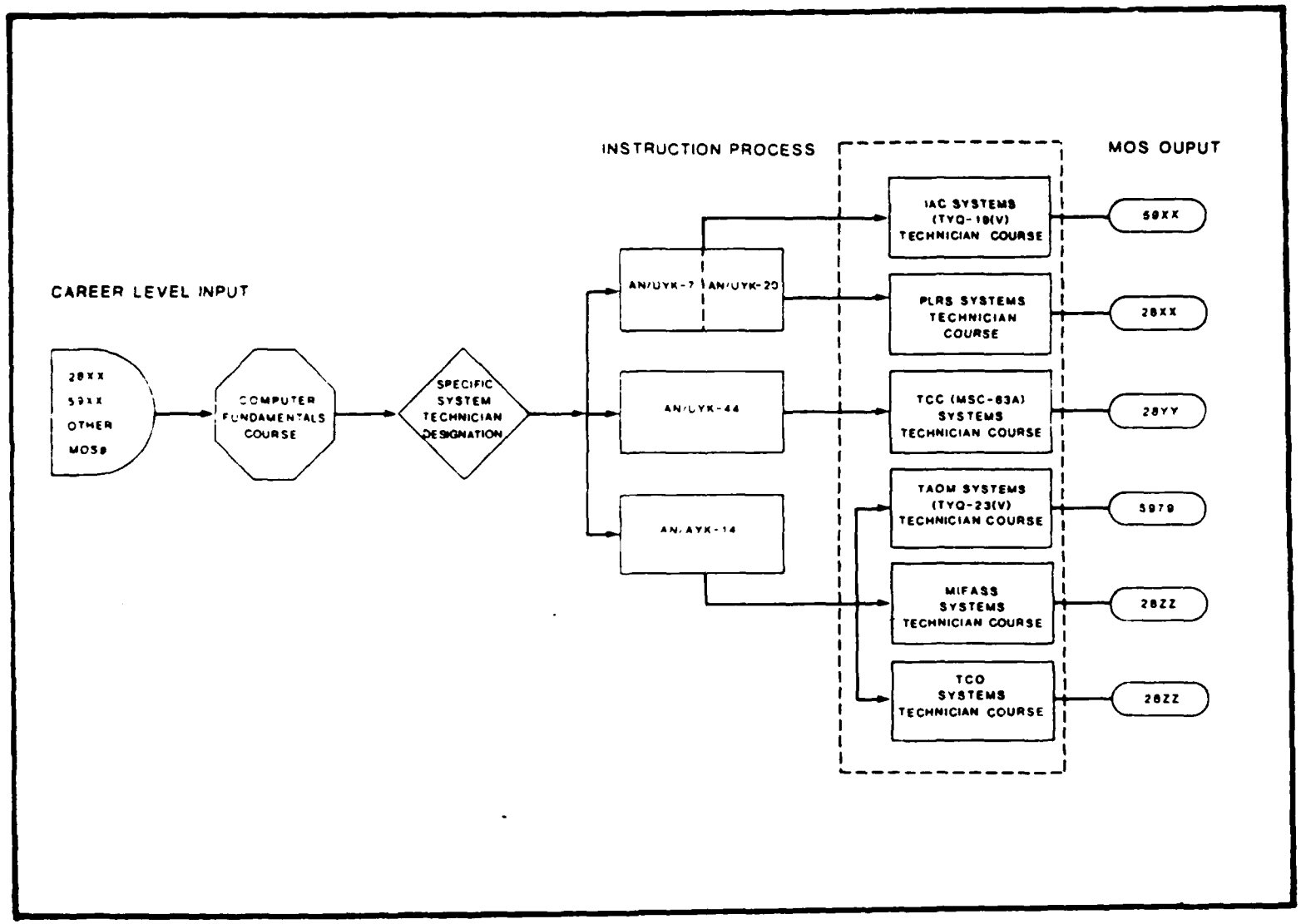


Figure 4-11. (U) Alternative C-Systems Level Technician

c. It is necessary to alleviate the inherent problem of the over diversification of MOS 5977.

4.5.5.4.1 Discussion. Alternative A provided in-depth computer training on one of two modules with follow-on training on specific systems, fostering three technically proficient MOS populations resulting in optimum numerical width and height with which to provide career growth. Alternative B provided familiarization training in all computer and systems modules. Alternative B, although providing a Systems Technician with career growth opportunity, provides a technician equipped with general, not specific, systems training. Alternative C provides a Systems Technician designated for a specific system. This alternative, although providing in-depth system instruction and a more qualified technician, is limited in its ability to provide attractive career development due to a small MOS population base. Precise quantification of length of training and further delineation of structural requirements can be provided through normal manpower determination processes. More detailed course prerequisites and lengths of training can be determined as part of the normal development of programs of instruction (POI) for each individual computer system selected.

4.5.5.4.2 Systems Level Technician Recommendation. Alternative A is recommended for consideration as a solution to the requirement for a systems level technician. It is recommended because it provides in-depth training on specific computers which are resident within certain system groups and increases the probability for producing a more technically proficient systems level technician. The application of this alternative will provide the population structure necessary to support career development.

4.6 Summary of C4 Systems Personnel and Training Support.

This section identified the MAGTF C4 systems in terms of personnel requirements for installation, operation, and maintenance activities. Illustrations that depict both an overview and individual system personnel

requirements provided a point of departure for an analysis of the manpower impact. Computer distribution ard growth profiles, COMSEC fielding, and C4 systems supporting data have provided for further analysis of personnel impacts by these systems. Current and near-term manpower availability to support these systems were evaluated by a detailed inspection of a variety of occupational fields and military occupational specialties. Impacts were found to have focused upon OF 25, 28, and 59. Personnel support deficiency issues over the period 1986 to 1996 were evaluated based upon the most current available Marine Corps manpower planning data. The System Level Technician recommendation was fostered by field research visits and interviews, and analysis of trends within the maintenance occupational specialties. Based upon the conclusions reached in this section the following recommendations are provided for consideration:

a) Program sponsors and MOS specialists must continue to increase necessary efforts to eradicate or substantially reduce MOS population deficiencies highlighted herein, particularly in OF 25, 28, 40 and 59.

b) Program sponsors and MOS specialists should continue to coordinate efforts with the Training and Manpower Departments and others as required and develop and refine the Systems Level Technician as indicated herein.

c) Reorient, redesignate and provide computer/peripheral instruction to personnel of MOSs 2827, Mobile Data Terminal Technician, and 2829, Mobile Communications Central Technician, to provide the required system maintenance support for the Tactical Communications Center (TCC).

SECTION 5
END-USER COMPUTING EQUIPMENT (EUCE) PROGRAM

5.1 Introduction

5.1.1 **Purpose**. The MAGTF C4 Personnel, Training, and Organizational Requirements study was revised to determine the impact that the End-User Computing Equipment (EUCE) program would have on C4 personnel, training and organizational requirements. The most significant organizational impact was believed by the government to be on the FMF Information System Management Officer (ISMO) staff requirements to provide technical and training assistance and the possible management of an EUCE device float. This section provides the results of the task's revision. The following additional subordinate assumptions were considered in the course of completing this task:

a) configuration management functions currently performed by the ISMO for the ADPE-FMF Program will also be performed by the ISMO for the EUCE Program;

b) training for Class I AISs that will be processed on the EUCE will be conducted by Marine Corps formal schools;

c) fifth echelon repair requirements will not impact MAGTF C4 personnel and will not be considered in the scope of the study; and

d) the FMF Information Systems Management Officer (ISMO) will have the staff responsibility for technical and training assistance in the EUC program.

The Maintenance and Training Plan provided in this section concerns all agencies, users and support activities that will have End-User Computing Equipment in the Fleet Marine Forces (FMF-EUCE). This plan is provided in lieu of the government-furnished maintenance concept and was validated through

analyses and personnel interviews with end-users, support-activities and Information System Sponsors. The plan contains a maintenance concept, training requirements and personnel requirements.

5.1.2 Background. The FMF-EUCE is the extension of the current and developing information system support to the reporting units of the operating forces. This requirement was first satisfied with the ADPE-FMF program which provided a ruggedized version of the IBM series/1 mini-computer to support data entry into the standard Marine Corps Class I AISs and support some local processing. An on-line communication capability was not provided. Input/output was handled by couriering discs or converting information to paper tape. The program was successful but requirements rapidly exceeded capability. Local commanders, using their delegation of procurement authority, obtained EUC devices of all types. HQMC also provided terminals to support information systems in garrison. Finally, the functional managers in redesigning their major Class I and II AISs have identified the EUCE as the required work stations for both data entry and local support in both garrison and deployed modes. HQMC has consolidated hardware/software EUC requirements into an RFP to obtain a standard suite of hardware/software to support all requirements and to standardize training, maintenance and supply support. Shown below in table 5-1, EUCE Utilization, is a list of systems by functional area showing how EUCE will be used by various FMF staff sections.

5.1.3 Fleet Marine Forces-End-User Computing Equipment (FMF-EUCE) Description

5.1.3.1 FMF-EUCE. The FMF-EUCE devices will replace the first extension of ADPE into the organic organizations of the FMF. This will not be on a one-for-one basis, but actually on a many-to-one basis as determined by the Class I work station requirements of the functional managers and the standardization of micro-processors.

Table 5-1. EUCE UTILIZATION

Section	Systems Utilized
S-1	REAL-FAMMIS, TAD accounting, CMCC Control, JINTACCS, word processing
S-2	JINTACCS, classified message preparation word processing
S-3	JINTACCS, Training Record Management, preparation of classified material, OP Plans, LOIs and word processing
S-4	JINTACCS, CALM, SEMS, overseas M3S, word processing
SUPPLY	JINTACCS, M3S (SASSY), MPS, word processing
MAINT	JINTACCS, M3S (MIMMS), MPS, word processing
FISCAL	SABRS, word processing, Local Financial Management Systems, TAD Management Systems
MISC/LOCAL APPLs	Maintenance spares, equipment for training, deployment augmentation, special requirements, future Class-I systems or expansion of present systems, and replacement of outdated ADPE

5.1.3.1.1 Hardware Components. The Marine Corps FMF-EUCE program will acquire desk top microcomputer systems with a selection of peripheral equipment and software packages. The FMF-EUCE devices will be deployable, TEMPEST accredited, and meet the same environmental specifications now being met by the ADPE-FMF devices. Ruggedization will be limited primarily to the carrying case. Users will be provided a standard FMF-EUCE configuration and the ability to select from a list of available operations as their requirements are developed and validated. The standard EUCE will be made up of a system unit and other devices shown below as table 5-2, Standard EUCE Components, and table 5-3, EUCE Orderable Components. Items indicated by an asterisk represent those items that are recommended herein as possible Lowest Replaceable Units (LRU) candidates. Actual identification of specific LRUs will depend on the EUCE selected as a result of competitive contract award.

5.1.3.2 Software Configuration. The software capabilities of FMF-EUCE will be in three parts:

a) system software;

b) Class I Data Entry Application Software as developed and supported by the CDPAs; and

c) standard commercial software packages.

5.1.3.2.1 System Software. System software will be provided by the contractor with the hardware, as a standard configuration. It includes:

a) MS-DOS 3.1 or later O.S;

b) hard disk drive backup; and

c) system diagnostics.

Table 5-2. Standard EUCE Components

SYSTEM - UNIT	*	CPU - 80286 microprocessor
	*	RAM
	*	Circuit boards (to be identified upon selection of EUCE)
	*	Floppy disc drive
	*	Cabinet
	*	Power cable
Components of System - Unit	*	200 watt power supply 6 ft. power cable
	*	Cooling fan
	*	Floppy disc drive controller
	*	Hard disc drive controller
Other Devices	*	Hard disc drive - installed in Systems Unit cabinet
	*	Protective case to store Hard Disc Drive
	*	Keyboard with 4 ft. long cable
	*	Monochrome monitor with 6 ft. power supply cable
	*	Dot matrix impact printer with 6 ft. power cable
	*	Display adaptor
	*	Surge protector
	*	Transport cases

Table 5-3. EUCE Orderable Components

* Arithmetic Coprocessor
* Memory Expansion Board
* 360 KB Floppy Disk Drive
* Dial-up Modem
* Color Monitor
* Letter Quality Print Device
    a. Letter Quality Printer
    b. Cut-sheet Feeder
* Graphics Plotter
* Expansion Chassis
* Magnetic Tape Drive
* Paper Tape Reader/Punch
* Diskette Duplication and Aggregation Device
* Uninterruptible Power Supply (UPS)
* Modular to 4 Prong Plug Adapter
* Modular to 4 Spade Tip Adapter
* Telephone Cable
* Single Line Tap
* Power Plug Adapter
* RS-232 Additional Cabling
* External Eight (8) Inch Disk Drive
* Power Devices
    a. Step Down Power Converter
    b. Step Up Power Converter

This software is required to allow EUCE to fit within the Marine Corps System Architecture as a replacement for the ADPE-FMF. This software will be sponsored, tested and integrated by C4 in the overall system software environment. This central control with the same EUCE system software versions throughout the AIS environment will allow the CDPAs to support the data entry application software development and maintenance with fewer changes or versions. This will allow for greater efficiency on the CDPA's efforts and be more cost effective. The system diagnostics software will allow the operators to isolate any system problem.

5.1.3.2.2 Application Software. Application Software supporting data entry will be developed by the assigned CDPAs based upon the requirements of the functional managers. EUCE technology allows for greater use of user views as menu screens, but the editing functions for data accuracy and access still requires the development, maintenance and distribution of this application software as described in MCO 5231.1A. This means that this software must be supported in one of the following compiler languages listed in the EUCE RFP:

a) COBOL compiler;

b) BASIC compiler;

c) C compiler;

d) ADA compiler;

e) PASCAL; or

f) FORTRAN.

5.1.3.2.3 Standard Commercial Software Package. Software packages are available with End-user Computing Equipment to support word processing, report generation and other local applications. These packages are available as

standards approved by the USMC (C4) and are provided as required to the end-users. They are subject to the GSA schedule and the manufacturer's regulations. These packages will not be maintained by the Marine Corps. The following commercial software packages are available with EUCE:

a) Word processing (MULTIMATE, WORDSTAR);

b) Spreadsheet (SUPERCALC III);

c) DBMS (DB III, CONDOR III);

d) Business (GRAPHTALK) and composition (CADKEY) graphics;

e) Data communications;

f) Asynch terminal emulation;

g) WWMCCS terminal emulation;

h) IBM 3278/9 terminal emulation;

i) IBM 3274/6 controller emulation; and

j) IBM 3770 RJE emulation.

5.2 Maintenance Plan

The maintenance plan presented herein expands upon the government-furnished maintenance concept by providing a breakdown of specific requirements by echelon of maintenance, delineating a maintenance management policy and designating configuration control responsibilities for both hardware and software.

5.2.1 Maintenance Concept. The plan to maintain the EUCE is based on three levels of maintenance, subdivided into five echelons:

a) Organizational Level
   1st Echelon - operator/user
   2nd Echelon - general support;

b) Intermediate Level
   3rd Echelon - direct support
   4th Echelon - general support; and

c) Depot Level
   5th Echelon - Rebuild.

The present concept does not use depot level/5th echelon repair. 4th echelon repair is the highest level authorized for EUCE. Repair consists of isolating faulty LRUs and replacing them with working LRUs. The faulty LRU may be repaired or discarded depending on the economic feasibility of repairing vs. replacing the item.

5.2.2 Maintenance Requirements. Specific requirements for each level of maintenance are described below.

5.2.2.1 Organizational Maintenance. Organizational level maintenance is that maintenance performed at the owning unit level by personnel trained to operate the equipment. In the case of EUCE the trained operator will be responsible for performing 1st and 2nd echelon.

5.2.2.1.1 1st Echelon. Operator maintenance will normally consist of inspecting, servicing, cleaning, adjusting and replacing expended items during scheduled preventive maintenance. The operator will use a preventive maintenance checklist while performing 1st echelon maintenance.

5.2.2.1.2 2nd Echelon. Unit maintenance will consist of applying corrective maintenance procedures to restore equipment to operational use. Maintenance manuals and diagnostic software will be used to isolate problems to the lowest replaceable unit. When the LRU is designated as an operator access LRU, such as cables or peripheral devices, the operator will remove the item, complete an equipment repair order (ERO), and dispose of the ERO and LRU in accordance with standard unit procedures. The item will be exchanged with a replacement item from the maintenance float maintained at the Force Service Support Group (FSSG). When the LRU is not designated for operator access, such as an internal disc drive to the CPU, the entire assembly plus an ERO will be turned in for replacement from the maintenance float. A specific listing will be provided to the unit depicting operator-accessible and non-accessible LRUs.

5.2.2.2 Intermediate Maintenance. Maintenance at the intermediate level consists of troubleshooting, inspecting, testing and analyzing end item and LRU malfunctions which require more precise test capability than is available at the organizational level.

5.2.2.2.1 3rd Echelon. Direct support maintenance consists of performing repairs not corrected by LRU removal and replacement, such as repair of wiring or replacement of LRUs from TEMPEST approved chasis. Fault isolation of problems not correctly identified by built-in-tests (BIT) or diagnostic software will require the use of general purpose test equipment and common handtools to perform voltage measurements and continuity checks to identify the cause of the malfunction. Electronics-Maintenance Company (ELMACO), Maintenance Battalion, Force Service Support Group is designated to perform 3rd echelon maintenance. Once an item is turned in to the maintenance float for repair, a technician will verify that the item is faulty and will forward the item with its ERO to ELMACO for repair.

5.2.2.2.2 4th Echelon. General support maintenance personnel will use automatic test equipment (ATE) and common support test equipment to test LRUs

and assemblies identified as faulty at the lower maintenance echelons. In accordance with source, maintainability, and recoverability (SMR) codes, faulty LRUs will be discarded, repaired or returned to the manufacturer. No special test equipment has been identified for any LRU or subassembly of the EUCE. ELMACO will perform all 4th echelon maintenance on EUCE. Once the item is repaired it will be returned to the maintenance float. During the warranty period any special test equipment required should be identified and plans should be made for its procurement.

5.2.2.3 Depot Maintenance. There is no plan to rebuild the end item or any of the EUCE major components within the Marine Corps. Items beyond the repair capability or which require overhaul will be disposed of, or if economically feasible, returned to the manufacturer for rebuild/major repair. The decision to discard or evacuate an end item or component will be made at 4th echelon.

5.2.2.4 Maintenance During the Warranty Period. Provisions have been made for direct factory representation to the using units for a one year period commencing upon acceptance of the EUCE by the unit. During this warranty period, 3rd and 4th echelon maintenance duties will be performed by the manufacturer.

5.2.2.4.1 Garrison Units. Once the operator/user has determined that a LRU is defective, an ERO will be prepared and unit supply will be notified to request a factory representative. Upon completion of required action by the factory representative the ERO will be forwarded in accordance with the unit's standard operating procedures. The factory representative will repair or replace the defective LRU or component. It is envisioned that factory repair will be controlled and monitored by ELMACO during the warranty period.

5.2.2.4.2 Deployed Units. Units in a deployed status will take with them a sufficient number of components (e.g., keyboard, printer) to effect replacement of components by the operator/ISC and to permit shipment of defective components to the manufacturer for repair. In the case of extended

deployments arrangements will be made for factory representation on site. An ERO will be prepared and disposed of in accordance with standard unit operating procedures.

5.2.2.4.3 ILSP Considerations. The EUCE program is being executed as a commercial off-the-shelf (COTS) program. It is therefore being pursued outside the development, acquisition, and logistics planning structure prescribed for systems in MCO 5000.10 and related regulations. Although this process reduces costs and expedites the acquisition it precludes advanced integrated logistics planning. This method of procurement does not, however, preclude the equipment being subjected to rigorous logistics management during and after its acquisition. To the contrary, in those cases where the system is going to be widely distributed and used by the FMF in combat, a COTS procurement actually increases the need for a modified logistic support plan (LSP).

The preferred, in-house, maintenance concept reinforces this need since it involves repair parts, technician training and other integration of the EUCE into the Marine Corps logistics system. It is therefore essential that action be taken to determine and document a composite of all of the support considerations necessary to assure effective and economical support of the EUCE throughout its operational life.

The warranty provisions of the current EUCE program provide the opportunity to execute a thorough ILSP effort that is based on operational experience with the equipment. The RFP calls for a 1 year warranty on each system with option for two additional 1 year extensions. In addition, the acquisition will be phased over a number of years. Consequently, the Marine Corps has from 1 to 3 years to develop and implement an ILSP based on experience with the first increment of equipments. This situation also supports a concept of phasing-in of USMC supply and maintenance for the EUCE.

The Marine Corps should therefore begin immediately by determining which ILSP steps are appropriate for a COTS acquisition and determining their optimum sequence. Action should be initiated on those items which do not depend on usage data. Once a reasonable amount of experience and usage data is accumulated, then actions and decisions dependent on that information should be executed. Since the process can be based on operational experience, the EUCE program presents an opportunity to create a more comprehensive (accurate) ILSP than is usually possible in a development situation. Additionally, the situation presents an opportunity to further establish the validity of and encourage additional COTS procurements.

The current MCO P5230.10, ADPE-FMF Management Plan can serve as a point of departure for the EUCE-ILSP since it addresses the equipment to be replaced. That document has been in use since 1980 and reflects most of the basic requirements for the management of general purpose ADP systems at the unit level. Its obvious deficiency is in the maintenance and supply areas since the ADPE-FMF equipment is contractor supported.

5.2.2.5 Software Maintenance

5.2.2.5.1 System Software. The contractor will provide a standard version of MS-DOS with the EUCE as part of the HW/SW configuration per site. This software will use memory. Therefore, version changes should be handled in the same manner as the main frame operating systems software. MCCDFA, Quantico, VA will test the system versions for impact upon application program support and make release notification after approval by HQMC (CCI).

5.2.2.5.2 Application Software. Class I data entry application software will be developed and distributed by the CPDA assigned this responsibility in accordance with MCO 5230.2D. This software support will encompass both the maintenance of the existing software configuration and the modification of software required by changes, either in operational requirements, or brought about by means of the software deficiency report system as an Incident Report.

The CDPAs will review copies of Incident Reports from the user, evaluate them for action, submit recommendations to the functional manager, maintain a status accounting system, implement and test software modifications, update documentation and produce and deliver application program packages.

5.2.3 Maintenance Management

5.2.3.1 General. Maintenance of the EUCE is the responsibility of individual major commands. Maintenance management data will be developed through the use of the existing Marine Corps data collection and reporting system. Data collection and reporting will be the responsibility of HQMC, Code LM.

5.2.3.2 Responsibilities. Table 5-4, EUCE Responsibilities, depicts the various functional and organizational responsibilities for the EUCE.

5.2.4 Configuration Control

5.2.4.1 General. HQMC, Code CCIR has been designated as the action point for the submission of Quality Deficiency Report (QDRs) to the Marine Corps. Standard form SF 368 or the deficiency report message format in TM-4700-15/1 will be used for all QDRs submitted to CMC. System software deficiency reporting will be submitted as an Incident Report, in the format of Appendix L, to MCO P5231.1 to Director, Marine Corps Central Design and Programming Activity (MCCDPA) Marine Corps Development and Education Command, Quantico, VA 22134-5010. Class I AIS software deficiency reporting will be submitted in the same format to the MCCDPA responsible for supporting the particular Class I system. MCO 5230.2D lists which MCCDPA supports which Class I AIS. Standard packaged software deficiency reporting, in the format of Appendix L to MCO P5231.1, will be submitted to the Commandant of the Marine Corps, Headquarters U.S. Marine Corps, Code CCIE, Washington, D.C. 20380.

Table 5-4. EUCE Responsibilities

Life Cycle Management
Commandant of the Marine Corps Headquarters, U.S. Marine Corps Code CCI Washington, D.C. 20380
Hardware Configuration Status and Accounting
Commandant of the Marine Corps Headquarters, U.S. Marine Corps Code LM Washington, D.C. 20380
System Configuration Status and Accounting
Director Marine Corps Central Design and Programming Activity (MCCDPA) Marine Corps Development and Education Command Quantico, Virginia 22134
EUCE Training
Commandant of the Marine Corps Headquarters, U.S. Marine Corps Code LM Washington, D.C. 20380
Warranty Support Coordination
Commandant of the Marine Corps Headquarters, U.S. Marine Corps Code CCI Washington, D.C. 20380

5.2.4.2 Quality Deficiency Reporting. TM-4700-15/1 requires a Quality Deficiency Report (QDR) to be submitted by the individual who discovers a deficiency in material. For the EUCE program, QDRs will be submitted as soon as practical in accordance with TM-4700-15/1.

5.2.4.3 System Software Deficiency Reporting. An incident report on software problems will be submitted to the appropriate MCCDPA by the unit experiencing the problem in accordance with the instructions contained in MCO P5231.1 at the time of occurrence or as soon as practical. The MCCDPA responsible for the software will distribute changes required to correct the problem using the most expeditious means available.

5.2.5 Warranty Period. During the warranty period for EUCE, the actual maintenance support will be by the contractor, as described in paragraph 5.2.2.4. However, maintenance management will be as described in paragraphs 5.2.3 and 5.2.4. This warranty period will allow the Marine Corps a finite time period to plan and organize to take over maintenance support for EUC. It will provide the time for the Marine Corps to collect usage data for stockage of components and to collect repair history. EUCE information would appear in LMIS and MIMMS for use at all levels of the Marine Corps.

5.3 Personnel and Training

5.3.1 EUCE Concept of Operations. The Marine Corps ADP policy and structure is centered around the centralized management concept. It is designed to enhance all levels of information processing. Therefore, both the ADPE-FMF and EUCE program will focus on the ISMO and his staff. The ISMO performs as a special staff officer under the direct supervision and control of the Chief of Staff of major FMF commands. The ISMO's responsibilities include advising the commander and his staff on ADP systems matters; serving as the command's single point of contact for the ADP matters; coordinating ADP requirements, objectives, concepts, plans and policies for multiple ADP systems; and conducting staff supervision of organic data processing units and

equipment. FMFM 3-1, Command and Staff Action, paragraph 1327, lists all of the command responsibilities assigned to an FMF ISMO.

5.3.1.1 ISMO Work Relationships. To perform these functions adequately, the ISMO must work closely with the users of ADP. A user is any unit or staff element within the FMF who utilizes ADP equipment or information extracted from ADPE in the performance of their duties. The ISMO interfaces with the user through an information system coordinator (ISC) who is the responsible person for the unit/staff section's ADP equipment and is assigned in writing to perform the liaison duties of an ISC. The ISMO also interfaces with the functional manager who is responsible for the distribution of systems under their cognizance and for providing technical guidance to users for the operation of these systems. The ISMO is also the single point of contact between the ISC and contractor for maintenance support of the ADPE-FMF. The ISC's association with contractor representatives will be limited to providing adequate facilities to accommodate repair actions. ISCs will contact the ISMO for contractor support. Under the maintenance concept developed in paragraph 5.2, The Maintenance Plan, the unit commander will assume this function.

5.3.1.2 Deployment Responsibilities. During deployments ISMO/ADP teams are task organized to support deployed units as required. The ISMO is a special staff officer who has the following responsibilities:

a) acting as the principal advisor on ADP matters;

b) coordinating the equipment maintenance activity for all organic ADP equipment configurations;

c) providing technical assistance for the identification and correction of problems associated with software applications and hardware maintenance; and

d) providing technical assistance in the development of new program applications.

5.3.1.3 Equipment Density Increase. All of these ISMO functions have and will continue to become more extensive and involved as EUCE expands into the FMF. Units are receiving equipment based upon needs and procured under the Local Delegation of Authority. ISMOs are then faced with instructing users how to apply software packages, like DBase II or Wordstar, to their unique applications. They have attempted to keep track of the EUCE presently in the major units, but it is too varied and changing. Maintenance support has not been standardized and in some cases there has been none at all. This planned fifteen-fold increase of EUCE over ADPE-FMF at the Battalion/Squadron level, because of a much wider application of systems in the AIS role and a replacement of manual office systems, will overtax the ISMO's configuration management capabilities. The ADPE-FMF was issued on a one or two per unit basis while the EUCE will be issued on a basis of one or more per section. For example, the S-1, S-2, S-3, (S-4/Supply, Maintenance and Fiscal) sections will each have an EUCE allowance. However, the organizational structure, as it exists in the FMF today, can support the implementation of EUCE into the FMF without major increases of functions or skills. This is possible because the configuration management responsibilities currently handled by the ISMO for ADPE-FMF will now be the responsibility of the receiving unit commander. EUCE will then be handled as any other item of equipment by trained supply and maintenance personnel.

5.3.1.4 EUCE Distribution. Annex D is the planned distribution of EUCE as known at this time. The EUCE will be distributed to the units as determined by the HQMC functional managers and as coordinated between the contractors, local ISMOs and Unit Command Representatives. The end-users will be the ISCs or other members of their sections. These Marines will be identified to the ISMO. The contractor is required to provide initial instruction for set-up and training as described in the RFP. An Advanced Logistics Order (ALO)

containing specific procedures for EUCE distribution should be published before the actual distribution.

5.3.1.5 EUCE Configuration. The EUCE will come assembled with a video monitor, detachable keyboard, and printer. Other configurations and peripherals available will depend upon user requirements.

5.3.1.6 Preparation and Operation. EUCE devices will require no special site preparation for most operational situations; however, users should ensure that proper actions are taken to verify that the source of electricity is within the equipment operating range. Prior to connecting an ADP device to a power receptical, the receptical will be checked for proper grounding and excess transient voltage fluctuations. These tests will be accomplished by qualified maintenance personnel utilizing a ground tester and voltage monitor. Equipment operators will be provided by the using unit. Users should ensure that an adequate number of operators are designated to support required usage. It is recommended, as an additional duty, that a minimum of a primary and one alternate operator be designated for each Class I system application processed by the section/unit. No increase in T/O is required. The information systems coordinators will be responsible for assisting users in enhancing the skill level of operators by coordinating required training with the ISMO and/or the assigned unit functional area representative of a Class I system, when applicable. The actual operation of EUCE should be in accordance with the equipment operation procedures and instructions for use of approved applications contained in the equipment operators manual and application user manual which will be provided separately.

5.3.1.7 Local Procedures. ISCs should develop local procedures to ensure compliance with AIS and ADP directives; familiarize themselves with special ADPE reporting requirements; and establish means for obtaining supplies using routine supply ordering procedures.

5.3.2 Personnel. No new occupational specialties are required to perform maintenance duties below the depot level. The operator of the EUCE will perform 1st echelon preventative maintenance and the ISC will perform 2nd echelon maintenance. The 3rd echelon (direct support) and 4th echelon maintenance will be accomplished by ELMACO. Table E-2 of annex E lists the recommended maintenance personnel by rank, MOS, and number required.

5.3.2.1 1st Echelon Maintenance. The operator will perform preventative maintenance, clean and inspect the equipment and run the supplied maintenance diagnostics.

5.3.2.2 2nd Echelon Maintenance. The ISC, as the supervisor/maintainer will perform corrective action as determined by the diagnostics if it does not invalidate the TEMPEST conditions of the EUCE. The TEMPEST accreditation of EUCE can only be maintained when it is repaired by TEMPEST certified technicians.

5.3.2.3 3rd & 4th Echelon Maintenance. The direct and general support maintenance duties for the EUCE will be accomplished by Marine Corps personnel with MOSs 2841 and 1182. Discussions with ELMACO personnel indicated that this can be done without additional personnel. The 1st and 2nd FSSGs are currently supporting maintenance on the non-standard EUC equipment in the FMF. However, the numbers of suites of equipment are less than a third planned for the standard EUCE. While 3rd & 4th echelon maintenance may appear satisfactory now, it may not be when the EUCE and other large density items of equipment are distributed to the FMF. This support can, and should, be validated during the warranty period for EUCE. ELMACO personnal indicated that an increased requirement could be accommodated within the current T/O if a 100% manning level is attained.

5.3.2.4 Software Support. The system software will be maintained/upgraded by MCCDPA, Quantico, Virginia, the Class I application software by the appropriate CDPA, and Class II software by the ISMO/USER. There is an initial

requirement to make conversions of application software from ADPE-FMF to EUCE, but this can be done without any increase in MCCDPA staffs because contractor personnel at MCCDPA will perform required changes. Discussions at the CDPAs verified that no increase in personnel is required to maintain Class I software once the initial requirements are met.

5.3.2.5 Maintenance Float Management. Staffing levels for the management of the maintenance float can be accomplished after necessary additional data is available. In order to determine the number of personnel required for each of the EUCE maintenance floats it will first be necessary to determine the numbers and types of individual EUCE maintenance float components involved. No changes in personnel assignment policies relating to parts densities are anticipated.

5.3.2.5.1 Numbers of Items. Determination of the actual numbers of EUCE components required should be a function of three elements; the failure rate, the usage rate, and the population mix. The failure rate initially is the manufacturer's computed rate provided. It should be modified subsequently by actual usage data obtained from the manufacturer during the warranty period. The manufacturer's cumputed failure rate for each element should be made available by the manufacturer in demonstrating the system MTBF of 720 hours required by the specifications. Usage rates should be calculated as the number of hours per month each element is utilized over 720 hours, times 100%. This is a variable depending upon the actual employment of the system. Maximum possible usage is 24 hours/day times 30 days/month, or 720 hours. Population mix involves the recognition that intended usage governs the actual configuration of any system. The final configuration should be determined by the functional managers who decide what array of accessories are to be added to the basic components in order to support the particular program of the functional managers.

5.3.2.5.2 Types of Equipment. The types of equipment in the EUCE maintenance float are the LRUs that are to be identified for the EUCE. Recommended

LRUs are contained in paragraph 5.1.3.1.1. Particular LRUs were not identified in the specifications. Until final product configuration is determined, there is no indication of which components will be removable as an LRU. TEMPEST-specified considerations are a significant factor in the design of the components and may be expected to influence both access and removability of EUCE system elements. The use of a Faraday Cage, or low-level gold-plated contacts, for instance, to meet TEMPEST requirements is the designers choice and will be critical to the types and final physical configuration numbers of the LRUs.

5.3.3 Training. Training is fundamental to the successful implementation of EUCE. The contractor will provide formal instruction as required on-site to include both the system overview and remedial maintenance. The contractor will also provide demonstration programs that will illustrate the computer's basic configuration, features and operation with every standard configuration. Finally, interactive, computer-assisted instruction (CAI) courses will be provided that will explain all of the standard packaged software. These will also have the necessary manuals for backup. Most of this training is pointed toward the end user on site. However, it should also be incorporated into formal school training.

5.3.3.1 Requirements. Training is required at points other than the end user. ISMOs and application programmers need to be taught the full capabilities of the systems and how to develop applications in the programming language selected to support the application. Functional managers and the formal schools supporting their functional areas need to update their courses to include EUCE applications and equipment use. Maintenance repairmen require some familiarization at C-E schools. The hierarchy of training is as shown below.

5.3.3.1.1 Computer Science School (CSS). The data processing officers course, system programmer courses and programming courses should teach familiarization of EUCE and the languages and other software associated with

it. CSS should also phase out ADPE-FMF courses as the equipment is phased out of the Marine Corps. This is being planned for and, in some areas, is ongoing at CSS.

5.3.3.1.2 Marine Corps Communications - Electronics Schools (MCCES). As a formal school for teaching equipment repair, MCCES teaches computer theory and maintenance. The successful contractor's EUCE instruction should be incorporated into the school curriculum for MOS 2841.

5.3.3.1.3 Functional Area Formal Schools. Courses that teach Direct Entry Clerks need both the equipment and software to instruct students in their courses. This is a replacement of the same instruction being taught for the ADPE-FMF. The Direct Entry software is required from the appropriate CDPA. This has to be programmed and scheduled as the current AISs and related functional applications are replaced by the new applications.

5.3.3.1.4 FMF Field Training. When the EUCE is programmed to be delivered to a major site, the ISCs should inform the ISMO of their training requirements. The ISMO should coordinate with the contracting agency/contractor for initial and follow-on instruction. The functional managers, with the assistance of the ISMO, should train users in their Class I system applications.

5.3.3.1.5 Information Center (IC). The Information Center concept is a school type approach used by organizations to instruct on installation of new applications. It is usually under the unit ISMO and provides non-DP end-users with tools, packages, techniques and assistance to access their data. In addition it assists the end user to function on a host or personal computer in three areas: decision support, business communications and professional support. The Marine Corps is using this concept to have the ISMO support the FMF end user today. This concept should be expanded to include training and maintenance support functions. The Information Center should be an organizational focal point for evaluation, acquisition and support of all workstations for end-user computing. In garrison, the Information Center should be

consolidated under the Base ISMO. The Information Center should provide continuing EUCE support in the four functional areas indicated below.

5.3.3.1.5.1 Consulting Support

a) Product Consulting. The IC provides in-house microcomputer industry expertise, along with knowledge of the customer's organizational functions and requirements. Standard configuration of hardware and application packages should be available for demonstration.

b) User/Application Consulting. The IC is staffed to evaluate end-user requirements and provide advice and recommendations for solutions which best meet both end-user needs and those of the organization. Test runs of possible solutions can be prototyped.

c) Education Consulting. Training curricula at various levels should be setup for managers and end-users. Appropriate training plans should be developed and training schedules published. New-user orientation should be offered covering hardware and software, organization policies, computer standards, usage tips, data security, and backup.

5.3.3.1.5.2 Administrative Support. The IC will act as a central location for receipt of equipment as well as assistance in initial setup and component testing. In addition, a software library should be maintained to fill requests resulting from new EUCE requirements.

5.3.3.1.5.3 Technical Support. The IC should have a help desk to provide end users with answers to hardware and software questions. This support should also include feed back on product improvements and recommended services.

5.3.3.1.5.4 Information Systems Support. The IC should play a supportive role to other groups responsible for strategies and policies in the implementation of information systems. The center should support standards

for the main frame environment and keep abreast of all standard computer main frame communications and connectivity alternatives. Data management and security aspects involving EUCE workstations should be determined and supported.

5.3.3.1.6 Potential Benefits. There are potential benefits of integrating an Information Center facility into an end-user computing support structure. These include:

a) providing a means to manage large volumes of EUCE effectively in an organization;

b) helping to ensure that the growth of EUCE is organized and consistent with the other decision support systems in the organization;

c) providing a centralized activity to support end-users; and

d) allowing the use of the Information System function to determine the use of EUCE by setting standards, maintaining compatibility and being the "service of choice" to the end-user.

SECTION 6
C4 SYSTEMS INTEGRATION MANAGEMENT CONSIDERATIONS

6.1 Introduction

The purpose of this section is two-fold. The first is to discuss the issue of interrelationship of the C4 systems as it pertains to the integrated planning areas of organization, personnel and training. The second is to proffer C4 systems integration management considerations based on the analyses conducted in sections 4 and 5 of this study. The issues are divided into two main categories; organizational considerations, and personnel and training.

6.2 Organizational Considerations

The 14 systems discussed in this study will provide new command and control capabilities to the Fleet Marine Forces (FMF) through the rest of this decade and well into the 1990s. Their introduction and integration into the Marine Air-Ground Task Force (MAGTF) command structure will affect operations at all levels in the operating forces. Optimum integration of the systems into the force structure depends, to a large degree, on how the FMF is organized in both garrison and combat and how it transitions between those organizational states. The following sub-paragraphs address the key organizational aspects of integrating C4 systems into the FMF.

6.2.1 The Basic Organization

6.2.1.1 **Structure and Objectives.** The basic structure and objectives pertaining to the Marine Corps are embedded in law and in directives derived from law. Specifically, the National Security Act of 1947 as amended in 1952 establishes that the Marine Corps shall be organized into no less than three combat divisions, three air wings and necessary support forces. It further stipulates that these forces will be organized, trained and equipped to provide combined arms organizations for service with the fleet and the conduct

of land operations. The contemporary USMC Fleet Marine Forces consist of numbered Marine Divisions, Marine Aircraft Wings and Force Service Support Groups deployed geographically and whose senior USMC field commanders are the Fleet Marine Force Commanders Pacific and Atlantic. These are the forces for which the Commandant is responsible for training, organizing and equipping. They also constitute an organizational baseline for purpose of allocating personnel and equipment and are the basis for task organizations for combat.

6.2.1.2 Personnel and Equipment. The distribution of personnel and equipment for the FMF, including command and control systems, is based on this structure of Divisions, Aircraft Wings, Force Service Support Groups and the individual units which make up these major commands. The normal procedure is for units to have permanent custody of the personnel, weapons and other equipment necessary to their basic mission. These resources are allocated by Tables of Organization (T/O) and Tables of Equipment (T/E) to a wide variety of permanent organizations. Appendix B illustrates the range and diversity of these units and shows a proposed allocation of the subject C4 equipments. This permanent allocation of resources down to the lowest levels meets two basic requirements. First, it keeps the personnel and equipment together which improves training and maintenance. Second, it supports the restructuring of the major commands into the MAGTF most suited to a specific operation.

6.2.2 Marine Air-Ground Task Forces (MAGTF)

6.2.2.1 Structure. The structure of Marine Divisions, Aircraft Wings and Force Service Support Groups described above constitutes most of the permanent organization of the Fleet Marine Forces. These organizations are made up of like units to capitalize on the efficiencies of concentration of similar resources for training and administrative purposes. They also provide the nuclei for the ground combat, air combat and combat service support elements of MAGTFs which are task organized for specific missions. The three forms of the MAGTF, the Marine Amphibious Unit (MAU), the Marine Amphibious Brigade

(MAB) and the Marine Amphibious Force (MAF), are made up from reinforced units and detachments from the three basic elements of the Fleet Marine Forces.

6.2.2.2 Organizational Status. The FMF unit exists in two organizational states, garrison and MAGTF. In its MAGTF form it may remain the same as in garrison but will normally be in a (-), (+) or (-, +) status because of giving up and/or receiving detachments. This changing organizational structure creates turbulence in a number of functional areas including administration, personnel, logistics and C4 support. However, the baseline garrison structure has three characteristics that serve to minimize the adverse C4 impacts of task organization; parallelism, distributed architecture, and tailoring.

6.2.2.2.1 Parallelism. The Division, Aircraft Wing, Force Service Support Group structure of the garrison Fleet Marine Forces closely parallels the ground, air and combat service support element triad of the MAGTFs. This parallelism serves to preserve functional integrity throughout the FMF-MAGTF-FMF transitions even though most of the time is spent in the FMF configuration. Consequently, there is a high degree of continuity in the constituent unit functions and in the relationships between the major elements of the MAGTF.

6.2.2.2.2 Distributed Architecture. The Commanders of the baseline units of the FMF are usually equipped with the command, control, communications, computer equipment, and personnel necessary to their basic missions. This forms a distributed architecture of units which are partially or totally self-sustaining in C4 functions. As a result, units or detachments thereof can move about within the MAGTF command and control structure using their own internal control equipment and mechanisms and, in many cases, provide direct interface with supported or supporting units. This organic capability is supported by doctrine which specifies the source and direction of coordination, i.e., senior to subordinate, supporting to supported, supported to attached, and left to right unless otherwise directed.

6.2.2.2.3 **Tailoring.** The third task organization enhancing characteristic of the FMF is the existence of C4 support units which are tailored to meet special requirements including those that exceed organic unit capabilities. Current examples of these resources are the Communications Company of the Marine Division; the Communications Battalion, FMF; the Communications Company of the Headquarters Battalion of the FSSG; and the Communications and Air Control Squadrons of the Marine Aircraft Wings. In addition to reinforcing organic capabilities, these units provide the communications resources for the MAGTF headquarters elements or, in the case of the Air Control Squadrons, to perform specialized C4 functions. The fact that most of these are communications units reflects the sequence of evolution of specialized C4 equipments and functions rather than a purposeful division. As indicated by the existence of the Air Control Squadrons, and the introduction of the PLRS Platoon into the Division Communications Company, there are precedents for both separation and consolidation of C4 functions.

6.2.2.3 **MAGTF Headquarters.** Since MAGTFs are formed on an as-required basis they begin their existence with the disadvantages inherent in temporary organizations. The impact and duration of organizational start-up difficulties is minimized in the ground, air and service support elements because of their being formed from existing similar units in the FMF. Consequently, they have a high degree of continuity in personnel, resources and function. This is not the case for the MAGTF headquarters element which is responsible for the command and control of the force.

6.2.2.3.1 **Special Case.** MAGTF headquarters elements present a special case of both organization and C4 support requirements since there are no functioning tactical source units in the FMF. Initially it was formed from drawdown on the other headquarters elements in the FMF. The result was usually a less than optimum command and control situation throughout the MAGTF. While the headquarters resources were eventually brought together, they were usually still in the shake down and learning process when the operation took place. Concurrently, the headquarters of air, ground, and

service support elements will also experience difficulties to the degree that the drawdown is on their resources.

6.2.2.3.2 Limitations. The impact of the disadvantages inherent in the ad hoc headquarters approach became more intense with the advent of prepositioning, rapid deployment concepts, and the demand for quicker responses in joint operations planning. Although a gradual evolution towards permanent MAGTF headquarters was already in progress, it was accelerated in 1983 as a result of these new imperatives. The concept was for the development of permanently organized and functioning headquarters for MABs and permanent nucleus headquarters for the MAFs. The MMROP 86-95 structure now identifies 7 permanent MAGTF headquarters elements. The eventual number of permanent MAGTF elements will reflect two limitations: the capability of each of the Division/Wing/FSSG teams to deploy the main elements of the one MAF or two MABs simultaneously; and the capability of the Communications Battalion, FMF to support only two MAGTF headquarters (1 MAF and 1 MAB or 2 MABs) at any one time.

6.2.2.3.3 Permanent MAGTF Headquarters Allowance. The tables of organization and equipment for the permanent MAGTF headquarters elements which have been established are shown in annex B. However, with the exception of the ADPE-FMF (EUCE), the T/O-T/E do not appear to have allocated any of the systems being studied. This was confirmed with system sponsors and indicated a continuation of the practice of keeping most of the C4 resources in the FMF units which constitute the GCE, ACE and CSSE. While this approach assures their C4 performance, it continues the ad hoc and drawdown philosophies to the degree that the MAGTF headquarters requires additional C4 resources for day-to-day operation. Since C4 functions are a principal part of the MAGTF headquarters mission, it would appear that action should be taken to also apply the concept of a basic allowance of C4 resources to the permanent MAGTF headquarters. As the C4 equipments begin to be used more and more for planning, then the requirement for the permanent MAGTF headquarters to have organic equipment and personnel will increase. This will apply primarily to

the communications, MIFASS, TCO, EUCE, and other equipments which have a planning support capability.

6.2.3 C4 System Functions in the MAGTF

6.2.3.1 Systems For The Unit Commander. The categorization of C4 systems as either the unit or MAGTF type was introduced and developed in section 3. Briefly, unit systems are those which are distributed widely through the various FMF organizations, support that unit's mission and are under the operational control of the unit commander. These systems and the functional support they provide for the unit are identified in table 6-1, Unit Systems.

Table 6-1. UNIT SYSTEMS

SYSTEM	FUNCTIONAL SUPPORT
ADPE-FMF/FMF-EUCE	ADMIN/LOGISTICS
DCT	COMMUNICATIONS
PLRS(UU)	OPERATIONS
BCS	OPERATIONS (FIRE CONTROL)
TCC	COMMUNICATIONS
ULCS	COMMUNICATIONS
MIFASS	OPERATIONS (FIRE SUPPORT)
ULMS	COMMUNICATIONS
TCO	OPERATIONS/INTELLIGENCE

The analysis of the system custodial relationships performed in section 3 indicated that the distribution for these systems, the function which they perform for the unit, and the implied operational control relationships inherent in unit custody, i.e. commander with custody exercises operational control of the system, led to the finding that no change to the proposed custodial relationships for these systems is warranted. In essence, using unit custody provides the optimum operational employment of the systems within the MAGTF structure.

6.2.3.2 Systems For the MAGTF Commander

6.2.3.2.1 Functional Support Areas. MAGTF systems are those specifically designed to support an overall force function as contrasted to the unit systems which support individual units within a MAGTF. As unit systems support the unit commander, MAGTF custodial relationships must be sensitive to the needs of the MAGTF commander. Table 6-2, MAGTF Systems, lists these systems and their area of functional support.

Table 6-2. MAGTF Systems

SYSTEM	FUNCTIONAL SUPPORT
DFASC/MASC	ADMIN/LOGISTICS
IAC	INTELLIGENCE
PLRS MS	OPERATIONS
TAOM	ANTI-AIR OPERATIONS
ISIS	INTELLIGENCE

6.2.3.2.2 Enhanced MAGTF Commander Support. The nature of the functional support reinforces the need for the systems to be responsive to the MAGTF commander. The analysis in section 3 found that no change in custodial relationships are indicated for TAOM and ISIS since these systems were already placed to be directly responsive to a MAGTF commander. For the DFASC/MASC, the analysis confirmed that the system should remain in the FSSG, but further found that within the FSSG, the system effectiveness would be enhanced if placed within the FSSG Communications Company. The PLRS MS and the IAC operational concepts specify that these systems support the MAGTF commander. The current proposed organizational custody for these systems specifies custody by the Division Communications Company and Headquarters Company, respectively. Since the Division commander may not necessarily be the MAGTF commander, the finding was that these systems could best support a MAGTF if

placed in the Communications Battalion, a unit whose mission is to support a MAGTF commander at the MAB or MAF level.

6.2.4 C4 Systems Organization-Maintenance Considerations

6.2.4.1 **MAGTF or Low Density Systems.** The MAGTF Systems (TCC, DFASC/MASC, IAC, PLRS MS, and ISIS) are considered, in the electronic maintenance environment, to be low density systems in terms of numbers fielded. Such systems are usually characterized by concentration into specialized units with small numbers of personnel trained to operate and maintain them. This concentration of systems enhances their logistic supportability. The custodial relationship findings of the study placed these systems in organizations with a significant third echelon maintenance capability, i.e. the IAC, PLRS MS as well as the TCC in the Communications Battalion; the DFASC/MASC in a Communications Company; the TAOM in the MACS; and the ISIS in Radio Battalion.

6.2.4.2 **Unit High Density Systems.** The number of organizations planned to receive unit systems and the quantity of these systems indicates that these "commodity systems" will have a major impact on maintenance organizations. Specifically, third echelon maintenance work loads can be expected to be increased at the FSSG level. These systems rely primarily on digital electronic components for their operation. The focal point for their repair will be the Electronics Maintenance Company, FSSG. While the time frame for complete introduction of these systems will cover almost a decade, the greatest numbers will have been introduced by 1989. The sheer volume of items can be expected to impact most severely at the Electronics Maintenance Company, FSSG during 1987-89. Preparations to receive, classify, store, account for, maintain shop supply bins for spares, and to obtain and maintain sufficient test equipment are required. The critical element needed to begin preparation, however, is still unknown, and without it, any other calculations can only be considered speculative. This element is the identification of the EUCE Lowest Replaceable Unit (LRU). Once this identification has been

accomplished, and the currently-specified mean-time-between-failures (MTBF) together with the mean-time-to-repair (MTTR) has been verified through both developmental and operational testing, serious preparations can get underway. The IOC of the EUCE suggests the efficacy of timely identification of the EUCE LRU.

6.2.5 Summary of Organizational Considerations. Although the Marine Corps is organized with permanent FMF (garrison) organizations it forms Marine Air-Ground Task Forces (MAGTFs) for operational deployments. These task forces can exist for prolonged periods and tend to change form with variations in the tactical situation and terrain. In addition, some of the MAGTF headquarters elements are now established as permanent parts of the force structure and doctrine has been established for the forming of a composite MAGTF by combining forces from two or more MAGTFs.

6.2.5.1 Architecture. This changing organizational structure could severely complicate the allocation and use of C4 systems. However, the Marine Corps has established a basic command and control architecture which not only adjusts easily to the changes, but also serves to expedite their successful execution. The cornerstone of this architecture is the provision of a basic C4 structure. This is complimented by pools of additional, and more capable, C4 equipment and personnel at key units in the permanent force structure which makes up the FMF and, subsequently, the MAGTFs. By providing the basic organizational units with their own capability to perform fundamental C4 operations, the Marine Corps has avoided the problems inherent in a continual reallocation (and relearning) of subsistence level C4 capabilities. Additionally, by providing special C4 units, the Marine Corps has also provided a source of reinforcement for those cases wherein organic capabilities are not sufficient.

6.2.5.2 Continue Established Policy. There is no apparent reason to change the concepts of allocating C4 equipments and personnel to the units which are going to perform the function in combat. There are, however, requirements to

assure that allocation and custody of the new systems continues to follow the established policy and architecture. This includes allocation of selected equipments to the permanent MAGTF headquarters.

6.2.5.3 Unit and MAGTF Systems. The analysis in terms of MAGTF operation and maintenance planning considerations for the C4 systems found that proposed system control relationships for unit systems meet the requirement for responsiveness to the appropriate commander. For the MAGTF systems, enhanced operational control by the MAGTF commander as well as enhanced logistics supportability would be gained for the IAC and PLRS MS if custody for these systems were in the Communications Battalion. The study further found that enhanced operations for the DFASC/MASC would ensue if that system were placed in the custody of the Communications Company, FSSG. Finally the analysis recognized the potential increased maintenance work load which will fall on the Electronics Maintenance Company, FSSG and found that this workload must be measured more precisely than is now possible. One key to this is the identification and validation of the EUCE LRUs and the aggregation of their impact with that of the other systems.

6.3 Personnel & Training

6.3.1 Introduction. C4 systems personnel and training support during the 1986-1996 time frame will have an operational impact at all levels of command in the FMF as new systems with embedded computers and communication security (COMSEC) components are brought into the Marine Corps inventory. Personnel requirements will be dependent on equipment density and the organizational concepts and custodial relationships developed by operational planners in each system's concept of operations. Training skills required to support the installation, operational, and maintenance requirements for each C4 system during its introduction and integration into the FMF/MAGTF command structure will be identified, analyzed and formulated into an overall system training plan. This paragraph addresses systems integration in terms of personnel and training issues needed to formulate such a training plan.

6.3.2 C4 Systems Personnel Requirements

6.3.2.1 **Background.** Personnel requirements and qualifications for installation, operation, and maintenance activities for each C4 system are achieved through:

a) Manpower and Training Impact Analyses;

b) Quantitative and Qualitative Personnel Requirements for Information Data Analyses; and

c) information derived from the Logistic Support Analysis Record.

The analysis of the System Personnel Requirement performed in the C4 Systems Personnel and Training Support Section (section 4) utilized the above data where feasible. A comprehensive system-by-system organizational support effort identified specific personnel requirements for the fourteen systems and examined the variations between those requirements and today's Marine Corps Tables of Organization (T/O).

6.3.2.2 **Approach.** The results of the above analysis provided a point of departure for an assessment of the manpower impact. Computer distribution and growth profiles for the MAGTF and Unit Systems computers during 1986-1996 portray a rapid growth of computer systems and microprocessors. For example, the introduction of the EUCE into the Marine Corps inventory in FY87 will escalate the amount of computers by 13,000 plus units to a total of approximately 18,000 for the 14 systems. In the current environment of no structure growth, personnel support becomes a key limiting consideration as do instructor requirements to support training. Unless these issues are adequately discussed and planned during the acquisition process, the Marine Corps may encounter serious problems once the 18,000 processors are fielded. If not recognized and corrected in the early planning phase, or at the earliest opportunity during the full-scale development phase, the Marine Corps

may see an overload on repairers and technicians at the FSSG levels (Electronics Maintenance Company).

6.3.3 C4 Systems Training Requirements

6.3.3.1 **Background**. Each system contractor will propose a training and training equipment plan together with a training course recommendation. Once approved the plan will provide the foundation for training and training equipment and will be evaluated during the full-scale development (FSD) phase. The evaluation coupled with the experience gained in preparing and conducting operator and maintenance courses during FSD and the relevant information obtained during FSD testing will provide sufficient information to update the courses needed and the training equipment required for operational employment. This data, plus the Qualitative and Quantitative Personnel Requirements Information data mentioned in paragraph 6.3.2.1, should provide the basis for MOS and manpower changes by the Marine Corps. Training materials for the factory training courses and the formal courses to be conducted at the Marine Corps Communication-Electronics Schools (MCCES) are all included in the training and training equipment package.

6.3.3.2 **Approach**. The study research utilized the resources stated above and also included information derived from personnel interviews with designated Acquisition Sponsor Project Officers and Acquisition Project Officers for each C4 system. Interviews were also conducted with the Commanding Officer at the MCCES to ascertain the training skill requirements and capabilities for both the unit systems and MAGTF systems. The analysis of the system training relationship performed in section 4 reflects the training skill requirements by MOS, grade, and type training required (contractor, formal, or unit) to support the operation and maintenance capability for each C4 system.

6.3.4 **C4 Personnel and Training Deficiencies**. New systems, changing force structures and concepts of operation will create a continuous challenge for

the Marine Corps to insure that the personnel pipeline is always at an effective level. The personnel pipeline includes qualified and trained personnel who will support the military occupational specialty identified for each C4 system.

6.3.4.1 Example One. A comparative analysis of current personnel availability to requirements and long-range projected availability was accomplished in section 4. It shows MOS 4034, the computer operator, as currently short in population and only a 1.4% scheduled increase by FY91. A recommendation was made that the MASC program sponsor provide the Occupation Field/MOS specialist with timely MASC personnel increases to preclude deficiencies upon MASC fielding.

6.3.4.2 Example Two. Another example shows the Tactical General Purpose Computer (TGPC) Technician, with a shortfall of 18 in MOS 5977 for FY86 and a target strength of 111 in MOS 5977 for FY91, which is six below the FY86 figure. The MOS 5977 population shortfalls have been the rule, not the exception for many years. The TGPC Technician has been assigned primarily to the Marine Air Command and Control Squadrons since the specialty was developed in 1976. This technician receives training which qualifies him to perform maintenance through the fourth echelon on certain equipment items. As new systems are fielded additional items of equipment are being added to the myriad of items that this technician is responsible for maintaining. The TGPC Technician is trained to repair computer and peripheral devices, but is not trained to repair specific systems. This technician could be assigned to a PLRS, then two or three years later be reassigned and become responsible for an IAC System. Because PLRS does not have items in common with the IAC, the technician must redevelop skills and must also learn their application within the new system. Because of the fielding of C4 systems and the attendant increase of computers and associated peripheral equipment, it was found advantageous to delete the TGPC Technician MOS 5977 because of over-diversification. To replace this MOS three groups of System Level Technicians were identified as follows:

a) 28XX = IAC Systems Technician Course, PLRS Systems Technician Course, and TCC Technician Course;

b) 5979 = TAOM Systems Technician course; and

c) XXXX = MIFASS Systems Technician Course and the TCO Technician Course.

6.3.5 Summary of Personnel and Training Considerations. The analysis in terms of personnel support found that personnel and training requirements will be dependent upon organizational concepts and custodial relationships as developed in each of the system's concept of operations. The study further found that a well-developed and coordinated Personnel and Training Plan monitored by the Acquisition Coordinating Group would enhance the operational effectiveness of each C4 system. The study also realized that because of the over-diversification of the Tactical General Purpose Computer Technician (5977) a Systems Level Technician approach to solving the MOS 5977 shortfall should be taken. Finally, the study recognized the potential increased maintenance workload which will fall on the Electronics Maintenance Company, FSSG, with the introduction of over 13,000 TEMPEST accredited, EUCE systems beginning in FY87. The introduction of such a large number of computer units without an increase of maintenance support personnel may cause a serious operational deficiency in C4 system readiness. This increased workload placed on Electronics Maintenance Company by the introduction of EUCE must be evaluated in terms of the overall workload increase placed on them by the additional equipments being introduced. When evaluated independently it may appear that current T/O assignments can be absorbed by the additional repair work of DCT or PLRS or EUCE. However, examination of the aggregate workload increase of these systems may reveal an increased requirement for specific MOSs, once the EUCE LRUs are identified.

SECTION 7
CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

This section presents the findings of the study by discussing the specific task assignments based on the Statement Of Work (SOW), drawing conclusions based on the study report and related research, and recommending courses of action to be taken. Paragraphs 7.2 through 7.9 below consider all fourteen C4 systems including EUCE. Paragraph 7.10 and its succeeding paragraphs apply to the EUCE only, and consider those EUCE items not previously addressed in paragraphs 7.2 through 7.9. Paragraph 7.11 presents the Concept for Organizational, Personnel and Training Integration Requirements (COPTIR), a new concept with which to begin to develop a C4 system.

7.2 Identify Levels of Organizational Employment of the C4 Systems within the FMF/MAGTF (SOW 1.1)

7.2.1 Summary. The various levels of organizational employment of C4 systems within the FMF and MAGTF were identified in sections 1, 3 and 5, and annexes B and D. Identification of the levels of organizational employment of the fourteen C4 systems was developed through an analysis of existing acquisition documentation, personnel interviews, and supplemented by field research, to obtain the best estimate of when these systems would be fielded to the FMF. This research was initially documented in figure 1-1 of section 1 which illustrates the cumulative impact of these systems over the ten year period identified by the study. These system delivery times provided the cornerstone for displaying the impacts in annexes B and D, which illustrate the organizational T/Es with identified C4 systems and their planned distribution during the FY86 to FY96 time frame. Section 3 provides a narrative description of the levels of employment based on the illustrations depicted in annexes B and D.

7.2.2 Conclusion. The identification of the levels of employment of the 14 systems, as depicted in sections 1, 3, 5 and annexes B and D, provide an effective management tool to plan and organize for acquisition of the systems and to prepare for the training required within the operational communities concerned with these systems. Together, sections 1 and 3 with annexes B and D, provide a planning guide which can be used to adjust the timing of necessary support functions required for these systems (e.g., personnel, provisioning, training). Additionally, it should be used for assessing the potential impact of any system(s) fielding delay. While the 14 systems represent a substantial body of the USMC C4 systems capability, they do not represent all the significant acquisitions in this area.

7.2.3 Recommendations

a) That the information provided in sections 1, 3, 5, and annexes B and D, concerning the levels of organizational employment, be used to adjust the timing of necessary personnel, provisioning, training, etc., support for the 14 systems.

b) That the information provided in sections 1 and 3 and annexes B and D be expanded to accommodate all C4 systems to insure that all necessary factors are considered in order to enhance systems integration.

7.3 Identify Personnel Required by Military Occupational Field Designator (MOS), Training Skills Required, and Grade to Operate, Install and Maintain Each C4 System Planned for FMF/MAGTF Employment (SOW 1.2)

7.3.1 Summary. In identifying the personnel requirements by MOS, training skills, and grade, the study analyzed existing acquisition documentation to include:

a) Letters of Adoption and Procurement;

b) Integrated Logistic Support Plans;

c) Advanced Logistic Orders; and

d) Qualitative and Quantitative Personnel Requirements Information data on each C4 system that is to be fielded, and also those C4 systems that are currently operational in the FMF, such as the ADPE-FMF, IAC, and the DFASC.

Field research in the form of personnel interviews with representatives from various FMF field activities was conducted to supplement personnel and training requirements. The analysis on manpower impacts was developed in a series of illustrations in section 4 and in annex E. The initial illustration, figure 4-1, provides an overview of personnel requirements by MOS, grade and training skill necessary to operate the C4 systems stated in the study. The illustration identifies, in a comprehensive system-by-system effort, the personnel support that is required. Training has been identified in the same annex by MOS, school, and location.

7.3.2 Conclusion. The analysis conducted in section 4 revealed the need for MOS changes in OF 25, 28, and 59 to accomodate the new systems. Specific MOS changes, and the rationale for them, were contained in section 4. MOS imbalances can be addressed satisfactorily through normal Enlisted Planning System (EPS) processes.

7.3.3 Recommendations

a) That MOSs in OF 25, 28, and 59 be closely monitored to insure required adjustments due to systems fielding are implemented.

b) That three Systems Level Technician MOSs replace MOS 5977, Tactical General Purpose Computer Technician.

c) That personnel in MOS 2827, Mobile Data Terminal Technician, and 2829, Mobile Communications Central Technician, be reoriented, retrained, and redesignated to provide system support for the Tactical Communications Center (TCC).

7.4 Determine the System Custodial Relationships within the Organizational Structure Identified to Receive C4 System Equipment and the Personnel Support for Each System Supported (SOW 1.3)

7.4.1 Summary. The objective of systems acquisition management is to ensure not only that the system meets the identified requirement, but that the planned custody and control arrangements effectively contribute to and support the commander's mission. The analysis of the 14 systems led to their categorization into either unit systems, those supporting a diverse set of units, or MAGTF systems, those supporting a MAGTF level functional area. From this analysis, the custodial and control structural relationships and alternative concepts for the systems were identified. Sections 3 and 6 identified the personnel, operations, and administrative control relationships for each system from which custodial relationships were derived.

7.4.2 Conclusions

7.4.2.1 Unit Systems. The present custodial relationships of unit systems were consistent with Marine Corps employment concepts. One exception is the EUCE. The EUCE is planned to be a replacement T/E item for the ADPE-FMF, distributed on a many-to-one basis. It may or may not have the same TAM number, but the numbers of EUCE versus ADPE-FMF does impact upon the organizational structure. There are too many EUCEs in the FMF to have a separate supply and maintenance function different from all other items. Devices should be treated like any other T/E item. The unit supply and maintenance sections can be responsible for the supply support and maintenance reporting of the EUCE. In addition, operational considerations revealed the requirement for EUCE, MIFASS and TCO to be added to the permanent MAGTF headquarters.

7.4.2.2 MAGTF Systems. For MAGTF systems, TAOM and ISIS were also consistent with Marine Corps employment concepts. DFASC/MASC, PLRS MS and the IAC systems would better serve the current MAGTF operational employment concepts with an alternative organizational structure. IAC and PLRS MS would best organizationally support the MAGTF in the custody of the Force Communications Battalion, a unit specifically designed to support MAGTF commanders (MAB/MAF). The DFASC/MASC, supporting the MAGTF administrative/ logistics functions, is currently placed in the FSSG. Communications Company, FSSG can better support it than its present location in Service Company, FSSG.

7.4.3 Recommendations

a) That for those systems categorized as unit systems and for the TAOM and ISIS, the control and custody relationships remain as specified in current planning documents.

b) That for the IAC and PLRS MS systems, operational control remain as currently specified (i.e., MAGTF commander), but that these systems be allocated by T/E to the custody of the Force Communications Battalion.

c) That for the DFASC/MASC, operational control remain as currently specified (i.e., MAGTF commander through the FSSG commander), but that the DFASC/MASC be allocated by T/E to the Communications Company, FSSG.

d) That unit supply and maintenance sections be responsible for the supply support and maintenance reporting of the EUCE.

e) That the EUCE, MIFASS and TCO be added to the permanent MAGTF headquarters.

7.5 **Determine the Personnel, Operational, and Administrative Control Relationships within Each Organizational Structure Identified to Receive C4 Systems Equipment for Each System Supported (SOW 1.4)**

7.5.1 Summary. Taken as a group, the fourteen systems under study are distributed throughout all elements of a MAGTF down to separate battalions, companies, batteries, groups and squadrons. In accordance with Marine Corps equipment acquisition policy, the systems are allocated to specific standard Table of Equipment (T/E) units. Through the T/E, the unit commander becomes the custodian of specific equipment, such equipment being provided to support the units' function or mission. The diversity of the systems under study, both with respect to their function and their distribution throughout the MAGTF units, render a generalization based on custody alone inappropriate. Control (i.e., custodial) relationships such as personnel, operational and administrative for each system were analyzed and the results are summarized in table 3-1.

7.5.2 Conclusions

7.5.2.1 Personnel Relationships. The personnel relationships for each system, as shown in table 3-1, are considered adequate and appropriate with three exceptions.

7.5.2.1.1 TCO. Personnel relationships for TCO remain to be resolved when additional information becomes available.

7.5.2.1.2 ISIS. Personnel relationships for ISIS were determined initially for the system as a whole; however, requirements for the component Communications Collection Outstations (CCO) and Stand Alone Analyst Subsystem (SAAS) remain unresolved. Introduction and evaluation by the Marine Corps of the Army Technical Control and Analysis Center, AN/TSQ-130, can provide an appropriate vehicle to determine personnel relations for ISIS.

7.5.2.1.3 EUCE. Each FMF unit will have an Information System Coordinator (ISC) who will be responsible for the EUCE program in his section/unit. This provides an interface to the ISMO and the unit supply office for application and system hardware control. The EUCE can then be treated as any other T/E

item and used as a tool to perform a staff function. The ISMO performs as a staff officer providing a conduit to get the best use of the equipment but the data collection and support of hardware is normal.

7.5.2.2 Operational Relationships. The operational relationships of each system as discussed in section 3 are considered adequate and appropriate except for the PLRS Master Station, DFASC/MASC and the IAC.

7.5.2.3 Administrative Control. The administrative control relationships indicated in sections 3 and 5 are also considered adequate and appropriate except for the PLRS Master Station, DFASC/MASC and IAC. In addition, there is no ILSP governing the supply and maintenance support of the EUCE program.

7.5.3 Recommendations

a) That the Marine Corps proceed with all deliberate speed to evaluate the Army AN/TSQ-130 capability. Further, as part of that effort, that the Marine Corps fashion the test and evaluation portion of it to include a determination of all ISIS personnel relationships.

b) That the Marine Corps consider the EUCE, which requires no additional trained personnel to operate, as a possible substitute for the TCO.

c) That Unit supply and maintenance officers be tasked by the EUCE ILSP to provide necessary supply and maintenance support for the EUCE in lieu of the ISMO, who is currently tasked with the supply and maintenance support of ADPE-FMF.

d) That because of computer commonality, low-density of equipment, and centralized maintenance, the PLRS Master Stations and IAC be assigned to Force Communications Battalion, FMF.

e) That because of the terminal access requirements for internal and external communications, the DFASC/MASC be assigned to Communications Company, H&S Battalion, Force Service Support Group, vice Service Company, H&S Bn, FSSG.

7.6 Identify and Validate Current and Near Term Availability of the Required Personnel to Support Employment of C4 Systems within the FMF/MAGTF (SOW 1.5)

7.6.1 Summary. The objective in identifying and validating current and near term availability of required personnel to support stated C4 systems in their planned FMF delivery during FY86 and FY87 was to ensure that these systems can be effectively supported by the required occupational fields and related occupational specialties. Research was conducted and documented utilizing availability data from Target Force Planning Models at Headquarters, U.S. Marine Corps. The systems' delivery times in figure 1-1 provided the key validation. Near term was considered to include acquisitions through FY87. Seven systems were considered. ADPE-FMF, IAC and DFASC have completed their introduction.

7.6.2 Conclusions. Overall, the near-term availability of OF 28 and of OF 59 personnel is shown decreasing while the requirements are increasing. Within the FMF/MAGTF current and near term availability of personnel required to support employment of the DCT, PLRS, BCS and EUCE is considered adequate except as indicated herein. The EUCE impact at Electronics Maintenance Company, FSSG, cannot be truly defined until an ILSP, to include a Level of Repair Analysis (LORA) and a Logistic Support Analysis (LSA), is accomplished.

7.6.3 Recommendations

a) That appropriate measures be undertaken earliest to reverse the declines predicted in the Target Force Planning Model strengths for OF 28 and 59 in FY87.

b) That an ILSP for the EUCE be completed during the warranty period, and in sufficient time to allow a rational decision to be made about the economic and operational benefits to be measured when considering extending the contractor's maintenance or in performing maintenance by Marine Corps personnel.

7.7 Identify C4 Systems Personnel Support Requirements Which Will Allow Operational Capabilities to be Defined (SOW 1.6)

7.7.1 Summary. Personnel support requirements for individual C4 systems were aggregated. Both officer and enlisted personnel availability requirements by MOS were considered. FY86 personnel availability by MOS was compared with the FY87 Target Force Planning Model projections. The results of this analysis are illustrated in section 4. The study identifies a strength percentage increase or decrease of personnel availability for both officer and enlisted MOSs required of the 14 systems identified in section 1. In addition, the requirement to eliminate the current MOS 5977 and create three separate system level technicians was identified.

7.7.2 Conclusions. The introduction of the C4 systems under study will have definite long term personnel and training support impacts upon the Marine Corps although systems scheduled to be fielded after FY87 do not appear to generate a structure increase in the FMF. However, many of the necessary manpower planning functions have already been accomplished. The study analyses identified the sixty-one MOSs which are required to support the FMF/MAGTF C4 systems. Five MOSs are reflected as new or additional. While the MOS 5977 specialty was developed primarily for the technician assigned to maintain computer equipment associated with the Marine Air Command and Control System, these personnel are now required to maintain a greater variety of computer and peripheral equipment requiring diversification of expertise.

7.7.3 Recommendations

a) That appropriate measures be undertaken to ensure that target strengths and availability for the MOSs identified in section 4 are attained.

b) That the expertise of the current Mobile Data Terminal Technicians, MOS 2827, and the Mobile Communications Central Technicians, MOS 2829, form the nucleus of the proposed Tactical Communications Center, AN/MSC-63A, Systems Technician MOS 28XX, after appropriate computer and peripheral training.

c) That alternative A, discussed in section 4, be adopted to establish three separate and distinct MOSs to replace the existing 5977 MOS.

7.8 Provide Identification of FMF/MAGTF C4 Systems Custodial Relationships in Order to Develop an Integrated Support and Management Plan for the Supporting Systems at Each Organizational Level (SOW 1.7)

7.8.1 Summary. The objective of systems acquisition management is to ensure not only that the system meets the identified requirement but that the planned custody and control arrangements effectively contribute to and support the commander's mission. The analysis of the 14 systems led to their categorization into either unit systems, those supporting a diverse set of units; or MAGTF systems, those supporting a MAGTF level functional area. From this analysis, the custodial and control structural relationships and alternative concepts for the systems were identified. Section 3 identified the personnel, operations, and administrative control relationships for each system from which custodial relationships were derived. The custodial relationship defined in section 5 included an ILS concept for hardware and data collection for the FMF/EUCE. Section 6 illuminated those integrated considerations for the 14 systems.

7.8.2 Conclusions

7.8.2.1 Unit Systems. The study concluded that for unit systems the present custodial relationships were consistent with Marine Corps employment concepts. The possible exception is the EUCE.

7.8.2.2 EUCE. The EUCE is planned to be a replacement T/E item for the ADPE-FMF, distributed on a many-to-one basis. It may or may not have the same TAM number, but the numbers of EUCE versus ADPE-FMF does not impact upon the organizational structure. There are too many EUCEs in the FMF to have a separate supply and maintenance function different from all other items. Devices should be treated like any other T/E item. The unit supply and maintenance sections can be responsible for the supply support and maintenance reporting of the EUCE. The ADPE/FMF has proceeded well without any ILSP, however, the numbers of FMF/EUCE involved require that an ILSP be prepared.

7.8.2.3 MAGTF Systems. For MAGTF systems the study concluded that TAOM and ISIS were also consistent with Marine Corps employment concepts. For the DFASC/ MASC, PLRS MS and the IAC, the study concluded that these systems would better serve the current MAGTF operational employment concepts with an alternative organizational structure. The study concluded that the IAC and PLRS MS would best organizationally support the MAGTF if in the custody of the Force Communications Battalion, a unit specifically designed to support MAGTF commanders (MAB/MAF). The DFASC/MASC, supporting the MAGTF administrative/logistics functions, is currently placed in the FSSG.

7.8.2.4 Personnel and Training Considerations

7.8.2.4.1 Personnel and Training Plan. The analysis in terms of personnel support found that personnel and training requirements will be dependent upon organizational concepts and custodial relationships as developed in each of the system's concept of operations. The study further found that a well-developed and coordinated Personnel and Training Plan monitored by the

Acquisition Coordinating Group would enhance the operational effectiveness of each C4 system.

7.8.2.4.2 **Training Plan.** Each system's contractor will propose a training and training equipment plan together with a training course recommendation. Once approved, the plan will provide the foundation for training and training equipment for each C4 system identified. The training plan will be evaluated during the full-scale development (FSD) phase. The evaluation coupled with the experience gained in preparing and conducting operator and maintenance courses during FSD and the relevant information obtained during FSD testing will provide sufficient information to update the courses needed and the training equipment required for operational employment. This data and the Qualitative and Quantitative Personnel Requirements Information data should provide the basis for MOS and manpower changes by the Marine Corps. Training materials for the factory training courses and the formal courses to be conducted at the Marine Corps Communications-Electronics Schools are all included in the training and training equipment package.

7.8.3 **Recommendations**

a) That additional considerations be provided in order to develop an integrated support and management plan.

b) That an integrated Personnel and Training Plan for all C4 systems be developed and monitored by the Director, C4 Division, HQMC.

c) That the evaluation phases of each individual system be coordinated to ensure that individual system evaluation results are available for total C4 system level consideration prior to individual system MCPDM III production decisions.

7.9 Provide Alternative Concepts for FMF/MAGTF Systems Personnel and Custodial Organizational Support Structures (SOW 1.8)

7.9.1 Summary

7.9.1.1 Organizational Support. Various levels of organizational support structures for employment of C4 systems within the FMF and MAGTF were identified in sections 1, 3 and 5, and annexes B and D. The custodial organizational support structures were identified in sections 3, 4 and 5.

7.9.1.2 C4 System Custodial Relationship. An analysis of the equipment acquisition policies of the USMC with respect to equipment allocation indicates that equipment custody to standard units identified by specific T/E numbers is the normal mode. The FMF, on the other hand, routinely reconfigures these standard units when forming MAGTFs. Thus, standard units may be employed partially or may be reinforced by detachments when MAGTFs are task organized, or both. The employment modes described as "compositing" are current examples of this operational concept. In assessing the effects of the C4 systems custodial relationships on these two styles of organization, (i.e., standard units versus task organizations), the study placed the systems into two categories. The unit systems were typically those systems provided to various units to enhance the unit's capability. In effect, the systems so designated can be considered additional "tools" for the units. Those systems designated as MAGTF systems were those systems allocated to unique and specific organizations which supported a particular MAGTF function (e.g., intelligence, air defense) and whose employment benefited the MAGTF as a whole.

7.9.2 Conclusions. Alternative personnel and custodial organizational support concepts were discussed previously in this section and appropriate MOS and personnel recommendations were proffered. Section 5 provided what is considered the best alternative to integrate EUCE into the FMF to provide maintenance and supply support and is the least expensive way to train end-users by having the Information Center concept under the Base ISMO in garrison, so that the FMF ISMO and end-users can concentrate on deployment and operational considerations. With respect to custodial alternatives, the study recommends no change to custodial arrangements for unit systems. For the

systems identified as MAGTF systems, specific recommendations for alternative custody were made for the IAC, DFASC and PLRS MS systems. These alternatives are summarized graphically in section 4.

7.9.3 C4 Systems Custodial Alternatives and Recommendations. Table 7-1, C4 Systems Custody, summarizes the study's custodial alternatives and recommendations for those systems considered to be MAGTF-commander controlled.

Table 7-1. C4 Systems Custody

SYSTEM	CURRENT	ALTERNATIVE	RECOMMENDATION
TAOM	MACS	NONE Proposed	MACS
ISIS	Radio Bn	NONE Proposed	Radio Bn
DFADC/MASC	Serv Co., H&S BN, FSSG	#1 Comm Co., H&S Bn, FSSG #2 Support Co., Force Comm Bn	#1 Comm Co., H&S Bn, FSSG
IAC	HQ. CO., HQBN, Division	Support Co., Force Comm Bn	Support Co., Force Comm Bn
PLRS MS	Comm Co., HQBN, Division	Support Co., Force Comm Bn	Support Co., Force Comm Bn

7.10 FMF-EUCE Program

7.10.1 Introduction. The below-listed paragraphs address specific tasks in the statement of work concerning the EUCE, and the validation of the FMF Delivery Schedule provided in Interim Report #2, figure 1-1. Each paragraph deals with a statement of work task, and is comprised of a summary and concomitant conclusions and recommendations.

7.10.2 **Determine the Personnel Requirements Needed to Manage the EUCE Operational Ready Float and the Personnel Requirements Needed to Provide the Technical and Training Assistance to the Operational Users of the EUCE Devices (SOW I.9)**

7.10.2.1 Summary

7.10.2.1.1 General. Accurate personnel requirements of supply and maintenance support cannot be determined until the real number of requirements for the EUCE and its components have been finalized. This can be accomplished only after the LRUs of the yet-to-be-identified product baseline of the EUCE are known.

7.10.2.1.2 EUCE Information Center Concept. For EUCE, the Information Center has been tried as an activity to support the user in all aspects of training, product improvement and support. It has served as the library of EUCE knowledge and standard software packages. The Information Center has supported management and the end user by acting as a clearinghouse for user functions and software, thus providing a guide to the solution of user problems and supporting an instructional training plan.

7.10.2.1.3 EUCE ILSP Support. The majority of the systems included in this study were acquired under MCO 5000.10A procedures. The three ADP oriented systems, ADPE-FMF, DASC/MASC and FMF/EUCE, however, were acquired under GSA and Brooks Bill regulations and MCO 5231.1A (LCM-AIS), a document for developing information systems under a life cycle approach. The goals of these two acquisition life cycle systems documents are the same; that is, the deployment, operation and support of required capabilities in the FMF. Under MCO 5000.10A procedures, an Integrated Logistics Support Plan is developed and refined at each phase of development. This is compatible with the configuration management plan, training plan, ADPE support plan, and implementation plan under MCO 5231.1A. The purpose of all of these plans is to deliver and support the systems in the FMF.

7.10.2.1.4 Power Requirement Technicians for FMF-EUCE Support. EUCE systems require power to operate in the field. The EUCE is appearing in the FMF and is being defined as a requirement for Class I AIS work stations. As many as ten EUCE suites could be in a battalion either as stand-alones or networked. No power study has been made concerning the need or desirability for power, nor for the possibility of requiring additional technicians to support any additional power requirements.

7.10.2.2 Conclusions

7.10.2.2.1 General. Determination of the LRUs and the supply and maintenance personnel requirements can be accomplished during the warranty period while contractor support is provided. By developing the ILSP, including initial supply stockage and the accompanying stock list, a more rational management decision can be made about extending contractor support or phasing complete support into normal channels. Interviews and field visits indicate that so long as there is no initial surge of equipment into the FMF no increase in personnel is required. It should be noted that an introduction and distribution plan for EUCE has not yet been determined. Finalization of the plan is dependent on a number of factors including the date of award of the EUCE contract, introduction of new Class I systems into the FMF (M35, REAL FAMMIS) and development of an Advanced Logistic Order (ALO).

7.10.2.2.1.1 Technical and Training Assistance. Technical and Training Assistance requires both adequate information and availability to the end user. The Information Center concept previously described meets both these requirements. The Information Center concept, operating under the Base Operations and Base ISMO with the cooperation of FMF ISMO provides a consolidation in garrison that will prevent unnecessary duplication of effort at the lowest level. This allows participating ISMO personnel to concentrate on training rather than duplicative management functions. Designated Information Center personnel require formal school training to be able to function effectively. Paragraph 7.10.2.2.2.1 lists recommended minimum MOS

requirements. IC personnel with the recommended MOSs will require the needed formal school training.

7.10.2.2.1.2 Operational Ready Float. Since the end item configuration is left to the discretion of the commander the various components of EUCE are similar to secondary repairables, therefore, there is little to justify having both an operational ready float and a maintenance float for the EUCE. Any functions of an operational ready float could be provided by the maintenance float. The ISMO, in cooperation with the EUCE maintenance float manager, can provide the most efficient and effective management of the EUCE maintenance float assets by assisting in certain float management functions such as planning and prioritizing the deploying unit's support requirements. Coordination between appropriate I&L and C4 elements within HQMC can provide the most effective management of war Reserve assets and the assignment to various maintenance floats. Each MAF can have its own maintenance float. The ILSP can provide for the particular allocation to the various maintenance floats by appropriate coordination between C4 and I&L after the LRU populations are determined.

7.10.2.2.2 EUCE Information Center (IC) Concept. The Marine Corps is currently experimenting with the IC concept. It appears to be effective for bringing large numbers of users up to date quickly. Too many, however, can be costly in personnel, particularly if an MOS field is short. Care must be taken to insure that the number of centers is appropriate. Currently, there are information centers in major FMF units and the major support activities, because the ISMOs are charged to support these functions. The FMF ISMO is essentially concerned with deploying troops and systems. The supporting Base ISMO is concerned with Class I and II system support. Establishing a consolidated IC under base operations, with technical support from the Base ISMO, will allow the two ISMOs to concentrate on their major areas of concern and to provide jointly the best support to the Marine Corps without duplicating systems.

7.10.2.2.2.1 Personnel Requirements. As a result of the numerous interviews conducted during field visits, personnel designated below appear adequate to perform those IC functions enumerated in paragraph 5.3.3.1.5. Local variations engendered by varying conditions such as unit populations and geography should be the subject of mutual agreement by participants.

	Number	Grade	MOS	Title
a)	1	Capt/Lt	4002	OIC
b)	1	GYSgt/SSgt	4034/4063	NCOIC
c)	3	Sgt/Cpl	4034/4063	Instructor Assistants

7.10.2.2.2.2 IC Management Principles

a) Planning. Planning for establishing and conducting IC operations can be accomplished by a cooperative effort between the Base and FMF ISMOs.

b) Organizing. The organization of each IC can be accomplished, under the MAF commander, by the cooperative efforts of the Base and FMF ISMOs. The actual organization achieved can depend on their particular situation and perceived requirements.

c) Staffing. Staffing for the IC can be built around the central core of personnel shown in paragraph 7.10.2.2.2.1 above. FMF personnel may augment this core structure as mutually agreeable. Because of approved T/O changes scheduled in April 1987 for the Regional Automated Services Center which provides personnel to the IC, no further shifts appear necessary. The staffing efforts will be enhanced by the further establishment of Subject Matter User Groups (SMUG) among the ISCs. This staffing, together with the enforcement

of standard EUCE software packages will reduce programming changes and will help reduce the IC staffing requirements.

d) Directing. The IC can function most effectively under the direction of the Base ISMO, with the cooperation of the FMF ISMO. The requirments should be defined by the FMF ISMO with execution under the Base ISMO.

e) Controlling. Training can be evaluated both individaully and collectively to provide an effective feedback loop to influence subsequent training improvements. Technical issues should come under the cognizance of C^4 Division, HQMC. The G-3/S-3 of a unit should be the focal point for operational training.

7.10.2.2.3 EUC ILSP Support. Equipment fielded under 5000.10A procedures are supported by the Marine Corps supply and maintenance system because they have the SLs and supporting manuals that are developed for these systems. Usage history of repairs, parts stockage and costs are collected and maintained as a matter of course through SASSY and MIMMS and are available for management decisions. This information is not readily available for systems developed under MCO 5231.1A and therefore they require a second supply and maintenance organization. This was done for the ADPE-FMF through the ISMO to the contractor. This procedure is possible with low density items, but becomes harder and more manpower intensive as the density increases. The increases of ADPE-FMF to 841 suites and EUCE to 13,335 creates a large problem for the ISMO. Effective support of a separate supply and maintenance system for EUCE would be disruptive. An ILSP would be an effective solution to these problems. There is time during the warranty period to develop and complete an ILSP approach for the FMF/EUCE. The maintenance concept as presented still has C4 with configuration management control but working with I&L to support the FMF. One supply, maintenance and data collection system would be used and the support for all C4 systems could be integrated.

7.10.2.2.4 Power Requirement Technicians for the FMF-EUCE. Commanders and users consider that the FMF/EUCE is necessary and are using it in garrison. What is used in garrison can become required in combat. JUMPS/MMS used electric font typewriters; now REAL FAMMIS, M3S and other functional areas want the FMF/EUCE. A study to determine the power requirements within combat units to support the 14 C4 systems would appear necessary. The baseline for EUCE power requirements should include a concept of operations for the Class I and II systems that will be deployed after the EUCE product baseline is established. Any additional power requirements could mean additional engineering personnel support.

7.10.2.3 Recommendations

7.10.2.3.1 General

a) That determination of the LRUs, and the supply and maintenance personnel requirements which are concomitant to that determination, be accomplished at the earliest feasible time after selection of the EUCE so that all supply and maintenance personnel requirements can be determined.

b) That the decision to either extend the EUCE manufacturer's maintenance warranty beyond the first year, or to phase complete support into normal channels, not be made until after collection of at least 6 months maintenance data and after preparation and due consideration of an ILSP based on phasing EUC maintenance support into normal channels. No indication of Marine Corps intentions or maintenance support should be provided to prospective vendors.

c) That the Information Center concept, previously described as operating in garrison under Base Operations and the Base ISMO, be adopted for the EUCE to provide technical and training assistance.

d) That any requirements for an EUCE operational ready float function be assumed by the maintenance float to minimize EUCE management overhead and duplication of float EUCE assets.

e) That the ISMO, in cooperation with the EUCE maintenance float manager, assist in the management planning and control of the EUCE maintenance float assets. The maintenance float manager should retain autonomy in float management staffing, directing and organizing functions.

f) That an EUCE maintenance float be assigned to each MAF.

g) That appropriate I&L and C4 elements within HQMC cooperate in the management and the assignment of maintenance float assets to each MAF in connection with the development of the EUCE LAP letter and ILSP.

7.10.2.3.2 *EUCE Information Center Concept*

a) That the Information Center concept as described herein be formalized and adopted for the EUCE program.

b) That the commands having Information Centers be tasked to provide technical and training assistance to EUCE end-users upon introduction of the EUCE and until a new determination based on ISMO experience and recommendations can be made.

c) That FMF and Base Information Centers be consolidated wherever feasible.

7.10.2.3.3 **EUC ILSP Support.** That an ILSP for the EUCE be developed as indicated in previous recommendations.

7.10.2.3.4 Power Requirement Technicians for the FMF-EUCE. That the FMF/EUCE power requirements be analyzed as part of the ILSP.

7.10.3 Justify the Determined Number of Personnel Required for EUCE Support and Recommend Their Organizational Relationship (SOW 1.10)

7.10.3.1 Summary. Section 5 describes a concept of operation, training, maintenance and organizational relationships which will support the EUCE. ELMACO in 1st and 2nd FSSG are now performing repairs on various EUCE equipment. Mean Time Between Failure (MTBF) rates are not known and information is not available to be specific.

7.10.3.2 Conclusion. See paragraph 7.10.2.2, Conclusions.

7.10.3.3 Recommendations. See paragraph 7.10.2.3, Recommendations.

7.10.4 Evaluate and Validate the Government's Proposed EUCE Equipment Concept and Develop Alternative Maintenance Concepts (SOW 1.11)

7.10.4.1 Summary. Section 5 provides the results of the evaluation and validation of the approved and alternate EUCE maintenance concepts. The proposed concept has been modified and expanded as the results of field visits and analyses to conform to the Marine Corps standard supply and maintenance procedures in order to allow for better data collection and control of equipment. Repairs are best done by component replacement at the level supported by the software diagnostics. Any work on replacement inside the TEMPEST shield should be done by a TEMPEST accredited technician who is normally assigned to a third echelon repair facility.

7.10.4.2 Conclusion. See paragraph 7.10.2.2, Conclusions.

7.10.4.3 Recommendations. See paragraph 7.10.2.3, Recommendations.

7.10.5 Validate the FMF Delivery Schedule Illustrated Within Interim Report Number 2, Figure 1-1 (SOW 1.12)

7.10.5.1 Summary. Figure 1-1 in Interim Report number 2 was used as the basis for figure 1-1 in this report.

7.10.5.2 Conclusion. Figure 1-1 in this report has been updated in accordance with the latest available information and is validated as of 15 October 1986.

7.11 Concept for Organizational, Personnel and Training Integration Requirements (COPTIR)

7.11.1 Hypothesis. There is a need to bring about an integration of all C4 systems on both the operational and organizational levels. Integration on the operational level is called intraoperability/interoperability. It is the subject of many studies and is of less concern here than less studied and deterministic integration on an organizational level. This discussion focuses on the latter and the need for this integration recognition at the headquarters level.

7.11.2 Basic Principle. Judgements about subordinate systems should be made against known standards which are appropriate to the overall system. However, there are no known standards which apply to all systems equally, and there is as yet, no definition of an overall C4 system. A review of numerous MCPDMs (formerly termed MSARCs) reveals that many decisions are made without a clear understanding of what composes the overall C4 system. If there was a shared consensus of an overall C4 system, the essential ingredient lacking in MCPDMs could be identified and included. Therefore, the decision to support, or not to support, continued development and acquisition of a candidate system could be made in light of its contribution to the overall C4 system. Standards could be assigned which would apply equally to all systems, and against which more objective and less intuitive judgements could be rendered.

There does not appear to be a clear understanding of how the fourteen selected C4 systems (and the other C2 and C3 elements and AISs not considered in this study) fit together.

7.11.3 Need for a Single Manager. Organizationally only the Commandant and Chief of Staff are above the proponency levels for individual systems. There appears to be a need for an overall C4 systems Program Manager (PM) if there is to be an integrated C4 system. Only a single overall C4 systems PM can define the system without all the compromises that accompany consensus building.

7.11.4 Requirements. When defining the C4 system, the PM must cope with given requirements and conditions. Logic and analysis must be used to deal with requirements and conditions such as interoperability, program structures, budget, administration, technical standards and developmental technologies that contribute to shaping the C4 system and to making it functionally acceptable. The C4 PM must provide ideas and compositional strategies for an overall system composed of many other systems, which have smaller systems imbedded in them. The PM must have a clear understanding for both the geometry of the battlefield and that of information system requirements. The PM must also provide a picture of what the C4 system is and impose or persuade as needed to gain it. Priority for achieving intraoperability should be established as:

a) common goals,

b) common objectives,

c) common architecture,

d) common technical standards and schedules, and

e) cooperative equipment programs.

Rational analysis and engineering of the C4 system is accomplished by a conceptual design which provides physical image and order to the C4 system. If there is to be a C4 system which is more than a collection of fourteen separate and expensive individual systems, an overall design is needed to coordinate the various components. If planning considerations are limited only to achieving the most economical and efficient patterns of individual systems, an effective C4 system will never be achieved. COPTIR calls for a three phase approach - Analysis, Synthesis and Implementation - to assist the Program Manager in achieveing the goal of C4 system development. These phases are described below.

7.11.4.1 Analysis. The first phase of C4 system development involves analytic tasks. During this phase, the primary emphasis of the C4 system Program Manager is to obtain a valid appreciation of the problem in combining 14 or more separate systems into a single, workable system. This appreciation requires an understanding of the various systems necessary from a functional point of view. Here the use of the N^2 Chart, which depicts interfaces graphically, would be helpful to determine required functions and relationships. To date some of the fourteen, separate, designated systems are tactical, some non-tactical, some are ground oriented, some aviation-oriented, some are widely distributed, some are few in number. All of them are far enough along in the development/acquisition process that any significant perturbations would result in a cost impact. The analysis phase also deals with the functional requirements for the C4 system. These can be derived from the identified C4 system goals or objectives. Performance or general constraints are not included because those items relate to how the C4 systems accomplish their tasks, not what the C4 system does. Until the functions that the C4 system as a whole must perform are well understood, it is premature to even consider resources for the overall system. The more practical approach to letting the functions dictate the system resources requires a thorough understanding of the functions before deciding what all those resources are to be.

7.11.4.2 **Synthesis.** The second phase of the C4 system development, synthesis, uses the functional model of the C4 system developed in the analysis phase as a baseline. During this phase, the performance requirements and constraints, general requirements, and current state-of-the-art should be added into the next baseline for the C4 system. This phase includes trade-off studies, simulation/emulation, and other analytical or experimental techniques to aid in determining the proper mix of subordinate systems to best fulfill the functional requirements and the objectives for the C4 system. Generally emphasis is placed on the following factors: human resources, hardware, software, procedures, protocols, and time/dollar constraints. The synthesis phase should complete the Program Manager's concept for the overall C4 system configuration.

7.11.4.3 **Implementation.** The final step, implementation, requires the Program Manager to consider existing orders and organizational structures. One of the most cogent measures of organizational effectiveness will be a capability to effect necessary changes to Troop List manning levels during POM deliberations. In addition, MCO 3093.1A, Interoperability operability and Intraoperability of Marine Corps Tactical Data Systems (TDSs) and Interconnecting Equipment, establishes current policy to insure that inter and intraoperability (I^2O) standards are implemented. While this order does much to define the roles of the various participants, neither it nor other related orders requires participants to develop the concept of an overall C4 system. MCO 3093.1A can provide the basis to connect the many systems into one strong centralized and balanced C4 system. At the very least, COPTIR promises to save the time and dollars that may currently be expended in a variety of system applications that do not contribute fully to an enhanced and integrated overall C4 system.

7.11.5 **Approach.** As a first step, it is necessary to define the overall C4 system in both operational and organizational terms so that it can be recognized and treated as a single entity. Two factors can contribute to the definition of the system; the need for a single vocabulary, and the need for a

single systematic way to prioritize deficiencies. A single vocabulary helps to pull all C4 aspects together under one umbrella. A systematic way to prioritize deficiencies overcomes boundaries between subordinate systems and helps to define the outer limits of the overall C4 system against the larger environments, i.e., operational and financial, in which the overall C4 system itself exists as a subordinate system.

7.11.5.1 Factor One. Further definition of a C4 system is needed. JCS PUB 1 and other documents abound in academic and generic definitions of various systems. The final definition of the overall C4 system should begin with the basic element: command and control. To insure functionality is preserved, the definition must consider the functional aspects of any command and control system.

All individual C4 systems consist of the personnel, hardware, software, communications, training and logistic subsystems. So also must the overall C4 system. Most of those elements are widely, if not always, well understood. The exception is software. It is the newest and possibly least understood, element of a C4 system. Since software is so important a precise vocabulary is necessary for functional communication between operators, programmers, analysts, developers, users and management. But the necessary understanding between parties is often absent because of a lack of clear and precise terminology used in functional communications. A lexicon of terms, common to all with an interest in software, must be found and distributed widely within all affected communities as the only approved convention. The lexicon must include parameters and definitions without being so esoteric as to require a second lexicon to understand the first.

7.11.5.2 Factor Two. A command and control system must accomplish the following:

a. sense the environment in which it operates;

b. convey the data sensed to a place where it can be processed;

c. process the data in such a way that it will assist a human in making an intelligent, rational decision;

d. convey the decision to the effectors who will carry out the decision; and

e. repeat the process so the effect of the decision can be assessed.

After defining the overall C4 system, the next most pressing need is to scale the deficiencies in any one subordinate system so as to allow comparisons between that and any other subordinate system. In addition, a deficiency must be scaled in terms of the overall C4 system. Hence the need for a scale with sufficient degrees of deficiency evident so that rational judgements can be rendered about the significance of any single deficiency. In addition, the remedy for one subordinate system must not interfere with the remedy for another subordinate system. All deficiencies are not of the same magnitude, nor should their resolution command the same application of scarce resources.

7.11.6 **Organizational Concept.** The COPTIR organizational concept rests on three legs:

a) The definition of the overall C4 system;

b) Commonality of terminology describing system and hardware; and

c) A deficiency scale that will allow hardware and software deficiencies to be administered rationally.

7.11.6.1 Significant Baselines. There are three significant baselines that must be present in the development of a complex C4 system. A critical design review and MCPDM will be scheduled to consider each so that timely and effective decisions can be made as a development program matures. The first of these baselines pertains to functions. It defines what specific functions are to be performed by each of the subsystems as well as the overall C4 system. Preliminary and critical design reviews are held between the developers and program management at each stage. Once the functional baseline is reviewed and approved, the development proceeds until the allocated baseline is reached. While this baseline is multifaceted, the one aspect that is of greatest significance is that the previously agreed functions which the system is to perform are allocated to either hardware, software, or to the operators/maintainers. Functions that are allocated to operators and maintainers reveal the designer's true capabilities and the system's true effectiveness. If the system is worthwhile, the functions left for the operators/maintainers must be within the capability of the personnel available and within the training capability. The last of the baselines is the product configuration baseline. Any changes after that approval usually costs the government as opposed to the developer.

7.11.6.2 Personnel and Training. These two concepts are really inseparable when considering C4 systems and should be treated as complementary to each other. Personnel and Training authorities should assume an even larger role in the acquisition process of C4 systems. Their greatest contribution can be felt at MCPDM II or at that point when the functional baseline of a system is approved. It is this baseline at which Personnel and Training authorities may make their most timely contribution to the overall C4 system development. Personnel authorities know by demographic projections what percentage of Americans by age group, by intelligence band, and by achieveable pyscho-motor skills, can be anticipated in the years to come. Training authorities know the length of time and the resources required to turn a young Marine into a capable technician.

7.11.7 Recommendations

a) That appropriate actions be continued to define an overall C4 system.

b) That appropriate action be taken to designate an overall C4 systems Program Manager to ensure an integrated, overall C4 system.

c) That a C4 systems software quality vocabulary be adopted and promulgated for use between operators, programmers, analysts, developers, users and management.

d) That a hardware-software deficiency scale be developed and distributed for use in the C4 and related community.

e) That personnel and training authorities assume an even greater role at an appropriate MCPDM and that they consider both the subordinate system and the overall C4 system requirements in their MCPDM recommendations.

ANNEX A

STUDY REFERENCES

STUDY REFERENCES

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ANNEX B

PLANNED ORGANIZATIONAL (T/E - T/O) ALLOCATION FOR C^4 SYSTEMS

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
A1633	4652I	ASSAULT AMPHCO(-) TV BN 3D MARDIV	01										
N1010	1988M	HQBN, 1ST MARDIV FMF	01										
N1011	1986M	DIV HQ, HQBN 1ST MARDIV	01										
N1012	1987M	HQ CO, HQBN 1ST MARDIV	01	IAC ADPE-FMF (10)		PLRS(7)							
N1013	1985M	SERVCO, HQBN 1ST MARDIV	01										
N1014	1903M	MP CO, HQBN 1ST MARDIV	01										
N1015	1883M	COMM CO, HQBN 1ST MARDIV	01	DCT (2-LRIP)		PLRS MS(6) DCT(4)	(6) SB-3865 TCC (1)	(2) AN/TTC-42		MIFASS ULMS (3)		TCO	
N1016	1862N	TRK CO, HQBN, 1ST MARDIV	01			PLRS(4)							

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N1020	1988M	HQBN, 2D MARDIV FMF	01										
N1021	1986M	DIV HQ, HQBN, 2D MARDIV	01										
N1022	1987M	HQ CO, HQBN, 2D MAR DIV	01	IAC ADPE-FMF(11)		PLRS(7)							
N1023	1985N	SERV CO HQBN 2D MARDIV	01										
N1024	1903M	MP CO, HQBN 2D MARDIV	01										
N1025	1883M	COMM CO, HQBN 2D MARDIV	01	DCT LRIP(2)	DCT(4)	PLRS MS (6)		(2) AN/TTC-42 (6) SB-3865 TCC (1)		ULMS (3)	MIFASS (1)	TCO	
N1026	1862N	TRK CO, HQBN 2D MARDIV	01		PLRS(4)								
N1030	1988M	HQBN, 3D MARDIV, FMF	01										

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N1031	1986M	DIV HQ, HQBN 3D MARDIV	01										
N1032	1987M	HQ CO, HQBN 3D MARDIV	01	IAC ADPE-FMF (11)		PLRS BUU (7)							
N1033	1985N	SERV CO, HQBN 3D MARDIV	01										
N1034	1903M	MP CO, HQBN 3D MARDIV	01										
N1035	1883M	COMM CO, HQBN 3D MARDIV	01		DCT (2-LRIP)	PLRS MS (6) DCT (4)			(2) AN/TCC-42 (6) SB-3865 ULMS (3) TCC (1)		MIFASS		TCO
N1036	1862N	TRK CO, HQBN 3D MARDIV	01			PLRS BUU (4)							
N1040	1988M	HQBN 4TH MARDIV FMF	01										
N1041	1986M	DIV HQ, HQBN 4TH MARDIV	01										

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N1042	1987M	HQ CO, HQBN 4TH MARDIV	01	ADPE-FMF(11)									
N1043	1985N	SERV CO, HQBN 4TH MARDIV											
N1044	1903M	MPCO, HQBN, 4TH MARDIV	01										
N1045	1883M	COMM CO, HQBN 4TH MARDIV	01			PLRS MS (6) DCT(6)		(2) AN/TTC-42 (6) SB-3865 TCC (1)	ULMS (3)		MIFASS (1)		TCO (1)
N1046	1862N	TRK CO, HQBN 4TH MARDIV	01										
N1110	1099M	INF REGT 1ST MARDIV	03										
N1111	1096M	HQ CO, INF REGT 1ST MARDIV	03	DCT (6-LRIP) ADPE-FMF (1)	DCT (6)	PLRS(6)		(3) SB-3865		ULMS (2)	MIFASS (1)		TCO (1)
N1112	1096B	HQ CO 27TH MARINES	01	ADPE-FMF(1)									

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N1120	1099M	INF REGT 2D MARDIV	03										
N1121	1096M	HQ CO, INF REGT, 2D MARDIV	03	DCT (6-LRIP) ADPE-FMF (1)		PLRS(6) DCT (6)		(3) SB-3865		ULMS (2)	MIFASS		TCO
N1130	1099M	INF REGT 3D MARDIV	03										
N1131	1096M	HQ CO, INF REGT 3D MARDIV	02	ADPE-FMF(1)		PLRS(6) DCT (8) (4-LRIP)		(3) SB-3865		ULMS (2)	MIFASS (1)		TCO
N1140	1099M	INF REGT 4TH MARDIV	03										
N1141	1096M	HQ CO, INF REGT 4TH MARDIV	03			DCT (12)		(3) SB-3865		ULMS (2)	MIFASS		TCO
N1161	1038I	INF BN, INF REGT 1ST MARDIV FMF	03										
N1162	1037I	H&S CO, INF BN, INF REGT, 1ST MARDIV	09	ADPE-FMF (1)		DCT (162) PLRS(2)					MIFASS		

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N1163	1027I	WPNS CO, INF BN, 1ST MARDIV	09		PLRS(1)								
1164	1013I	RIFLE CO, INF REGT 1ST MARDIV	27		PLRS(4)								
N1171	1038I	INF BN, INF REGT 2D MARDIV, FMF	09										
N1172	1037I	H&S CO, INF BN INF REGT 2D MARDIV	09	DCT (18 LRIP) PLRS(2) ADPE-FMF (1)		DCT (144)		(1) SB-3865			MIFASS		TCO
N1173	1037I	WPNS CO, INF BN, INF REGT 2D MARDIV	09			PLRS(1)							
N1174	1013I	RIFLE CO, INF BN, INF REGT, 2D MARDIV	27			PLRS(4)							
N1181	1038I	INF BN, INF REGT 3D MARDIV, FMF	06										
N1182	1037I	H&S CO, INF BN, 3D MARDIV	06	ADPE-FMF(1)		PLRS(2) (12-LRIP) DCT (108))		(1) SB-3865			MIFASS		TCO

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M1183	1027I	WPNS CO, INF BN, INF REGT 3D MARDIV	06		PLRS(1)								
M1184	1013I	RIFLE CO, INF BN INF REGT 3D MARDIV	18		PLRS(4)								
M1191	1038I	INF BN, INF REGT 4TH MARDIV FMF	89=09 85=04										
M1192	1037I	H&S CO, INF BN INF REGT, 4TH MARDIV FMF	84=09 85=04			DCT(162)		(1) SB-3865			MIFASS		TCO
M1193	1027I	WPNS CO, INF BN INF REGT, 4TH MARDIV	01										
M1194	1013I	RIFLE CO, INF 5TH INF REGT, 4TH MARDIV	03										
M1260	1199M	ARTY REGT 4TH MARDIV	01										
M1261	1197M	HQ BTRY, ARTY REGT 4TH MARDIV	01										

MARINE DIVISIONS

T/K #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N1267	1104M	105MM(T) BTRY, DS BN, ARTY REGT, 4TH MARDIV	85-86=03 87-94=00										
N1270	1138M	GENSUP BN 4TH MARDIV, FMF	01										
N1271	1136M	HQ BTRY, 155MM(SP) GS BN, ARTY REGT, 4TH MARDIV	01			DCT(12)		(1) SB-3865			MIFASS (1)		TCO
N1272	1133M	155MM(SP) BTRY, GS BN, ARTY REGT 4TH MARDIV	03		1 BCS (7 GDU)								
N1273	[illegible]	GENSUP BN (8" HOW/175 GUN) 4TH MARDIV	01										
N1274	4226M	HQ BTRY, 8"GS BN ARTY REGT, 4TH MARDIV	01			DCT(12)		(1) SB-3865			MIFASS (1)		TCO
N1275	4112M	8"(SP) BTRY, 8"GS BN, ARTY REGT, 4TH MARDIV	03		1 BCS (7 GDU)								
N1310	1378M	COMBAT ENGR BN 1ST MARDIV FMF	01										

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M1311	1377M	H&S CO, CBT ENGR BN 1ST MARDIV	01	ADPE-FMF (2)		PLRS(2)		(1) SB-3865					
M1312	1363M	CBT ENGR SPT CO, CBT ENGR BN 1ST MARDIV	01			PLRS(2)							
M1313	1373M	ENGR CO, CBT ENGR BN, 1ST MARDIV	04		PLRS(2)								
M1320	1378M	COMBAT ENGR BN 2D MARDIV FMF	01										
M1321	1377M	H&S CO, CBT ENGR BN 2D MARDIV	01	PLRS(2) ADPE-FMF (2)				(1) SB-3865					
M1322	1363M	CBT ENGR SPT CO. CBT ENGR BN, 2D MARDIV	01	PLRS(2)									
M1323	1373M	ENGR CO, CBT ENGR BN, 2D MARDIV	04	PLRS(2)									
M1330	1378M	COMBAT ENGR BN 3D MARDIV, FMF	01										

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N1331	1377N	H&S CO, CBT ENGR BN, 3D MARDIV	01	ADPE-FMF (2)	PLRS(2)			(1) SB-3865					
N1332	1363N	CBT ENGR SPT CO. CBT ENGR BN 3D MARDIV	01		PLRS(2)								
N1333	1373N	ENGR CO, CBT ENGR BN, 3D MARDIV	04			PLRS(2)							
N1340	1378N	CBT ENGR BN 4TH MARDIV	01										
N1341	1377N	H&S CO CBT ENGR BN 4TH MARDIV	01	ADPE-FMF(1)				(1) SB-3865					
N1342	1363N	CBT ENGR SPT CO CBT ENGR BN 4TH MARDIV	01										
N1343	1373N	ENGR CO CBT ENGR BN 4TH MARDIV	04										
N1410	1428M	RECON BN 1ST MARDIV FMF	01										

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M1411	1427M	H&S CO RECON BN 1ST MARDIV	01	DCT (22-LRIP) ADPE-FMF (1)	PLRS(1)	DCT(36)		(1) SB-3865		MIPASS			TCO
M1412	1423M	RECON CO RECON BN 1ST MARDIV	01		PLRS(4)								
M1413	1423P	RECON CO, W/DEEP RECON CAP, RECON BN 1ST MARDIV	01										
M1420	1428M	RECON BN 2D MARDIV FMF	01										
M1421	1427M	H&S CO RECON BN 2D MAR DIV	01	DCT (22-LRIP) ADPE-FMF (1)	PLRS(1)	DCT(36)		(1)SB-3865		MIPASS			TCO
M1422	1423M	RECON CO RECON BN 2D MARDIV	04		PLRS(4)								
M1430	1428M	RECON BN 3D MARDIV	01										
M1431	1427M	H&S CO RECON BN 3D MARDIV	01	ADPE- FMF(1)	(15-LRIP) PLRS(1)		DCT(44)	(1) SB-3865		MIPASS			TCO

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N1432	1423M	RECON CO RECON BN 3D MARDIV	02	DCT (8-LRIP) PLRS(4)		DCT(6)							
N1433	1423P	RECONCO W/DEEP RECON CAP, RECON BN 3D MARDIV	01										
N1440	1428M	RECON BN 4TH MARDIV FMF	01										
N1441	1427M	H&S CO RECON BN 4TH MARDIV	01	ADPE-FMF (1)		DCT(58)		(1) SB-3865				MIFASS	TCO
N1442	1423M	RECON CO RECON BN 4TH MARDIV	85=04 86-94 =05										
N1510	4238M	1ST TANK BN 1ST MARDIV FMF	01										
N1511	4237M	H&S CO 1ST TANK BN 1ST MARDIV	01	ADPE- FMF(2)		PLRS(1)		(1) SB-3865					TCO
N1514	4233M	MED TANK CO 1ST TANK BN 1ST MARDIV	04			PLRS(7)							

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M1516	A235M	ANTITANK CO 1ST TANK BN 1ST MARDIV	01			PLRS(3)							
M1520	A238M	2D TANK BN 2D MARDIV FMF	01										
M1521	A237M	H&S CO 2D TANK BN 2D MARDIV	01	ADPE-FMF (2)		PLRS(1)		(1) SB-3865					TCO
M1524	A233M	MED TANK CO 2D TANK BN 2D MARDIV	04			PLRS(7)							
M1526	A235M	ANTITANK CO 2D TANK BN 2D MARDIV	01			PLRS(3)							
M1530	A238M	3D TANK BN 1ST MARDIV	01										
M1531	A237M	H&S CO 3D TANK BN 1ST MARDIV	01	ADPE-FMF (2)		PLRS(1)		(1) SB-3865					TCO
M1534	A233M	MED TANK CO, 3D TANK BN 1ST MARDIV	03			PLRS(7)							

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N1536	4235M	ANTITANK CO 3D TANK BN 1ST MARDIV	01			PLRS(3)							
N1540	4238M	4TH TANK BN 4TH MARDIV	01										
N1541	4237M	H&S CO 4TH TANK BN 4TH MARDIV	01	ADPE-FMF (1)		PLRS(1)		(1) SB-3865					TCO
N1544	4233M	MED TANK CO 4TH TANK BN 4TH MARDIV	03			PLRS(7)							
N1546	4235M	AT (TOW) CO 4TH TANK BN 4TH MARDIV	01										
N1580	4238M	8TH TANK BN 4TH MARDIV	01										
N1581	4237M	H&S CO 8TH TANK BN 4TH MARDIV	01	PLRS(1) ADPE-FMF (1)				(1) SB-3856					TCO
N1584	4233M	MED TANK CO 8TH TANK BN 4TH MARDIV	04			PLRS(7)							

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M1586	4235M	ANTITANK CO 6TH TANK BN 4TH MARDIV	01										
M1610	4655M	ASSAULT AMPHIB TRACTOR BN 1ST MARDIV	01										
M1611	4654M	H&S CO ASSAULT AMPH TRACTOR BN, 1ST MARDIV	01	ADPE-FMF (3)		PLRS(2)		(1) SB-3856					
M1613	4652M	ASSAULT AMPH TRACKED CO ASSAULT BN 1ST MARDIV	03			PLRS(10)							
M1620	4655M	ASSAULT AMPH TRACKED BN, 2D MARDIV	01										
M1621	4657M	H&S CO ASSAULT AMPH TRACTOR BN, 2D MARDIV	01	ADPE-FMF (2)		PLRS(4)		(1) SB-3865					
M1623	4652M	ASSAULT AMPH TRACKED CO, ASSAULT BN, 2D MARDIV	04			PLRS(10)							
M1630	4660M	TRACKED VEHICLE BN 3D MARDIV FMF	01										

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N1631	4657M	H&S CO TRACKED VEHICLE BN 3D MARDIV	01	ADPE-FMF (1)		PLRS(3)		(1) SB-3865					
N1633	4652M	ASSAULT AMPHCO TRACKED VEHICLE BN 3D MARDIV	01			PLRS(10)							
N1635	4233M	MED TANK CO TRACKED VEHICLE BN 3D MARDIV	02										
N1640	4[illegible]	LIGHT ASSAULT AMPH TRAC BN 4TH MARDIV	01										
N1641	4656A	H&S CO LIGHT ASSAULT AMPHIB TRAC BN, 4TH MARDIV	01			PLRS(3)		(1) SB-3865					
N1643	4652A	ASSAULT AMPH TRACKED CO, ASSAULT BN 4TH MARDIV	02			PLRS(10)							
N1710	4680C	1ST LIGHT ARMORED VEHICLE BN 1ST MARDIV	01										
N1711	4681C	H&S CO 1ST LAV BN 1ST MARDIV	01	ADPE-FMF (2)		PLRS(10)							

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M1712	4682C	WPNS CO 1ST LAV BN 1ST MARDIV	01			PLRS(17)							
M1713	4683C	LAV CO 1ST LAV BN 1ST MARDIV	03			PLRS(7)							
M1720	4680C	2D LIGHT ARMORED VEHICLE BN, (LAV) 2D MARDIV	01										
M1721	4681C	H&S CO 2D LAV BN 2D MARDIV, FMF	01			PLRS(10)		ADPE-FMF(2)					
M1722	4682C	WPNS CO, 2D LAV BN, 2D MARDIV	01			PLRS(17)							
M1723	4683C	LAV CO, 2D LAV BN 2D MARDIV, FMF	1985=00 1986=03			PLRS(7)							
M1731	4681C	H&S CO, 3D LAV BN(-) 1ST MARDIV	01			PLRS(8)		ADPE-FMF (2)					
M1732	4682C	WPNS CO 3RD LAV BN(-) 1ST MARDIV	01			PLRS(14)							

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N1733	4683C	LAV CO 3D LAV BN (-) 1ST MARDIV	02		PLRS(8)								
N1734	46831	LAV CO, 3D LAV BN 1ST MARDIV, FMF	01			PLRS(14)		ADPE-FMF (1)					
N1740	4680C	4TH LIGHT ARMORED VEHICLE BN 4TH MARDIV	01										
N1741	4680C	HSS CO, 4TH LAV BN 4TH MARDIV, FMF	01			PLRS(10)		ADPE-FMF (2)					
N1742	4680C	WPNSCO, 4TH LAV BN 4TH MARDIV, FMF	1984-88=00 1989=01			PLRS(17)							
N1743	4680C	LAV CO 4TH LAV BN 4TH MARDIV, FMF	1984-88=00 1989-03			PLRS(7)							
N2100	1198M	ARTY REGT 1ST MARDIV, FMF	01										
N2101	1196M	HQBTRY, ARTYREGT 1ST MARDIV	01	ADPE-FMF (2)	DCT (10-LRIP)	PLRS(1)		(1) AN/TCC-42 (2) SB-3865	ULMS (3)			(1) MIFASS	TCO

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M2102		TARGET ACQ BTRY, ARTY REGT 1ST MARDIV, FMF	1984-86 =00 1987=01										
M2108	1113C	155MM (M198) BTRY, D/S(T)BN, ARTY REGT, 1ST MARDIV, FMF	09	DCT (72-LRIP)		PLRS(1) (2-BCS) (9-GDU)							
M2109	1126M	HQ BTRY, D/S(T)BN, ARTY REGT 1ST MARDIV, FMF	1984-87=02 1988=003	ADPE-FMF (1)		PLRS(1) DCT (30-LRIP)		SB-3865		ULMS (1)		MIFASS	TCO
M2110	1128M	D/S(T) BN, ARTY REGT 1ST MARDIV, FMF	01										
M2118	1153C	155 MM M198 BTRY, G/S(T) BN, ARTY REGT 1ST MARDIV, FMF	1984-87=00 1988=03			PLRS(1) 1-BCS (7-GDU)							
M2119	1152C	HQ BTRY, G/S(T)BN ARTY REGT 1ST MARDIV, FMF	1984-87=00 1988-01	ADPE-FMF (1)		PLRS(1) DCT(15)						MIFASS	TCO
M2120	1151C	G/S(T)BN, ARTY REGT 1ST MARDIV, FMF	01										
M2128	1143M	155MM BTRY, D/S(T) BN (M114), ARTY REGT 1ST MARDIV, FMF	1984-85=00 1986-87=03 1988-=00			PLRS(1) 2 BCS (9-GDU)							

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N2137	1290M	8"/175 GUN BTRY, G/S (SP)BN, ARTY REGT 1ST MARDIV, FMF	84=00 85-87=3 88-=02			PLRS(1) 1 BCS (7 GDU)							
N2138	1265M	155 MM BTRY, G/S(SP)BN ARTY REGT 1ST MARDIV, FMF	84=00 85=03 86-87=4 88=03			1 BCS (7 GDU) PLRS(1)							
N2139	1251C	HQ BTRY G/S(SP)BN ARTY REGT 1ST MARDIV	01	ADPE-FMF (1)		DCT (16-LRIP)			(1) SB-3865		MIFASS		TCO
N2140	1270M	G/S(SP)BN ARTY REGT 1ST MARDIV	01										
N2200	1198M	ARTY REGT 2D MARDIV	01										
N2201	1196M	HQ BTRY ARTY REGT 2D MARDIV	01	ADPE-FMF (1)		PLRS(1) DCT (10-LRIP)			(1) AN/TTC-42 (2) SB-3865	ULMS (3)	MIFASS		TCO
N2202	-	TARGET ACQ BTRY ARTY REGT 2D MARDIV	01	ADPE-FMF (1)									
N2208	1113C	155MM BTRY D/S(T)BN (M198) ARTY REGT 2D MARDIV	09			2 BCS (9 GDU) PLRS(1) DCT (72-LRIP)							

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M2209	1126M	HQ BTRY D/S(T)BN (M198) ARTY REGT 2D MARDIV	03	ADPE-FMF (1)		PLRS(1) DCT (30-LRIP)		(2) SB-3865		ULMS (1)	MIFASS	TCO	
M2210	1128C	D/S(T)BN (M198) ARTY REGT 2D MARDIV	01										
M2218	1153C	155MM BTRY G/S(T)BN (M198) ARTY REGT 2D MARDIV	03		PLRS(1) 1 BCS (7 GDU)								
M2219	1152C	HQ BTRY G/S(T)BN (M198) ARTY REGT 2D MARDIV	01	ADPE-FMF(1)	DCT (15-LRIP) PLRS(1)						MIFASS	TCO	
M2220	1151C	G/S(T)BN (M198) ARTY REGT 2D MARDIV	01										
M2228	1143M	155MM BTRY D/S(T)BN (M114) ARTY REGT 2D MARDIV	84-87= 03 88-=00		2 BCS (9 GDU) PLRS(1)								
M2230	1128M	D/S(T)BN (M114) ARTY REGT 2D MARDIV	01										
M2237	1290M	8"/175MM BTRY G/S (SP)BN ARTY REGT 2D MAR DIV	84-87= 03 88= 02		PLRS(1) 1 BCS (7 GDU)								

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N2238	1265M	155MM BTRY G/S(SP)BN ARTY REGT 2D MAR DIV	03		1 BCS (7 GDU)	PLRS(1)							
N2239	1251C	HQ BTRY G/S(SP)BN ARTY REGT	01	ADPE-FMF (1)	DCT (16-LRIP)	PLRS(1)		(1) SB-3865			MIFASS		TCO
N2240	1270M	G/S(SP)BN ARTY REGT 2D MARDIV	01										
N2300	1198M	ARTY REGT 3D MARDIV	01										
N2301	1196M	HQ BTRY ARTY REGT 3D MARDIV	01	ADPE-FMF(1)	DCT (10-LRIP)	PLRS(1)		(2) SB-3865 (1) AN/TTC-42		ULMS (3)	MIFASS		TCO
N2302	-	TARGET ACQ BTRY ARTY REGT 3D MARDIV	01										
N2308	113C	155MM(M198)BTRY D/S(T) BN ARTY REGT 3D MARDIV	84-85: 05 86:06		2 BCS (9 GDU) DCT (48-LRIP)	PLRS(1)							
N2309	1126M	HQ BTRY D/S(T)BN D/S(T) BN (M198) ARTY REG 3D MARDIV	01	ADPE-FMF(1)	DCT (20-LRIP)	PLRS(1)			(2) SB-3865	MIFASS ULMS (1)			TCO

MARINE DIVISIONS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M2310	1128M	D/S(T) (M198) ARTY REGT 3D MARDIV	01										
M2318	1113C	155MM(T)(M198)BTRY G/S BN ARTY REGT 3D MARDIV	84-85=00 86=03		1 BCS (7 GDU)	PLRS(1)							
M2319	1152C	HQ BTRY G/S(T) BN ARTY REGT 3D MARDIV	84-85=02 86=01	ADPE-FMF(1)	DCT (15-LRIP)	PLRS(1)					MIFASS		TCO
M2320	1151C	G/S(T)BN(M198) ARTY REGT 3D MARDIV	01										
M2330	1128M	DIRSPT(T)BN(M114) ARTY REGT, 3D MARDIV	01										
M2337	4112M	8"/175GUN BTRY, G/S (SP)BN, ARTY REGT 3D MARDIV	84-87=00 88=02		1 BCS	(7 GDU) PLRS(1)							
M2338	1265M	155MM BTRY, G/S(SP) BN ARTY REGT 3RD MARDIV	84-87=00 '88=03		1 BCS	(7 BDU) PLRS(1)							
M2339	1255M	HQ BTRY, G/S(SP)BN ARTY REGT, 3D MARDIV, FMF	01		DCT (16-LRIP)	PLRS(1)		(1) SB-3865				MIFASS	TCO

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N2340	1270M	GEN SPT(SP)BN ARTY REGT 3D MARDIV	01										
N2402	-	TARGET ACQ BTRY ARTY REGT 4TH MARDIV	84-87: 00 88:01										
N2408	-	155MM BTRY, D/S(T)BN (M198), ARTY REGT 4TH MARDIV	09		(2) BCS (9 GDU) DCT(72)								
N2409	1126M	HQ BTRY, D/S(T)BN (M198), ARTY REGT 4TH MARDIV	84-86:2 87:01	ADPE- FMF(1)		DCT(30)		(2) SB-3865		ULMS	MIFASS (1)		TCO
N2410	1128C	DIRSPT(T)BN(M198), ARTY REGT 4TH MARDIV	01										

1ST MARINE BRIGADE

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
B1130	1099M	INF REGT, 1ST MARBDE	01										
B1131	1096M	HQCO, INF REGT MARBDE	01	ADPE-FMF (1)	DCT (2-LRIP)	PLRS(6) DCT(2)		(3) SB-3865		ULMS (1)	MIFASS		TCO
B1181	1083C	INF BN, INF REGT MARBDE	03										
B1182	1037C	H&SCO, INF BN INF REGT MARBDE	03	ADPE-FMF(1)	(6-LRIP)	PLRS(4)		(1) SB-3865 DCT(48)			MIFASS		TCO
B1183	1027C	WPNSCO, INF BN INF REGT 1ST MARBDE	03			PLRS(2)							
B1184	1013C	RIFLECO, INF BN INF REGT 1ST MARBDE	09			PLRS(32)							
B1432	1423H	A CO (REIN) RECON BN, 1ST MARBDE	01			PLRS(4)							
B1633	4652H	AAV PLT, 1ST TV BN/DET H&SCO, 3D AA BN, 1ST MARBDE	01			PLRS(6)							

1ST MARINE BRIGADE

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
B1996	1996M	HQ 1ST MARBDE	01	ADPE-FMF-(10)							MIFASS		TCO
B2308	1113C	155(T)BTRY, D/S BN (M198), ARTY REGT 1ST MARBDE	03		2 BCS DCT PLRS(1) (24-LRIP)	(9 GDU)							
B2309	1126M	HQ BTRY, D/S(T)BN (M198), ARTY REGT 1ST MARBDE	01	ADPE-FMF (1)	DCT PLRS(1) (10-LRIP)			(2) SB-3865		ULMS	MIFASS		TCO
B2310	1128C	D/S(T) BN ARTY REGT 1ST MARBDE	01										
B3310	3449H	BRIGADE SERVICE SUPPORT GROUP	01										
B3311	3448H	H&SCO BSSG	01	ADPE-FMF (5)									
B3321	3348H	SUPCO BSSG	01	ADPE-FMF (2)									
B3331	3248H	MAINTCO BSSG	01	ADPE-FMF (4)	DCT (2-LRIP)								

1ST MARINE BRIGADE

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
B3351	3757N	ENGRCO BSSG	01	ADPE-FMF (1)									
B3361	4648H	MTCO BSSG	01	ADPE-FMF (1)									
B3371	3853H	MEDCO BSSG	01	ADPE-FMF (1)									
B3381	3850N	DENTALCO BSSG	01	ADPE-FMF (1)									
B4034	4863M	COMM SPT CO COMM BN, III MAF	01		DCT (2-LRIP)		DCT(4)	TCC(1)	(9) SB-3865 (3) AN/TTC-42				
B4722	4722H	COUNTERINTELL TEAM FMF	01										
B8633	8631R	MACS/MTDS 1ST MARBDE	01	ADPE-FMF (2)					TAOM	(2) SB-3865 ULMS (1)			
B8813	8813R	H&MS (VA, VF, VFAM) 1ST MARBDE	01	ADPE-FMF (4)									

1ST MARINE BRIGADE

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
B8820	8820N	MABS 1ST MARBDE	01	ADPE-FMF (1)						ULMS (2)			
B8849	8849N	MARFIT/ATK SQDN (VMFA) 1ST MARBDE	02	ADPE-FMF (1)									
B8938	8938N	HMM (12 CH46E) 1ST MARBDE	04	ADPE-FMF (1)		PLRS(36)							
B8945	8945S	MARHVHELO SQDN (HMH)(CH-53) 1ST MARBDE	01	ADPE-FMF (1)		PLRS(16)							

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
MA001		ORF 1ST FSSG	01					(5) SB-3865 (1) AN/TTC-42		(2) ULMS			
MA002		ORF 2D FSSG	01					(5) SB-3865 (1) AN/TTC-42		(2) ULMS			
MA003		ORF 3D FSSG	01					(5) SB-3865 (1) AN/TTC-42		(2) ULMS			
MA004		ORF 4TH FSSG	01					(5) SB-3865 (1) AN/TTC-42		(2) ULMS			
M3110	3448M	H&S BN 1ST FSSG	01										
M3111	3447M	H&S CO	01	ADPE FMF(29)		PLRS(10)							
M3112	3445M	SERV CO	01	DFASC			(3) MASC						
M3113	3443M	COMM CO	01					(3) AN/TTC-42 (6) SB-3865 TCC (1)		ULMS (2)			

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N3119	3444N	MPCO	01										
N3120_	3348N	SUP BN 1ST FSSG	01										
N3121	3347N	H&S CO	01	ADPE-FMF(9)									
N3122	3343N	AMMO CO	01										
N3123	3323N	RATION CO 01											
N3124	3313N	SUP CO	01										
N3125	3333N	MED LOG CO	01										
N3130	3248N	MAINT BN 1ST FSSG	01										

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M3131	3247M	H&S CO	01	ADPE-FMF(7)									
M3132	3253M	C/E MAINT CO	01	DCT (2-LRIP)		DCT-(2)							
M3133	3243M	ENGR MAINT CO	01										
M3134	3223M	ORD MAINT CO	01										
M3135	3233M	MT MAINT CO	01										
M3136	3263M	G/S MAINT CO	01								MIFASS		
M3140	3148M	LNDG SPT BN 1ST FSSG	01										
M3141	3147M	H&S CO	01	ADPE-FMF (1)		PLRS(6)		(2) SB-3865					

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N3142	3142N	BEACH & PORT CO	01										
[illegible]	[illegible]4N	LNDG SPT CO	03										
N3150	3758N	ENGR SPT BN	01										
N3151	3757N	H&S CO	01	ADPE-FMF(2)		PLRS(2)							
N3152	3755N	ENGR SPT CO	01										
N3153	3752N	BRIDGE CO 001											
N3154	3751N	BULK FUEL CO	02										
N3155	3753N	ENGR CO	03										

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M3160	4648M	MT BN 1ST FSSG	01										
M3161	4647M	H&S CO	01	ADPE-FMF (1)		PLRS (6)							
M3162	4647M	TRANS CO	01										
M3163	4643M	TRK CO	01										
M3164	4645M	MARGTERR VEH CO	01										
M3170	3858M	MED BN 1ST FSSG	01										
M3171	3857M	H&S CO	01	ADPE-FMF (1)									
M3172	3853M	MED CO	05										

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N3173	3854N	HOSP CO	01										
N3180	3850N	DENT BN 1ST FSSG	01										
N3181	3852N	H&S CO	01	ADPE-FMF (1)									
N3182	3851N	DIV DENT CO	01										
N3183	3851N	WING DENT CO	01										
N3184	3851N	FSSG DENT CO	01										
N3210	3448N	H&S BN 2D FSSG	01										
N3211	3447N	H&S CO	01	ADPE-FMF(40)		PLRS(10)							

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M3212	3445M	SVC CO	01	DFASC (1)			(3) MASC						
M3213	3443M	COMM CO	01					(3) AN/TTC-42 (6) SB-3865 TCC (1)		ULMS (2)			
M3214	3444M	MP CO	01										
M3220	3348M	SUP BN 2D FSSG	01										
M3221	3347M	H&S CO	01	ADPE-FMF(8)									
M3222	3343M	AMMO CO	01										
M3223	3323M	RATION CO 01											
M3234	3313M	SUP CO	01										

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N3225	3333N	MED LOG CO	01										
N3230	3248N	MAINT BN 2D FSSG	01										
N3231	3247N	H&S CO	01	ADPE-FMF (7)									
N3232	3253N	C/E MAINT CO	01	(2-LRIP)		DCT(4)							
N3233	3243N	ENGR MAINT CO	01										
N3234	3223N	ORD MAINT CO	01										
N3235	3233N	MT MAINT CO	01										
N3236	3263N	G/S MAINT CO	01								MTFASS (1)		

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M3240	3148M	LNDG SPT BN 2D FSSG	01										
M3241	3147M	H&S CO	01	ADPE-FMF(1)		PLRS(6)		(2) SB-3865					
M3242	3142M	BEACH & PORT CO	01										
M3244	3144M	LNDG SPT CO	03										
M3247		OPERATIONAL READINESS FLOAT	01	See M4002									
M3250	3758M	ENGR SPT BN 2D FSSG	01										
M3251	3757M	H&S CO	01	ADPE-FMF(2)		PLRS(2)							
M3252	3755M	ENGR SPT CO	01										

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
[illegible]	3752N	BRIDGE CO 01											
N3254	3751N	BULK FUEL CO	02										
N3255	3753N	ENGR CO	03										
N3260	4648N	MT BN 2D FSSG	01										
N3261	4647N	H&S CO	01	ADPE-FMF (1)		PLRS(6)							
N3262	4644N	TRANS CO	01										
N3263	4643N	TRK CO	01										
N3264	4645N	MARGTERR VEH CO	01										

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M3270	3858M	MED BN 2D FSSG	01										
M3271	3857M	H&S CO	01	ADPE-FMP (1)									
M3272	3853M	MED CO	05										
M3273	3854M	HOSP CO	01										
M3280	3850M	DENT BN 2D FSSG	01										
M3281	3852M	H&S CO	01	ADPE-FMP(1)									
M3282	3851M	DIV DENT CO	01										
M3283	3851M	WING DENT CO	01										

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N3284	3851N	FSSG DEMT CO	01										
N3310	3448N	H&S BN 3D FSSG	01										
N3311	3447N	H&S CO	01	ADPE-FMF(28)		PLRS(10)							
N3312	3445N	SVC CO	01	(1) DFASC			(3) MASC						
N3313	3443N	COMM CO	01					(3) AN/TTC-42 (6) SB-3865 TCC (1)		ULMS (2)			
N3314	3444N	MP CO	01										
N3320	3448N	SUP BN 3D FSSG	01										
N3321	3447N	H&S CO	01	ADPE-FMF(9)									

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M3322	3343M	AMMO CO	01										
M3323	3323M	RATION CO	01										
M3324	3313M	SUP CO	01										
M3325	3333M	MED LOG CO	01										
M3330	3248M	MAINT BN 3D FSSG	01										
M3331	3247M	H&S CO	01	ADPE-FMF(7)									
M3332	3253M	C/E MAINT CO	01			DCT(4) (2-LRIP)							
M3333	3243M	ENGR MAINT CO	01										

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N3334	3229N	ORD MAINT CO	01										
N3335	3233N	MT MAINT CO	01										
N3336	3263N	G/S MAINT CO	01								MIFASS (1)		
N3340	3148N	LNDG SPT BN 3D FSSG	01										
N3341	3147N	H&S CO	01	ADPE-FMF(1)		PLRS(6)		(2) SB-3865					
N3342	3142N	BEACH & PORT CO	01										
N3344	3144N	LNDG SPT CO	03										
N3350	3758N	ENGR SPT BN 3D FSSG	01										

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N3351	3757N	H&S CO	01	ADPE-FMF (2)		PLRS(2)							
N3352	3755N	ENGR SPT CO	01										
N3353	3752N	BRIDGE CO 01											
N3354	3751N	BULK FUEL CO	02										
N3355	3753N	ENGR CO	03										
N3360	4648N	MT BN 3D FSSG	01										
N3361	4647N	H&S CO	01	ADPE-FMF (1)		PLRS(6)							
N3362	4644N	TRANS CO	01										

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N3363	4643N	TRK CO	01										
N3364	4645N	MARGTERR VEH CO	01										
N3370	3858N	MED BN 3D FSSG	01										
N3371	3857N	H&S CO	01	ADPE-FMF (1)									
N3372	3853N	MED CO	05										
N3373	3854N	HOSP CO	01										
N3380	3850N	DENT BN 3D FSSG	01										
N3381	3852N	H&S CO	01	ADPE-FMF(1)									

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N3382	3851N	DIV DENT CO	01										
N3383	3851N	WING DENT CO	01										
N3384	3851N	FSSG DENT CO	01										
N3410	3448N	H&S BN 4TH FSSG	01										
N3411	3448N	H&S CO	01										
N3412	3445N	SERVICE CO	01				(3) MASC						
N3413	3443N	COMM CO (-)	01					(3) AN/TTC-42 (6) SB-3865 TCC (1)		ULMS (2)			
N3414	3448N	MP CO	02										

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N3420	3348N	SUP BN 4TH FSSG	01										
N3421	3347N	H&S CO	01										
N3422	3343N	AMMO CO	01										
N3423	3323N	RATION CO	01										
N3424	3313N	SUP CO	01										
N3425	3333N	MED LOG CO	01										
N3430	3248N	MAINT BN 4TH FSSG	01										
N3431	3247N	H&S CO	01										

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N3432	3253N	C/E MAINT CO	01		DCT(4)								
N3433	3243N	ENGR MAINT CO	01										
N3434	3223N	ORD MAINT CO	01										
N3435	3233N	MT MAINT CO	01										
N3436	3263N	G/S MAINT CO	01								MIPASS		
N3440	3148N	LNDG SPT BN 4TH FSSG	01										
N3441	3147N	H&S CO	01					(2) SB-3865					
N3442	3142N	BEACH & PORT CO	02										

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N3444	3144N	LNDG SPT CO	03										
N3450	3758N	ENGR SPT BN	01										
N3451	3757N	H&S CO	01										
N3452	3755N	ENGR SPT CO	01										
N3453	3752N	BRIDGE CO 01											
N3454	3751N	BULK FUEL CO	02										
N3455	3753N	ENGR CO	01										
N3460	4648N	MT BN 4TH FSSG	01										

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N3461	4647N	H&S CO	01										
N3462	4644N	TRANS CO	01										
N3463	4643N	TRK CO	01										
N3464	4645N	MARGTERR VEH CO	01										
N3470	3858N	MED BN 4TH FSSG	01										
N3471	3857N	H&S CO	01										
N3472	3853N	MED CO	05										
N3473	3854N	HOSP CO	01										

FORCE SERVICE SUPPORT GROUPS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N3480	3850N	DENT BN 4TH FSSG	01										
N3481	3852N	H&S CO	01										
N3482	3851N	DIV DENT CO	01										
N3483	3851N	WING DENT CO	01										
N3484	3851N	FSSG DENT CO	01										

MARINE AIRCRAFT WINGS

T/R #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M8611	8611R	MWHS MAW	04	ADPE-FMF-(11)									
M8612	8612M	MARINE WING COMM SQD MACG MAW	04	ADPE-FMF(2)			TCC(2)	(3)AN/TTC-42 (6)SB-3865		ULMS(2)			TCO
M8615	8615R	H&HS MACG MAW	04	ADPE-FMF(3)									
M8618	8618M	H&S BTRY LAAMBN MAW	04	ADPE-FMF(2)				(2) SB-3865					
M8619	8619M	MISSILE BTRY (IMPROVED HAWK) LAAMBN MAW	04										
M8622	8622M	LIGHT AA MISSLE BN 1ST MAW	01										
M8625	8625M	FAAD BTRY MACG MAW	04	DCT (45-LRIP) ADPE-FMF(2)									
M8631	8631R	MACS/MTDS MACG 1ST MAW	01	ADPE-FMF(2)				(2) SB-3865 TAOM		ULMS (1)			

MARINE AIRCRAFT WINGS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N8632	8631R	MACS/MTDS MACG 2D MAW	02	ADPE-FMF(2)				(2)SB-3865 TAOM		ULMS (1)			
N8633	8631R	MACS/MTDS MACG 3D MAW	02	ADPE-FMF(2)				(2)SB-3865 TAOM		ULMS (1)			
N8634	8631R	MACS/MTDS MACG 4TH MAW	02	ADPE-FMF(2)				(2)SB-3865 TAOM		ULMS (1)			
N8643	8643N	MAR AIR TRFC CNTRL SQDN MACG MAW	04	ADPE-FMF(1)									
N8655	8655M	MAR TACT PHOTO RECON SQD (VMFP) (21 RF4B) MAW	01	ADPE-FMF(1)									
N8657	8657Q	MAR TAC EW SQD VMAQ(-)(7 EA-6B MAW	01	ADPE-FMF(2)									
N8658	8658M	DET, MAR TAC SQD VMAQ; (4 EA-6B) MAW	02										
N8671	8640R	MASS MACG MACG 1ST MAW	01	ADPE-FMF(1) DCT (34-LRIP)				(2) SB-3865			MIFASS	TCO	

MARINE AIRCRAFT WINGS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N8672	8640R	MASS MACG 2D MAW	01	ADPE- FMF(1) DCT (34-LRIP)				(2) SB-3865			MIPASS	TCO	
N8673	8640R	MASS MACG 3D MAW	01	ADPE- FMF(1) DCT (34-LRIP)				(2) SB-3865			MIPASS		TCO
N8674	8674	MASS-4 MACG 4TH MAW	01			DCT(34)		(2) SB-3865			MIPASS		TCO
N8675	8640R	MASS-6 MACG 4TH MAW	01			DCT(34)		(2) SB-3865					
N8712	8712M	MAR WING WPNS UNIT MAW	01										
N8730	8710N	HQ&GRND MAINT SQDN MWSG 1ST MAW	01	ADPE- FMF(5)				(2) SB-3865		ULMS (1)			
N8734	8714N	ENGR SQDN MARWGSERGRU 1ST MAW	01	ADPE- FMF(1)									
N8740	8710N	HQ&GRND MAINT SQDN MWSG 2D MAW	01	ADPE- FMF(5)				(2) SB-3865		ULMS(1)			

MARINE AIRCRAFT WINGS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N8744	8714N	ENGR SQDN MWSG 2D MAW	01	ADPE-FMF(1)									
N8745	8715N	MOTOR TRANS SQDN MWSG 2D MAW	01	ADPE-FMF(1)									
N8750	8710N	HQ&GRND MAINT SQDN MWSG 3D MAW	01	ADPE-FMF(5)				(2) SB-3865		ULMS (1)			
N8754	8714N	ENGR SQDN MWSG 3D MAW	01	ADPE-FMF(1)									
N8755	8715N	MOTOR TRANS SQDN MWSG 3D MAW	01	ADPE-FMF(1)									
N8760	8710N	HQ&GRND MAINT MWSG	01	ADPE-FMF(5)				(2) SB-3865		ULMS (1)			
N8764	8714N	ENGR SQDN MWSG 4TJ MAW	01	ADPE-FMF(1)									
8765	8715N	TRANS SQDN MWSG 4TH MAW	01	ADPE-FMF(1)									

MARINE AIRCRAFT WINGS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M8775	8775R	MARAIRREPSQDN (18 KC-130) (VMGR) 2D MAW	01	ADPE-FMF(1)									
M8777	8777R	MARAIRREPSQDN (18 KC-130) (VMGR) 3D MAW	01	ADPE-FMF(1)									
M8780	8780M	MARAIRREPSQDN (12 KC-130) (VMGR) 4TH MAW	01	ADPE-FMF(1)									
M8783	8783S	MARAIRREPSQDN (12 KC-130) (VMGR) 1ST MAW	01	ADPE-FMF(1)									
M8813	8813R	H&MS (VA/VP/VP(AW)) MAG MAW	09	ADPE-FMF(5)									
M8820	8820R	MAR AIR BASE SQDN (VA/VP/VA(AW)) MAG MAW	10	ADPE-FMF(1)				(2) SB-3865		(2) ULMS			TCO
M8847	8847M	MAR FIT/ATK SQDN (VMFA) (12 PAA) MAG MAW	02	ADPE-FMF(1)									
M8849	8849M	MAR FIT/ATK SQDN (VMFA)(12PAA) MAG MAW	84=06 85=04 86=03 87=02 88=01 89=00	ADPE-FMF(1)									

MARINE AIRCRAFT WINGS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N8851	8851X	MAR FIT/ATK SQDN (VMFA)(12F18) MAG MAW	08	ADPE-FMF(1)									
N8852	8852	MAR ATK SQDN (19-A4)(VMA) MAG MAW	09	ADPE-FMF(1)									
N8856	8856S	MAR ATK SQDN (10 A6E) (VMA) (AW) MAG MAW	II MAF=03 I MAF=02	ADPE-FMF(1)									
N8859	8859R	MAR ATK SQDN (20AV8A)(VMA) MAG MAW	I MAF=03 II MAF=02 III MAF=03	ADPE-FMF(1)		PLRS(20)							
N8914	8914R	H&MS MAG/VH (SINGLE SITE) MAG MAW	03	ADPE-FMF(4)									
N8915	8915R	H&MS MAG/VH MAW	02	ADPE-FMF(4)									
N8916	8916R	H&MS MAG/VH HMA/HML/VMO MAW	01	ADPE-FMF(4)									
N8919	8919N	H&MS MAG (SATELLITE AIRFIELD) MAW	01	ADPE-FMF(4)									

MARINE AIRCRAFT WINGS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M8921	8921M	MABS MAG/VH MAW	I MAF= 01 II MAF= 02 III MAF= 01	ADPE-FMF(1)		DCT(162)		(2) SB-3865		(2) ULMS			TCO
M8937	8937M	MARMEDHELO SQDN (HMM) MAG/VH (18CH46F) MAW	00	ADPE-FMF(1)									
M8938	8938M	MARMEDHELO SQDN (HMM) (12CH46F) MAG MAW	I MAF= 06 II MAF= 06 IV MAF= 02	ADPE-FMF(1)		PLRS BUU (12)							
M8945	8945S	MARMEDHELO SQDN (HMH) (16CH53D) MAG/VH MAW	IV MAF= 01 II MAF 1984-85= 02 1986= 01 I MAF 1984-86= 03 1987= 01	ADPE-FMF(1)		PLRS BUU (16)							
M8946	8947	MARHVYHELO SQDN (16CH53E) MAG/VH MAW	86=6 87=7 88= 05	ADPE-FMF(1)									
M8965	8965M	MARLIGHTHELO SQDN (HML) (24UH1N) MAW	I MAF= 02 II MAF= 01	ADPE-FMF(1)		PLRS(24)							

MARINE AIRCRAFT WINGS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M8968	8968R	MAROBSERVSQDN (VMO) (18 OV10A) MAW	I MAF= 01 II MAF= 01	ADPE-FMF(1)		PLRS(18)							
M8971	8971R	MARHELOATK SQDN (HMA) (24AH1J/T) MAW	I MAF= 02 II MAF= 01 III MAF= 01 IV MAF=	ADPE-FMF(1)		PLRS(18)							
M8571	8571M	MATS VMFAT 12F4J/21F4J MCCRTG MAW	01	ADPE-FMF(1)									
M8572	8572M	MATS VMAT8 AV-8A/ 7TAV-8A MCCRTG MAW	01	ADPE-FMF(1)									
M8586	8586M	VMAT (AW) 13A6/ 3TC4C, MCCRTG MAW	01	ADPE-FMF(1)									
M8591	8591M	HMT (10 CH46/9 CH53) MAW FMF	02	ADPE-FMF(1)									
M8594	8594M	HLMTE 6 UH1N	01	ADPE-FMF(1)									
M8598	8598M	HMATE 4 AH1J	01										

MARINE AIRCRAFT WINGS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M8573	8573M	MARAVN WPNS & TACTICS SQDN	01	ADPE-FMF(1)									
M8580	8580M	H&MS MCCRTG-10 MAW	01	ADPE-FMF(4)									

OTHER FMF ELEMENTS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M4010	4888M	COMM BN I MAF	01										
M4011	4886M	HQ CO COMM BN I MAF	01	ADPE- FMF(2)									
M4012	4883M	COMM CO COMM BN I MAF	01	DCT (2-LRIP)	DCT (4)			(2) AN/TTC-42 (6) SB-3865 TCC (1)		ULMS (1)	MIFASS		TCO
M4013	4873M	LONG LINES CO COMM BN I MAF	01										
M4014	4863M	COMM SPT CO COMM BN I MAF	01	DCT (2-LRIP)	DCT (4)			(3) AN/TTC-42 (9) SB-3865 TCC (1)					
M4020	4888M	COMM BN II MAF	01										
M4021	4886M	HQ CO COMM BN II MAF	01	ADPE- FMF(1)									
M4022	4883M	COMM CO COMM BN II MAF	01	DCT (2-LRIP)	DCT(4)			(2) AN/TCC-42 (6) SB-3865 TCC (1)		ULMS (1)	MIFASS		TCO

OTHER FMF ELEMENTS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M4023	4873M	LONG LINES CO COMM BN II MAF	01										
M4024	4863M	COMM SPT CO COMM BN II MAF	01	DCT (2-LRIP)	DCT (4)			(3) AN/TTC-42 (9) SB-3865 TCC (1)					
M4030	4886M	COMM BN III MAF	01										
M4031	4886M	HQ CO COMM BN III MAF	01	ADPE-FMF(5)									
M4032	4883M	COMM CO COMM BN III MAF	01		DCT (6)			(2) AN/TTC-42 (6) SB-3865 TCC (1)		ULMS (1)	MIFASS		TCO
M4033	4873M	LONG LINES CO COMM BN III MAF	01										
M4040	4888M	COMM BN IV MAF	01										
M4041	4886M	HQ CO COMM BN IV MAF	01	ADPE-FMF(1)									

OTHER FMF ELEMENTS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N4042	4883M	COMM CO COMM BN 4TH MAF	01		DCT (6)			(2) AN/TTC-42 (6) SB-3865 TCC(1)		ULMS	MIFASS		TCO
N4043	4873M	LONG LINES CO COMM BN 4TH MAF	01										
P4014	4863P	COMM SPT CO 9th COMM BN I MAF	01										
N4044	4863M	COMM SPT CO COMM BN IV MAF	01	DCT (6)				(3) AN/TTC-42 (9) SB-3865 TCC (1)					
N4392	4392M	TOPOGRAPHIC PLATOON FMF	01										
N4722	4722M	COUNTER- INTELLIGENCE TEAMS FMF	04										
N4725	4725K	FORCE IMAGERY INTERPRETATION UNIT	01										
N4732	4732M	SPECIAL SECURITY COMM TEAM FMF	02										

OTHER FMF ELEMENTS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
MA735	A735M	"A" CO RADBN FMF	02			PLRS(20)							
MA736	A736M	"B" CO RADBN FMF	02			PLRS(20)							
MA737	A737M	H&S CO RADBN FMF 02		ADPE-FMF(2)		TAOC		(2) SB-3865	ISIS	CCO			SAAS
MA738	A738M	RADBN	02										
MA917	A917B	HQ, MARINE AMPHIBIOUS BRIGADE	02	ADPE-FMF(3)									
M5999	5999M	MUC LANDING FORCE STAFF	01										
MA623	A623M	FORCE RECON CO FMF	03	(20-LRIP) ADPE-FMF(1)		DCT (60) PLRS(7)							
PA852	A852M	AIR/NAV GUNFIRE LN CO (ANGLICO) FMF	01 II MAF	ADPE-FMF(1)	DCT (36-LRIP)								

OTHER FMF ELEMENTS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
MA853	4853M	1ST ANGLICO (-) FMF (1ST BRIGADE)	01	ADPE-FMF(1)									
MA918	4918M	HQ, MARINE AMPHIBIOUS FORCE	01										
MA919	4919M	H&S CO MAF	01	ADPE-FMF(1)									
MA953	4953M	MP CO H&S BN FMFLANT	01										
MA955	4955 M	SERVCO, H&S BN FMFLANT	01										
MA956	4956M	FORCE HQ, HQCO H&S BN, FMFLANT	01	IAC									
MA957	4957M	HQ CO, H&S BN FMFLANT	01	ADPE-FMF(2)									
MA958	4958M	H&S BN FMFLANT	01										

OTHER FMF ELEMENTS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M4998	4998M	CIVIL AFFAIRS GROUP FMF	01										
M5999	5999M	NUC LNDG FORCE STAFF (LHA CLASS SHIP)	05										
M8000		4TH MAR AIRCRAFT WING/ MARTC	01										
M8570	8570M	MATS VMAT, 15 A-4/5 TA-4 MCCRTG, MAW	01	ADPE-FMF (1)									

NON-FMF ELEMENTS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
N3247		ORF I II III IV	04	DCT (20-LRIP) I-II MAF	9 BCS (10-DCT LRIP) III-MAF	(42 GDU) DCT(110)				(4) TTC-42 (20) SB-3865			
5980		LFTC LANT	01	DCT (20-LRIP)									
5981		LFTC PAC	01	DCT (20-LRIP)									
6102	6102	MARBKS GUANTANAMO CUBA	01		(2) DCS (9) GDU								
7011	7011	MCLB BARSTOW CA	IAC		(8) BCS (38 GDU)			(20) SB-3865 (2) TTC-42 TCC		ULMS (4)	MIFASS		
7014	7014	MCLB ALBANY, GA	MAINT FLOAT (1) (ATSU) (1)	(5)FY85	(4) BCS (20 GDU) PLRS(36) DCT(30) DCT(5)			(17) SB-3865) (2) TCC-42 TCC (1)		ULMS (2)	MIFASS		
		WAR RESERVE			(4) BCS (35 GDU)			(12) SB-3865 (12) AN/TTC-42		(3) ULMS			
9934		REDEYE/STINGER SCHOOL, FT. BLISS, TX	01	DCT (8-LRIP)									

NON-FMF ELEMENTS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
7102	7102	CAMP HM, SMITH HI	01	ADPE-FMF (2)									
7711	7711	MC AIR-GRND CMBT TRNG CTR EQUP ALW POOL (EAP)	01	ADPE-FMF (1)									
7401	7400	HQ MCDEC QUANTICO, VA	01					AN/TTC-42 (1) SB-3865 (6)		ULMS (2)			
7434	7434	CDS EDUCATION CTR MCDEC	01	DCT (6-LRIP)			MASC						
7441	7441	C^3 DEV CTR, MCDEC, QUANTICO, VA	01	(4-LRIP, FY85) ADPE-FMF (1)		DCT(4)							
7450	7450	TBS, ED R MCDEC QUANTICO, VA	01	DCT (6-LRIP)	(2) BCS (9) GDU, PLRS(2)								
65060		FT GORDON, GA	01					(59) SB-3865 (19) AN/TTC-42					
9902		VDC, FMC SAN JOSE	01		PLRS(1)								

NON-FMF ELEMENTS

T/E #	T/O #	NAME OF UNIT	# of UNITS	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
9912		FT MONMOUTH-PDSS N.J.	01					(4) SB-3865 (2) AN/TTC-42					
7630		SCHOOLS BN CAMPEN CA	01		PLRS(5)								
7661		ITS CAMPEN CA	01		PLRS(5)								
7442	7442	MCTSSA CAMP PEND, CA	01	DCT (6-LRIP-FY85)	PLRS MS(1) (2) BCS (16) GDU	BUU (9)		TAOM		ULMS (2)	MIFASS		
75060	5060	NIPS TRNG FAC KEY WEST, FLA		IAC									
7720	7720	MCCES 29 PALMS, CA	01	DCT (40-LRIP)	PLRS MS (1) BUU (18)				TAOM AN/TTC-42(2)	ULMS(6)	MIFASS	(6) SB-3865	
35060	5060	ARTY SCHOOL, FT. SILL	01	DCT (8-LRIP)									
015060		ABERDEEN PROVING GROUND	01		PLRS(1)								

ANNEX C

MAGTF C4 SYSTEM REFERENCE DATA SHEETS

Annex C provides a supplemental, detailed reference to the 14 systems whose summary descriptions were contained in section 2. The data sheet is composed of the following elements:

A. SYSTEM NOMENCLATURE
B. SYSTEM DESCRIPTION
C. SYSTEM/EQUIPMENT REPLACED
D. MAJOR SYSTEM COMPONENTS
E. SYSTEM ACCESSORIES
F. RELATED EQUIPMENT
G. EMBEDDED COMPUTER
H. COMMUNICATION SECURITY
I. BATTERIES
J. EXTERNAL POWER
K. ENVIRONMENTAL CONTROL UNIT (ECU)
L. OTHER SYSTEM/EQUIPMENT INTERFACES
M. FIRST FMF DELIVERY
N. REFERENCES
O. REMARKS

In those instances where information was unavailable/not developed to complete a sub-element, the sub-element is left blank.

MAGTF C4 SYSTEM REFERENCE DATA SHEET - ADPE-FMF

A. **SYSTEM NOMENCLATURE**: Automated Data Processing Equipment - Fleet Marine Force (ADPE-FMF)

TAMCN: A0080 VII GP
NSN: 7035-01-099-2949
WT: 423 lbs
CU: 16 ft^3 (2 cases)

REMARKS: Basic system includes a minicomputer with two floppy disk drives and a video display, a keyboard, and printer. Optional equipment or full system includes the magnetic tape unit and the Paper Tape Punch.

B. **SYSTEM DESCRIPTION**: The ADPE-FMF system or "green machine" consists of IBM Series 1 (ruggedized) data processing equipment specially packaged. It provides a deployable capability for input to existing automated information systems (AISs) and provides automated support for FMF staff. The ADPE-FMF is utilized as a source data automation (SDA) tool, primarily acquired to enhance the input process to Class I Systems.

C. **SYSTEM/EQUIPMENT REPLACED**: N/A

D. **MAJOR SYSTEM COMPONENTS**:

1. DESCRIPTION: Central Processor Unit (CPU) IBM 4952 Processor

NSN:
WT: (Para A)
CU: (Para A)

REMARKS: Upgraded to 128K memory

ADPE-FMF (Continued)

2. DESCRIPTION: Video Display IBM 4978 Display Station.

NSN: WT: (Para A)
CU: (Para A)

REMARKS: 9 inch screen

3. DESCRIPTION: Terminal Printer and Keyboard IBM 4974

NSN: WT: (Para A)
CU: (Para A)

REMARKS: N/A

4. DESCRIPTION: Immediate Access Storage

NSN: WT: (Para A)
CU: (Para A)

REMARKS: Integral part to display/processor

5. DESCRIPTION: Magnetic Tape Drive (MTD) IBM 4469

NSN: WT: 119 lbs
CU: 9.49 ft^3 (in case)

REMARKS: Component provided in limited quantities to users who must interface with MAG TAPE systems.

ADPE-FMF (Continued)

6. DESCRIPTION: Paper Tape Punch (PTP) IBM 4470

NSN: WT: 65 lbs
CU: 7.62 ft^3 (in case)

REMARKS: Prepares tape for entry into communication system.

E. SYSTEM ACCESSORIES: N/A

F. RELATED EQUIPMENT: N/A

G. EMBEDDED COMPUTER: IBM Series 1

1. DESCRIPTION: IBM 4952 Processor
LANGUAGE: COBOL EDX 4.1
PDSS AGENCY: USMC CDPA for Class I system
QUANTITY: 1 per ADPE-FMF set

H. COMMUNICATION SECURITY: N/A

I. BATTERIES: N/A

J. EXTERNAL POWER:

1. DESCRIPTION: Operates from available AC power 115V/60Hz. Can be converted to run on 220 VAC/50Hz.

K. ENVIRONMENTAL CONTROL UNIT (ECU): N/A

REMARKS: Operating Temperature $1^{o}C$ to $50^{o}C$ Relative Humidity 25% to 80%.

ADPE-FMF (Continued)

L. OTHER SYSTEM/EQUIPMENT INTERFACES:

REMARKS: Capable of stand-alone operation or can be used with modem to transmit data.

M. FIRST FMF DELIVERY: Initial distribution complete

N. REFERENCES:

1. Letter of Adoption and Procurement, 23-80, for the Automated Data Processing Equipment for the FMF (ADPE-FMF), 24 June 1980

2. MCO 5230.11, dated 10 February 1981 subj: Advance Logistics Order for ADPE-FMF

3. USMC Command and Control Master Plan, 23 March 1983

4. USMC Information Systems Support Plan, 5 November 1984

O. REMARKS: Follow-on units scheduled for delivery in FY86. The 842 ADPE-FMF devices will be replaced, starting in July 1987, by 4,198 microcomputers acquired under the EUCE program.

MAGTF C4 SYSTEM REFERENCE DATA SHEET - MASC

A. **SYSTEM NOMENCLATURE:** MAGTF Automated Services Center (MASC) (DFASC Characteristics used to describe MASC)

TAMCN: C4527 II EP — WT: 35,010 lbs/trailer
NSN: 7010-01-186-0328 — CU: 3080 ft^3/trailer

REMARKS: Two trailer configuration equals 70,020 lbs and 6160 cubic feet.

B. **SYSTEM DESCRIPTION:** The MASC (DFASC) is an independent complex of ADPE integrated into two MILSTD semitrailer vans to form central control processor/mass storage trailer (Trailer Number 1) and an ADP operations trailer (Trailer Number 2) which supports MAGTF ADP requirements.

C. **SYSTEM/EQUIPMENT REPLACED:** Data Processing Set, Platoon Relocatable (small scale).

TAMCN: C4526 — WT: Not Available
CU: Not Available

D. **MAJOR SYSTEM COMPONENTS:**

1. Trailer 1 - Central Processor/mass storage

NSN: (Para A) — WT: 35,010 lbs
CU: 3080 ft^3

MASC (Continued)

2. Trailer 2 - ADP operations

NSN: (Para A)

WT: 35,010 lbs
CU: 3080 ft^3

E. SYSTEM ACCESSORIES: N/A

F. RELATED EQUIPMENT:

1. 5-ton tractors required to move trailers
2. 2 1/2 ton truck required to move generators
3. 100 KW generators required for power

G. EMBEDDED COMPUTER:

1. DESCRIPTION: IBM 43XX
LANGUAGE: COBOL
PDSS AGENCY: CDPA
QUANTITY: TBD

H. COMMUNICATION SECURITY (COMSEC): N/A

I. BATTERIES: N/A

J. EXTERNAL POWER:

1. DESCRIPTION: MEP 007A, 60 Hz 120/208 VAC 3-phase, 4-wire, 100KW Military Generator
CONFIGURATION: Trailer Mounted
120/208 VAC

MASC (Continued)

2. Commercial: 60 Hz 3-phase

3. Shipboard: 440 VAC 60 Hz 3-phase, 4-wire

K. ENVIRONMENTAL CONTROL UNIT (ECU):

1. DESCRIPTION: Type is MIL-A-52767 vertical compact 60,000 BTU
POWER REQUIRED: See paragraph J
QUANTITY: 2 per trailer w/option for one additional per trailer

L. OTHER SYSTEM/EQUIPMENT INTERFACES: This configuration used to support JUMPS/MMS, 3M, SASSY, MIMMS processing.

M. FIRST FMF DELIVERY: September 1984 (DFASC), FY1989 (MASC)

M. REFERENCES:

1. MCO 5230.16 dated 27 November 1984 subj: Advance Logistics Order for the DFASC

2. Letter of Adoption and Procurement Part 1 14-84, dated 12 April 1985

3. USMC Command and Control (C^2) Master Plan, dated 23 March 1983

O. REMARKS: Most of the above data pertains to the DFASC which is a pilot production model to MASC. MASC is programmed for acquisition in FY90/91. Current plans call for the acquisition of thirteen (13) MASCs with 12 units scheduled for the FMF and one unit scheduled for the Education Center, MCDEC, Quantico, Virginia.

MASC (Continued)

Also, a most recent LAP letter for the MASC indicates that the MASC will consist of commercial ADPE capable of processing the current and planned future automated information systems required by MAB and MAF deployed environments. The ADPE will be configured into standard Marine Corps shelters and electrical power will be provided by currently fielded MEP.

MAGTF C4 SYSTEM REFERENCE DATA SHEET - IAC

A. **SYSTEM NOMENCLATURE**: Intelligence Analysis Center (IAC); AN/TYQ-19

TAMCN:	A0845	WT:	42,982 lbs
NSN:	7010-01-150-0360	CU:	6295 ft^3

REMARKS: Wt/cu for configuration is described in paragraph D. Six systems are being built plus configuration items (no shelter) for a 7th (software support) system.

B. **SYSTEM DESCRIPTION**: The IAC segment of the Marine Air Ground Intelligence System (MAGIS) consists of personnel, equipment, software and procedures that support all-source intelligence activities for the MAGTF. The IAC provides a capability for direction and management of the collection effort and for the dissemination of intelligence. Designed for deployment with a senior MAGTF HQ (MAF, MAB). It contains four digital data links and three teletype links in addition to secure and non-secure voice phases to facilitate communication with MAGIS segments.

C. **SYSTEM/EQUIPMENT REPLACED**: N/A

D. **MAJOR SYSTEM COMPONENTS**: The AN/TYQ-19(U) consists of: 1 ADP/COMM shelter AN/TYQ-21(V) and 2 Analyst Shelters (AN/TYQ-20(V)) at MAF level expandable to 3 Analyst Shelters; Distribution Box, J-336(V)/Air Conditioner Group OA08840(V) I/T per Analyst Shelter and 1 OA-8840(V) 3/T Air Conditioner Group per ADP/COMM Shelter. Note: AN/GRM-94 not part of AN/TYQ-19(V).

IAC (Continued)

1. DESCRIPTION: ADP/COMM Shelter; AN/TYQ-2(V)

NSN: WT: 15,000 lbs
CU: 1346 ft^3

REMARKS: One (8 x 8 x 20 ISO shelter) per IAC configuration

2. DESCRIPTION: Analyst Shelter; AN/TYQ-20(V)

NSN: WT: 7,896 lbs
CU: 1346 ft^3

REMARKS: Normally 2 per IAC configuration each housed in an 8 x 8 x 20 ISO shelter

3. DESCRIPTION: Distribution Box; J-3336(V)6/T

NSN: WT: 4,900 lbs
CU: 408 ft^3

REMARKS: Palletized with M720 trailer

4. DESCRIPTION: Air Conditioner Group; OA-8840(V)1/T

NSN: WT: 3,100 lbs
CU: 816 ft^3

REMARKS: 1 per Analyst Shelter

IAC (Continued)

5. DESCRIPTION: Air Conditioner Group; OA-8840 lbs

NSN: WT: 3,400
CU: 408 ft^3

REMARKS: 1 per ADP/COMM Shelter

6. DESCRIPTION: Maintenance shelter; AN/GRM-94

NSN: WT: 4,800 lbs
CU: 624 ft^3

REMARKS: Not part of AN/TYQ-19(V)

E. **SYSTEM ACCESSORIES**: Shelters comprising AN/TYQ-19 are equipped with various equipment including some normally considered end items. See configuration item data lists for each shelter in the IAC-ILSP. Below paragraph contains details of COMSEC and computers contained in IAC shelters.

F. **RELATED EQUIPMENT**: The IAC is part of the Marine Air Ground Intelligence System (MAGIS), an integrated tactical data system. The below segments related to IAC form part of the MAGIS concept:

1. Imagery Interpretation Facility (IIF)
2. Imagery Processing (IP)
3. Tactical Electronic Reconnaissance Processing and Evaluation Segment (TERPES).

IAC (Continued)

G. EMBEDDED COMPUTER:

1. DESCRIPTION: AN/UYK-7(V) (FSCM 90536)
LANGUAGE: JOVIAL (J-3), ULTRA/32
PDSS AGENCY: NSWC DAHLGREN
QUANTITY: 1 per ADP/COMM Shelter

REMARKS: Other computer peripherals are contained in each shelter. See Configuration Item Data Table - ILSP.

2. DESCRIPTION: AN/UYK-20(V) (FSCM 90536)
LANGUAGE: ULTRA/16, CMS-2M
PDSS AGENCY: NSWC DAHLGREN
QUANTITY: 2 per ADP/COMM Shelter; 1 per Analyst Shelter

REMARKS: Other computer peripherals are contained in each shelter. See Configuration Item Data Table - ILSP.

H. COMMUNICATION SECURITY (COMSEC):

1. DESCRIPTION: TSEC/KY-68, Digital Subscriber Voice Terminal (DSVT)
QUANTITY: 1 per ADP/COMM shelter; 1 per Analyst Shelter

REMARKS: Must be requested by using unit (available late CY87).

2. DESCRIPTION: TSEC/KG-84(V-1), Dedicated Loop Encryption Device (DLED)
QUANTITY: 7 per ADP/COMM Shelter

REMARKS: Must be requested by using unit.

IAC (Continued)

I. BATTERIES: N/A

J. EXTERNAL POWER:

1. DESCRIPTION: Three plans 120/208 VAC 60/400 Hz (Commercial or military generator)
FUEL CONSUMPTION:
CONFIGURATION:

REMARKS: Power provided by using unit. Nominal load is 107 KW of 60 Hz and 10 KW of 400 Hz.

K. ENVIRONMENTAL CONTROL UNIT (ECU):

1. DESCRIPTION:
POWER REQUIRED:
QUANTITY: Two

REMARKS: Integral to IAC. See paragraphs D4 and D5 above.

L. OTHER SYSTEM/EQUIPMENT INTERFACES: The IAC is dependent upon landing force communications system for communications connectivity internal and external to the CP. IAC has communications interfaces with other MAGIS segments, ISIS, COC and external agencies served by AUTODIN/DSSCS.

M. FIRST FMF DELIVERY: FY85 and completed in FY86

REMARKS: 6 full configuration systems plus partial system for software support, 4 systems deployed to the FMF.

IAC (Continued)

N. REFERENCES:

1. Marine Air Ground Intelligence System Computer System, Digital AN/TYQ-19 (Intelligence Analysis Center) Integrated Logistic Support Plan (MAGIS-IAC ILSP) March 1980, first revision 10 July 1984

2. MCO 3884 Subj: Advanced Logistics Order for the Computer System, Digital AN/TYQ-19(V) (Intelligence Analysis Center), 2 August 1985.

3. MCO P5000.10A, Systems Acquisition Management Manual, 27 January 1981.

O. REMARKS:

1. Two Teletypwriter Sets AN/UGC-74(A)(V)(3) are contained in each ADP/COMM shelter.

MAGTF C4 SYSTEM REFERENCE DATA SHEET - DCT

A. **SYSTEM NOMENCLATURE**: Digital Communications Terminal (DCT); AN/PSC-2 (DCT)

TAMCN: A04987GP WT: 4.2 lbs
NSN: 5895-01-146-6736 CU: 100 in^3

B. **SYSTEM DESCRIPTION**: The DCT is a hand-held lightweight, microprocessor-based, programmable communications terminal unit used for composing, editing, transmitting, receiving, and displaying fixed format messages and free text messages. The terminal enables the user to transmit/receive messages in short digital bursts to and from MTACC systems over standard military radio nets or by wire. The DCT and its accessories can provide source data to a tactical data system.

C. **SYSTEM/EQUIPMENT REPLACED**: *N/A*

D. **MAJOR SYSTEM COMPONENTS**:

1. DESCRIPTION: Digital Communications Terminal (DCT), AN/PSC-2

NSN: 5895-01-146-6736 WT: 4.2 lbs (less carrying case)
CU: 100 in^3

REMARKS: DCT is a self-contained unit housed in a molded polycarbonate case with a lithium 9V battery power source. Heavy canvas field carrying case contains or carries the DCT.

DCT (Continued)

E. SYSTEM ACCESSORIES:

1. DESCRIPTION: Program Entry Device (PED) is a microprocessor-based unit designed to perform high-speed loading of digital data into a DCT.

TAMCN: A12757 GP WT: N/A
NSN: CU: N/A

REMARKS:

2. DESCRIPTION: Map Generation Unit (MGU) is an X-Y digitizer system

TAMCN: A09077GP WT: 25 lbs
NSN: CU: 1 ft^3

REMARKS:

3. DESCRIPTION: AC/DC Power Converter converts 115/220 Vac power to an 8 Vdc regulated output.

NSN: WT: 11 lbs
CU: 1,000 in^3

REMARKS:

4. DESCRIPTION: DC/DC Power Converter features a single conversion stage for reducing the 28 Vdc to an 8 Vdc regulated output.

NSN: WT 12.5 lbs
CU: 168 in^3

DCT (Continued)

REMARKS: Alternate power source to a single DCT.

5. DESCRIPTION: Audio Frequency Coupler (AFC) provides the interface capability to connect the DCT to either 2-wire or 4-wire telephone lines.

NSN: WT: 8 lbs
CU: 93 in^3

REMARKS: Provides interface to telephone lines.

6. DESCRIPTION: Interface Cables (11 various) are used to interface the DCT with various accessory or communication equipment.

NSN: Various WT: N/A
CU: N/A

REMARKS: Cables interface with various accessory/communications equipment. There are two types of cables, signal and power.

F. RELATED EQUIPMENT:

1. The DCT operates/interfaces with various tactical communication equipment. See paragraph "L" this reference sheet.

G. EMBEDDED COMPUTER:

1. DESCRIPTION: NSC-800 Microprocessor. 128K RAM Memory.
LANGUAGE: Interactive C
PDSS: MCTSSA
QUANTITY: One per DCT

DCT (Continued)

H. COMMUNICATION SECURITY (COMSEC):

1. DESCRIPTION: N/A

REMARKS: Interfaces with TSEC/KY-68, TSEC/KY-57/67, TSEC/KY-58.

I. BATTERIES:

1. DESCRIPTION: 9 VDC lithium (Mainpower)
QUANTITY: 1 per DCT

2. DESCRIPTION: 3.9 VDC lithium (keep-alive memory)
QUANTITY: 1 per DCT

J. EXTERNAL POWER:

1. DESCRIPTION: CAMP/VEHICULAR using appropriate converter

K. ENVIRONMENTAL CONTROL UNIT (ECU): N/A

L. OTHER SYSTEM/EQUIPMENT INTERFACES: Operates with tactical communication equipment and compatible with following C^2 systems:

- Marine Integrated Fire and Air Support System (MIFASS)
- Battery Computer System (BCS)
- Direct Air Support Central (DASC)
- Tactical Combat Operations System (TCO)

DCT (Continued)

- Modular Universal Laser Equipment (MULE)
- Standard USMC printers, and switch equipment

The DCT will interface with the following equipment:

- Radio Sets

  AN/GRC-193
  AN/PRC-75A
  AN/PRC-77
  AN/GRC-125
  AN/GRC-160
  AN/PRC-104
  AN/PRC-105
  AN/VRC-12
  AN/GRC-171
  AN/PRC-68 (without KYV-2)

- Switching and Control Equipment

  AN/GRA-39
  SB-3614
  TA-312/PT

- COMSEC Equipment

  ANDVT
  TSEC/KY-57
  TSEC/KY-58
  TSEC/KY-67
  TSEC/KY-68 (narrowband FSK only)

- Printer and Facsimile Equipment

  AN/UGC-74 Teletype
  MIFASS Type 1 Printer

- Field Wire and Switchboard Interface

  The DCT with an AFC will interface with field wire connections and switchboards of the actual communications network.

DCT (Continued)

M. FIRST FMF DELIVERY: FY86

N. REFERENCES:

1. USMC Command and Control Master Plan, 23 March 1983

2. Integrated Logistics Support Plan for DCT Rev B, August 1984

3. Letter of Adoption and Procurement, 39-77, Rev 5, 26 April 1985

4. Computer Resource Life Cycle Management Plan (CRLCMP) for the AN/PSC-2 (Digital Communications Terminal), 1 February 1984

5. MCDEC Tactical Data System/Equipment, Support Management Plan, Volume II, 1 April 1984.

O. REMARKS:

USAF procure 400 DCTs under low rate of initial production (LRIP)

MAGTF C4 SYSTEM REFERENCE DATA SHEET - PLRS

A. SYSTEM NOMENCLATURE: Position Location Reporting System (PLRS) AN/TSQ-129

TAMCN: A12297 GP WT: See Para D
NSN: CU: See Para D

B. SYSTEM DESCRIPTION: The PLRS consists of two elements: a Master Station (MS) and a User Unit (UU). The MS is a shelterized, multiprocessor system which performs centralized network management functions, automatic processing of position, navigation, and identification information for each user, exchange of limited digital data communications, data logging, real-time display of users within the system's operational area of coverage, and provision of PLRS-derived information to supported command and control centers. The second element consists of User Units (UUs). Each UU is individually identifiable to the MS and performs reception, transmission, range measurement, and various signal and message processing functions necessary for position location and communications operations within the system.

C. SYSTEM/EQUIPMENT REPLACED: N/A

D. MAJOR SYSTEM COMPONENTS:

1. DESCRIPTION: AN/MSQ-119 Master Station (2), a Primary and an Alternate

TAMCN: A1224 7 GP WT: 5800 lbs
NSN: CU: 873 ft^3

PLRS (Continued)

2. DESCRIPTION: User Unit Radio Sets

a. Aviation Category

(1)	AN/ASQ-177(V)1	(Fixed Wing)
(2)	AN/ASQ-177(V)2	(Rotary Wing)

b. Ground Category

AN/PSQ-4	(Manpack Unit)
AN/VSQ-1	WT: 23 ;bs
AN/GRC-210	CU 342 in^3
	(Surface Vehicle Unit)

REMARKS: UUs provide all the functional capabilities necessary for an operator to communicate with the MS.

3. DESCRIPTION: Modification Kits

REMARKS: Unique to specific aircraft and surface vehicles.

4. DESCRIPTION: User Data Input/Output Devices (I/O)

REMARKS: Allows operator to request and receive data from the MS and to input data to the MS.

5. DESCRIPTION: Electronic Shop, Shelter Mounted, AN/MSQ-108

REMARKS: Dedicated to each Master/Alternative Master Station.

E. SYSTEM ACCESSORIES:

1. Truck, cargo 5 ton M813lA1 TAMCN D1035 (Dedicated)

PLRS (Continued)

F. RELATED EQUIPMENT: The PLRS User Unit will, in addition to manpack operation, be installed on various types of ground vehicles and aircraft (fixed wing and rotary).

G. EMBEDDED COMPUTER:

1. AN/UYK-7 Computer Set
   LANGUAGE: ULTRA-32
   PDSS AGENCY: MCTSSA
   QUANTITY: 1 per MS

2. AN/UYK-20A Computer Set
   LANGUAGE: CMS-2Y and ULTRA-16
   PDSS AGENCY: MCTSSA
   QUANTITY: 2 per MS

H. COMMUNICATION SECURITY (COMSEC):

1. TSEC/KY-58 (VINSON) Speech Encryption Equipment
   QUANTITY: 1 per Master Station

   REMARKS: Wideband (16 Kbs) digital voice/data encryption/decryption device that uses CVSD for voice processing. See Appendix E, Communications Security (COMSEC) Equipment Description.

2. TSEC/KGV-6 Secure Data Unit
   QUANTITY: 1 per BUU

   REMARKS: Failure of this unit requires evacuation of BUU to COMM/Elect Maintenance Company, FSSG for replacement of the module.

PLRS (Continued)

I. BATTERIES:

1. DESCRIPTION: BA 5590 (Lithium)

2. QUANTITY: Two per Manpack User Unit

J. EXTERNAL POWER:

1. DESCRIPTION: Generator MEP-005, 30KW/60 Hz TAMCN B0953
CONFIGURATION: Trailer

REMARKS: Using unit must provide power.

K. ENVIRONMENTAL CONTROL UNIT (ECU):

1. DESCRIPTION: Air Conditioner/Heater 60 Hz MC18HA6-208 TAMCN B0002

L. OTHER SYSTEM/EQUIPMENT INTERFACES: MIFASS, TCO

M. FIRST FMF DELIVERY: FY87

N. REFERENCES:

1. Integrated Logistics Support Plan (ILSP) for the Position Location Reporting System (PLRS), 16 April 1985

2. Letter of Adoption and Procurement, 12-75, Revision 5, for the Position Location Reporting System, 13 June 1983

3. MCDEC Tactical Data System/Equipment, Support Management Plan, Volume II, 1 April 1984

PLRS (Continued)

4. Computer Resources Life Cycle Management Plan (CRLCMP) for the Position Location Reporting System (PLRS), Revision 3, 12 July 1985

0. REMARKS: N/A

MAGTF C4 SYSTEM REFERENCE DATA SHEET - BCS

A. **SYSTEM NOMENCLATURE:** Battery Computer System (BCS), AN/GYK-29

TAMCN: E 0040 WT: 125 lbs
NSN: 7025-01-134-2331 CU: 68 ft^3

REMARKS: Weight and cube depicted represent Gun Direction Computer and Power Distribution Unit only.

B. **SYSTEM DESCRIPTION:** The BCS is a computer-based system which provides for technical information recording, processing, computation, manual entry, display, control, and digital transmission of tactical and/or technical firing data from the Fire Detection Center (FDC) to individual weapons.

C. **SYSTEM/EQUIPMENT REPLACED:** FADAC M-18 system

TAMCN: E 0250 WT: 511 lbs
CU: 26 ft^3

D. **MAJOR SYSTEM COMPONENTS:**

1. DESCRIPTION: Computer Group, Gun Direction (1 ea.), OL-2000/GYC-29

NSN: 7025-01-134-2329 WT: 125 lbs
CU: 10 ft^3

2. DESCRIPTION: Gun Display Unit; OD-144(V)1/GYK-29

NSN: 7025-01-134-2329 WT: 33.8 lbs
CU: 1 ft^3

BCS (Continued)

REMARKS: Three GDU variations, each with different TAMCN (for M109A#, M110A2, towed howitzer); 1 to 12 GDUs in a firing battery.

E. SYSTEM ACCESSORIES:

1. DESCRIPTION: Interconnecting kit (1 ea.); MK-1829/GYK-29

NSN: 7035-01-134-3762

WT: N/A
CU: N/A

F. RELATED EQUIPMENT:

1. DESCRIPTION: Communications Terminal; AN/UGC-74(A)(U)

NSN: 5815-01-0652-8194

WT: 88 lbs
CU: 1.8 ft^3

REMARKS: 134 AN/UGC-74(A)(V) being added to various T/Es 3rd Qtr FY87

2. DESCRIPTION: Radio; AN/VRC-49

NSN: 5820-00-223-7437

WT: 86 lbs
CU: 1.7 ft^3

REMARKS: 132 AN/MRC-110s being deleted from various T/Es; 136 AN/VRC-49s being added to various T/Es 3rd Qtr FY87. AN/MRC-110 radio is 2600 lbs and 328 ft^3.

3. DESCRIPTION: Radio; AN/PRC-68

BCS (Continued)

NSN: 5820-01-019-9260

WT: 3 lbs
CU: 36 in^3

REMARKS: Secure voice FM radio; intra battery (FDC/guns)

G. EMBEDDED COMPUTER:

1. DESCRIPTION: AN/GYK-29 18 bit CPU/256
LANGUAGE: Symbolic Interpreter Routine
PDSS AGENCY: U.S. Army CECOM FATDS - FT. Sill OK. (CDSSF)
QUANTITY: 1 per Battery Computer Group

H. COMMUNICATION SECURITY (COMSEC):

1. DESCRIPTION: TSEC/KY-57 (VINSON) Speech Encryption Equipment

WT: 5 lbs
CU: 93.3 in^3

QUANTITY: 1 per vehicular mounted radio

REMARKS: Voice digital communications security device used in a vehicular configuration using Power Adapter HYP-57/TSEC plus installation kit. KYP-57 uses BA-1372 for memory storage.

I. BATTERIES:

1. DESCRIPTION: BA-5590/U (Lithium organic)

NSN: 6135-01-035-3495
QUANTITY: Two per Gun Display Unit

REMARKS: When GDU external power drops below 12 Vdc, BA-5590/U supplies power.

2. DESCRIPTION: BB-590 (Nickel Cadmium)

NSN: 6140-01-063-3918
QUANTITY: 2 per Power Distribution Unit (Computer Group)

REMARKS: Rechargeable, used to retain computer memory in event of power failure.

J. EXTERNAL POWER:

1. DESCRIPTION: Generator Set, MEP-016A (3KW, 60 Hz)

REMARKS: BCS can operate from HMMWV or with above generator kit as alternate source of power provided by using units. MEP is primary power source.

K. ENVIRONMENTAL CONTROL UNIT (ECU): N/A

L. OTHER SYSTEM/EQUIPMENT INTERFACES:

- Digital Communication Terminal (DCT)
- TACFIRE
- MIFASS
- AN/TPO-36 Radar
- MULE
- AN/TMQ-31 Meteorological Data System
- M-90 Chronogram

BCS (Continued)

M. FIRST FMF DELIVERY: FY87

N. REFERENCES:

1. Letter of Adoption and Procurement, 27-84 dated 25 July 1984

2. BCS Integrated Logistics Support Plan (ILSP) dated 15 January 1985

3. USMC Command and Control (C^2) Master Plan, 23 March 1983

O. REMARKS: The Battery Computer Unit will be installed on the HIgh Mobility Multipurpose Wheeled Vehicle (HMMWV) for vehicular application. Radio Set AN/VRC-49 will be installed on the HMMWV to replace the AN/MRC-110.

MAGTF C4 SYSTEM REFERENCE DATA SHEET - TAOM

A. **SYSTEM NOMENCLATURE**: Tactical Air Operations Module (TAOM), AN/TYQ-23(V)1

TAMCN: A25257 WT: 17,500 lbs
NSN: Not Assigned CU: 1,280 ft^3

REMARKS: The above weight and cube figures reflect only the shelter and internally mounted equipment mounted in an Internal Organization for Standardization (ISO) standard 8'x 8'x 20' shelter.

B. **SYSTEM DESCRIPTION**: The TAOM is a real-time C^2 system which, in conjunction with sensors, executes the MAGTF anti-air warfare plan, provides positive air control services, and performs specified airspace management tasks. The TAOM can operate independently or in conjunction with additional TAOMs.

C. **SYSTEM/EQUIPMENT REPLACED**: AN/TYQ-2 and its associated AN/TYQ-3A and Communications Security Group OW-75/UYQ

AN/TYQ-2	TAMCN:	A2530	WT:	61,586 lbs	CU:	9,224 ft^3
AN/TYQ-3A	TAMCN:	A2540	WT:	30,604 lbs	CU:	3,264.2 ft^3

REMARKS: N/A

D. **MAJOR SYSTEM COMPONENTS**:

1. DESCRIPTION: Digital Communications Equipment (DCE)

REMARKS: Consist of a modem, controller, and COMSEC equipment necessary for data communications between the TAOM and other agencies.

TAOM (Continued)

2. DESCRIPTION: Voice Communications Equipment (VCE)

REMARKS: Consists of control-monitors, radio/signal patch panels, remote control units and COMSEC equipments for access to both internal and external TAOM voice communications.

3. DESCRIPTION: Radar Interface Equipment (RIE)

REMARKS: Interface between the Computer Unit and up to five radar/IFF sets.

4. DESCRIPTION: Data Processing Equipment (DPE)

REMARKS: Consists of two computer units, mass memory unit and loaders, and digital data bases with which to process and store digital data and provide a digital data communications network for the TAOM.

5. DESCRIPTION: Internal Radio Equipment (IRE)

REMARKS: Consists of two HF, three VHF, four UHF radios, antennas, and antenna couplers.

6. DESCRIPTION: Operator Interface Equipment

REMARKS: Provides operator control of the TAOM equipment and consists of graphic displays, system access controls, and communications circuits.

E. SYSTEM ACCESSORIES: N/A

TAOM (Continued)

F. RELATED EQUIPMENT: N/A

G. EMBEDDED COMPUTER:

1. DESCRIPTION: AN/AYK-14 Digital Data Computer Set
LANGUAGE: CMS-2M
PDSS AGENCY: MCTSSA
QUANTITY: 2 (per module)

REMARKS: The AN/AYK-14 is the principle memory, arithmetic, logic and control element of the TAOM. 256 K local memory. When operating as a single TAOM, loss of one of the two AN/AYK-14s will not affect operations.

H. COMMUNICATION SECURITY (COMSEC):

1. TSEC/KG-40, Key Generator
QUANTITY: 1 per TAOM

REMARKS: KG-40 is used in the NTDS/ATDS for encryption of data on the TADIL-A link.

2. TSEC/KY-58, Encryption Equipment (VINSON)
QUANTITY: 14 per TAOM

REMARKS: Wideband (16 Kbs) digital voice/data encryption/decryption device

3. TSEC/KY-68, Digital Subscriber Voice Terminal (DSVT)
QUANTITY: 1 per TAOM

TAOM (Continued)

REMARKS: Provides secure voice communications.

4. TSEC/KY-75, Tactical Speech Encryption Equipment (Parkhill)
QUANTITY: 4 per each TAOM

REMARKS: Narrowband analog voice security device for use with existing analog HF radios and wireline circuits.

5. TSEC/KG-84, Dedicated Loop Encryption Device (DLED)
QUANTITY: 13 per each TAOM

REMARKS: Provides full-duplex encryption/decryption of teletypewriter and data traffic on netted and point-to-point circuits. Can handle up to 64 Kbs of synchronous digital data or up to 9.6 Kbs of teletypewriter data.

I. BATTERIES: N/A

J. EXTERNAL POWER:

1. 120/208 VAC ± 12%, 50/60 Hz, 3-phase, 4-wire wye, 27 KW per shelter (includes power requirement for 2 shelter mounted ECUs but not the ground-mounted secondary ECU nor a 20% reserve for growth potential.

REMARKS: Power requirements may exceed capacity of a 30 KW generator. A 60 KW generator connected to 2 TAOMs with a 60 KW generator as backup is being considered as an alternative.

K. ENVIRONMENTAL CONTROL UNIT (ECU):

1. USMC standard MAC 6V90 60 Hz 18,000 BTU (shelter mtd)

NSN: 4120-00-345-0227
TAMCN: B0003 - VII-B
POWER REQUIRED: 120/208 VAC, 60 Hz, 3-phase, 4-wire
QUANTITY: Two units per TAOM

REMARKS: Auxillary ECU (USMC standard) ground-mounted 60 Hz, 36,000 BTU unit, utilized when required

L. OTHER SYSTEM/EQUIPMENT INTERFACES:

External

NATO Air Defense Ground Environment (NADGE)
Naval Tactical Data System/Airborne Tactical Data System (NTDS/ATDS)
Army Air Defense Command Post (AADCP)
Air Force Command Reporting Center/Control and Reporting Post (AF CRC/CRP)
Airborne Warning and Control System (AWACS)

Internal

Tactical Air Command Center (TACC)
Marine Air Traffic Control and Landing System (MATCALS)
Aircraft
Marine Integrated Fire and Air Support System (MIFASS)
Fire and Air Support Center (FASC)
Ground-to-Air Missile Firing Units
Other TAOMs
Tactical Combat Operations (TCO) System
Position Location Reporting System (PLRS)
Marine Air-Ground Intelligence System (MAGIS)

TAOM (Continued)

Unit Level Circuit Switch (ULCS)
Unit Level Message Switch (ULMS)

M. FIRST FMF DELIVERY: FY90

N. REFERENCES:

1. TM 2000-15/2 Principal Technical Characteristic of US Marine Corps Communication-Electronics Equipment, 30 June 1983

2. Draft Joint Integrated Logistics Support Plan (ILSP) for the Tactical Air Operations Module, (TAOM) AN/TYQ-23(V)1, Undated

3. USMC Command and Control (C^2) Master Plan, 23 March 1983

O. REMARKS: N/A

MAGTF C4 SYSTEM REFERENCE DATA SHEET - ULMS

A. **SYSTEM NOMENCLATURE**: Switching Set, Message, Automatic; AN/GYC-7(V)

TAMCN: A2506 WT: 284 lbs
NSN: 5805-01-190-8667 CU: 11.5 ft^3

B. **SYSTEM DESCRIPTION**: The AN/GYC-7(V), Unit Level Message Switch (ULMS), is a 12-line message switch capable of near real-time service for data traffic. The AN/GYC-7 is configured into two-man transportable modules. Capable of forming independent networks alone or in conjunction with other TRI-TAC equipment. Shares hardware commonality with SB-3865 modules.

C. **SYSTEM/EQUIPMENT REPLACED**: N/A

D. **MAJOR SYSTEM COMPONENTS**:

1. DESCRIPTION: Switch Module

NSN: WT: 97 lbs
CU: 4.9 ft^3

2. DESCRIPTION: Power Module

NSN: WT: 99 lbs
CU: 3.8 ft^3

3. DESCRIPTION: Communications Security Module, HGF-77/TSEC

NSN: WT: 88 lbs
CU: 2.8 ft^3

ULMS (Continued)

4. DESCRIPTION: Fault Assistance Module: No dimensions available at this time

NSN: WT: N/A
CU: N/A

E. SYSTEM ACCESSORIES: N/A

F. RELATED EQUIPMENT: The AN/UGC-74 Teletype Terminal is used as a remote operator device for certain control functions of the AN/GYC-7.

G. EMBEDDED COMPUTER:

1. DESCRIPTION: Z80A Microprocessor
LANGUAGE: Interactive Systems "C" and Assembly
PDSS AGENCY: MCTSSA (Fort Monmouth, N.J. if program becomes joint service)
QUANTITY: One

H. COMMUNICATION SECURITY (COMSEC):

1. DESCRIPTION: Tactical COMSEC Unit HGF-77
QUANTITY: 1

REMARKS: Accommodates one HGX-82/TSEC Common Unit and eight (8) Loop Key Generators, TSEC/KG-82, which provide encryption/ decryption of signaling and digital traffic between the message switch and the T/SEC/KY-68s, the TSEC/KG-84/KG-84s, and other TSEC/KG-82s.

ULMS (Continued)

I. BATTERIES:

1. DESCRIPTION: BB-646 (Silver-zinc) Monoblock
   QUANTITY: 5 (39 lbs total)

   REMARKS: Provides emergency power

J. EXTERNAL POWER:

1. DESCRIPTION: 50/60 Hz, single phase 120/240 VAC or 28 Vdc

K. ENVIRONMENTAL CONTROL UNIT (ECU): N/A

L. OTHER SYSTEM/EQUIPMENT INTERFACES:

1. Tactical Air Operations Module (TAOM)
2. Position Location Reporting System (PLRS)
3. Marine Integrated Fire and Air Support System (MIFASS)
4. Tactical Combat Operations System (TCO)
5. AN/UGC-74 (Teletype Terminal)

M. FIRST FMF DELIVERY: FY92/FY93

N. REFERENCES:

1. Integrated Logistics Support Plan (ILSP) for the Unit Level Message Switch, August 1985

2. Letter of Adoption and Procurement, 15-75, Revision 3, for the Unit Level Message Switch (ULMS), 29 April 1985

ULMS (Continued)

3. MCDEC Tactical Data System/Equipment, Support Management Plan, Volume II, 1 April 1984

O. REMARKS: The AN/GYC-7(V) with COMSEC will be configured into three two-man transportable packages. It will be utilized at regimental and higher levels in the FMF.

MAGTF C4 SYSTEM REFERENCE DATA SHEET - ULCS: AN/TTC-2

A. **SYSTEM NOMENCLATURE**: Central Office Telephone Automatic, AN/TTC-2, Unit Level Circuit Switch (ULCS)

TAMCN: A0248 VII GP WT: 5,500 lbs
NSN: 5805-01-188-3993 CU: 805 ft^3

REMARKS: Size and weight depict the AN/TCC-42, less vehicle.

B. **SYSTEM DESCRIPTION**: The AN/TCC-42 is a 150 line, shelterized (in S-280), telephone central office providing automatic switching service and subscriber service functions to the TRI-TAC family of four-wire, digital secure and non-secure voice-terminal telephone instruments. It is interoperable with the SB-3865 and AN/TTC-38 telephone switching units.

C. **SYSTEM/EQUIPMENT REPLACED**: AN/TTC-38, switching unit

TAMCN: A0246 WT: 5,400 lbs
CU: 723 ft^3

REMARKS: N/A

D. **MAJOR SYSTEM COMPONENTS**:

1. DESCRIPTION: Termination Subsystem

REMARKS: Contains functions associated with interfacing with the external transmission plant and providing connectivity to remote switches and subscriber terminals. This subsystem provides the capability to patch and monitor both analog and digital channels, patch COMSEC equipment, and terminal digital and analog orderwires.

ULCS (Continued)

2. DESCRIPTION: Attendant Subsystem

REMARKS: Contains functions and facilities associated with the man-machine interface. There are capabilities for a call service attendant (switch operator/telephone operator) to provide call service assistance.

3. DESCRIPTION: Conference Subsystem

REMARKS: Comprised of functions and facilities for simultaneous conversation among the subscribers to which it is connected. The conference subsystem provides service that is limited to a total of five conferences.

4. DESCRIPTION: Memory Subsystem

REMARKS: Stores information for use by other subsystems.

5. DESCRIPTION: Matrix Subsystem

REMARKS: Consists of facilities and functions necessary to accomplish switching actions.

6. DESCRIPTION: COMSEC Subsystem

REMARKS: Consists of COMSEC Module (two groups) and elements of the switching unit subsystem with associated COMSEC functions.

ULCS (Continued)

7. DESCRIPTION: Control Subsystem

   REMARKS: Detects and interprets requirements for switching action and assembles the switching resources needed to satisfy the requirement.

8. DESCRIPTION: Timing Subsystem

   REMARKS: Contains functions for generation, re-timing, division, and distribution of the local station signal.

9. DESCRIPTION: Power Subsystem

   REMARKS: Consists of functions necessary to produce, convert, monitor, alarm, switch power, and distribute power to other subsystems.

E. SYSTEM ACCESSORIES: N/A

F. RELATED EQUIPMENT: TA-954 Digital Non-Secure Voice Terminal (DNVT)

G. EMBEDDED COMPUTER:

1. DESCRIPTION: 80 80A Microcomputer
   LANGUAGE: Interactive "C"
   PDSS AGENCY: Fort Monmouth, N.J.
   QUANTITY: 1

H. COMMUNICATION SECURITY (COMSEC):

1. DESCRIPTION: COMSEC Module
QUANTITY: 1

REMARKS: Integral COMSEC units are built into the AN/TTC-42 COMSEC module.

a. TSEC/KG-82, Loop Key Generator (LKG)
QUANTITY: 16

REMARKS: Provides full-duplex encryption/decryption of signaling and digital traffic.

b. TSEC/KG-94, Trunk Encryption Device (TED)
QUANTITY: 12

REMARKS: Full-duplex, provides bulk encryption/decryption of trunk-line or multichannel data links.

I. BATTERIES:

1. DESCRIPTION: TBD
QUANTITY: TBD

REMARKS: Internal lead-acid batteries are supplied for emergency 24 Vdc power. The special type of lead-acid battery to be used has not been determined to date.

ULCS (Continued)

J. EXTERNAL POWER:

1. DESCRIPTION: 120/240 VAC, 60 Hz (17 KW) or 24 VDC at 1,600 watts (without ECUs)

   REMARKS: Field power to be supplied by MEP 006 60 KW, 60 Hz or MEP 007 100 KW, 60 Hz generators.

K. ENVIRONMENTAL CONTROL UNIT (ECU):

1. DESCRIPTION: KECO Model F18H-3
   POWER REQUIRED: 115 V., 60 Hz (7.17 KW)
   QUANTITY: 2 per AN/TTC-2
   TAMCN: B002
   BTU Required: 18,000
   Skid Mounted: No

   REMARKS: N/A

L. OTHER SYSTEM/EQUIPMENT INTERFACES: Designed to be interoperable with the switchboard, telephone, automatic SB-3865 and other inventory digital and analog switching equipment, such as the AN/TTC-30, AN/TTC-38, AN/TTC-39, and SB-3614 switching systems.

M. FIRST FMF DELIVERY: FY90

N. REFERENCES:

1. Letter of Adoption and Procurement (LAP) Parts I and II, 28-75, Revision 2, for the Central Office, Telephone, Automatic, AN/TCC-42(V), 24 June 1983.

ULCS (Continued)

2. Integrated Logistics Support Plan (ILSP) for the Unit Level Circuit Switches, Revised August 1984.

3. Draft Advance Logistics Order for the Central Office Telephone, Automatic, AN/TCC-42(V).

4. Transition Plan for the Unit Level Circuit Switches, HQMC, CODE LMC-ULS, 1 October 1985.

5. Maintenance Plan for the Unit Level Circuit Switches, HQMC, CODE LMC-ULS, 15 October 1985.

6. Fielding Plan for the Unit Level Circuit Switches, HQMC, CODE LMC-ULS, February 1986.

7. Joint Logistics Support Plan for Unit Level Circuit Switches, July 1984.

8. Qualitative and Quantitative Personnel Requirements Information (QQPRI) for the Level Circuit Switch, February 1986.

0. REMARKS: N/A

MAGTF C4 SYSTEM REFERENCE DATA SHEET ULCS: SB-3865

A. **SYSTEM NOMENCLATURE**: Switching Unit, Telephone, Automatic, SB-3865 ( ) (P)/TCC

TAMCN: A2508 VII CP — WT: 180 lbs
NSN: 5805-01-197-9399 — CU: 8.7 ft^3

B. **SYSTEM DESCRIPTION**: A team transportable telephone switchboard which provides automatic digital switching service to a variety of digital and analog loops and trunks. It provides switching for 30 lines and can be stacked to provide 60 or 90 lines capacity. Part of the Unit Level Circuit Switch (ULCS) program.

C. **SYSTEM/EQUIPMENT REPLACED**:

1. SB-3082(V)2/GT Switchboard

TAMCN: A2500 — WT: 280 lbs
CU: 3.8 ft^3

2. SB-3614( )/TT Switchboard

TAMCN: A2505 — WT: 49 lbs
CU: 4.9 ft^3

D. **MAJOR SYSTEM COMPONENTS**:

1. DESCRIPTION: Power Module

NSN: — WT: 99 lbs
CU: 3.8 ft^3

SB-3865 (Continued)

2. DESCRIPTION: Switch Module

NSN: WT: 97 lbs
CU: 4.9 ft^3

3. DESCRIPTION: Fault Assistance Module - Dimensions not available at this time.

E. SYSTEM ACCESSORIES: N/A

F. RELATED EQUIPMENT:

1. TA-954, Digital Non-Secure Voice Terminal (DNVT)
2. TD-1234 Remote Multiplexer Combiner (RMC)
3. TSEC/KY-68, Digital Subscriber Voice Terminal (DSVT)

G. EMBEDDED COMPUTER:

1. DESCRIPTION: 8080A Microcompressor
LANGUAGE: Interactive "C"
PDSS AGENCY: Fort Monmouth, N.J
QUANTITY: 1

H. COMMUNICATION SECURITY (COMSEC):

1. DESCRIPTION: TSEC/KG-93, Tactical Trunk Encryption Device (TAC-TED)
QUANTITY: 1

REMARKS: The SB-3865 has no integral COMSEC elements. Associated with the SB-3865 is a TAC-TED or KG-93 which enables bulk encryption of one multiplex group.

SB-3865 (Continued)

I. BATTERIES:

1. DESCRIPTION: BB-646 (Silver-zinc) 24 VDC
QUANTITY: 5 (39 lbs total) per power module

REMARKS: N/A

J. EXTERNAL POWER:

1. DESCRIPTION: 120/240 VAC 50/60 Hz single phase

K. ENVIRONMENTAL CONTROL UNIT (ECU): N/A

L. OTHER SYSTEM/EQUIPMENT INTERFACES: The SB-3865 is designed to operate with other inventory digital and analog communication system/equipment and other switching equipment identified in reference 2 below.

M. FIRST FMF DELIVERY: FY90

N. REFERENCES:

1. Letter of Adoption and Procurement (LAP) Parts I and II; LAP 27-75, Rev 3, SB-3865.

2. Draft Advance Logistics Order, Switching Unit, Telephone, Automatic, SB-3865.

3. Integrated Logistics Support Plan (ILSP) for the Unit Level Circuit Switches, Revised August 1984.

SB-3865 (Continued)

4. Transition Plan for the Unit Level Circuit Switches, HQMC, CODE LMC-ULS, February 1986.

5. Fielding Plan for the Unit Level Circuit Switches HQMC, CODE LMC-ULC, February 1986.

6. Qualitative and Quantitative Personnel Requirements Information (QQPRI) for the Unit Level Circuit Switch, February 1986.

0. REMARKS: N/A

MAGTF C4 SYSTEM REFERENCE DATA SHEET - ISIS

A. **SYSTEM NOMENCLATURE**: Integrated Signals Intelligence System (ISIS)

TAMCN: A2631 WT: Not available
NSN: Not assigned CU: Not available

REMARKS: TAMCN number has not been assigned due to possible changes to the components of the ISIS program and possible deletion of the system.

B. **SYSTEM DESCRIPTION**: ISIS is a semiautomatic tactical SIGINT collection, analysis and reporting system which will provide MAGTF commanders with timely accurate SIGINT and EW support in the form of combat information and intelligence. Composed of the Communications Collection Outstation (CCO) which conducts communications collection and direction finding and the Stand-Alone-Analyst Subsystem (SAAS) which conducts signals-intelligence analysis.

C. **SYSTEM EQUIPMENT REPLACED**:

Light Intercept Facility AN/TSQ-103A
TAMCN: A0865

Heavy Intercept Facility An/TSQ-54B
TAMCN: A0860

REMARKS: N/A

D. **MAJOR SYSTEM COMPONENTS**:

1. DESCRIPTION: Stand-Alone-Analyst Shelter (SAAS). Specific equipment has not been selected nor has a product baseline been redefined.

ISIS (Continued)

REMARKS: Due for distribution to the FMF in FY95.

2. DESCRIPTION: AN/TSQ-130(V), Technical Control and Analysis Center (TCAC)

TAMCN: Not assigned

WT: 8,600 lbs
CU: 6.53.1 ft^3

REMARKS: Provides command and control of collection and EW jamming resources. The TCAC will be an interim replacement for the SAAS.

a. Subassemblies:

(1) Analyst Work Stations
(2) Black Communications Rack
(3) Red Communications Rack

3. DESCRIPTIVE NAME: To be determined

TAMCN: A0287GP

E. SYSTEM ACCESSORIES:

1. CCO: Radio Set, AN/MRC-110

F. RELATED EQUIPMENT: N/A

G. EMBEDDED COMPUTER:

1. DESCRIPTION: PDP-11/70 Military Computer
LANGUAGE: FORTRAN

ISIS (Continued)

PDSS AGENCY: MCTSSA
QUANTITY: 6
REMARKS: One installed in each TCAC.

2. DESCRIPTION: LSI-11M Military Microcomputer
LANGUAGE: FORTRAN
PDSS AGENCY: MCTSSA
QUANTITY: 3
REMARKS: Installed in TCAC.

H. COMMUNICATION SECURITY (COMSEC):

1. KW-7, Electronic Tactical Teletypewriter Security Equipment
QUANTITY: 2 per TCAC

2. KG-84, Dedicated Loop Encryption Device (DLED)
QUANTITY: 1 per TCAC

Equipment description of the above COMSEC equipment can be found in Appendix E, Communications Security (COMSEC) Equipment Description.

I. BATTERIES: N/A

J. EXTERNAL POWER:

1. 30 KW of Mobile Electric Power Generation

REMARKS: Required for TCAC

ISIS (Continued)

K. ENVIRONMENTAL CONTROL UNIT (ECU):

1. None required for SAAS.
2. To be determined for CCO.
3. One unit required for TCAC.

L. OTHER SYSTEM/EQUIPMENT INTERFACES:

1. AN/MSC-63A Special Security Communications Central (SSCC)
2. AN/TYC-19 Intelligence Analysis Center (IAC)

M. FIRST FMF DELIVERY: The following is a delivery schedule for the ISIS components:

1. CCO-FY92
2. SASS-FY96
3. TCAC-FY88

N. REFERENCES:

1. Integrated Logistics Support Plan (ILSP) for the Integrated Signals-Intelligence System (ISIS), February 1984.

2. Marine Corps Command and Control (C^2) Master Plan, 23 March 1983.

3. MCDEC Tactical Data System/Equipment Support Management Plan, Volume II, 1 April 1984.

O. REMARKS: N/A

MAGTF C4 SYSTEM REFERENCE DATA SHEET - MIFASS

A. **SYSTEM NOMENCLATURE**: Marine Integrated Fire and Air Support System (MIFASS)

TAMCN: A0915 WT: 8,014 lbs
NSN: Not assigned CU: 1,280 ft^3

REMARKS: Weight and cube identified represents an 8'x 8'x 10' ISO shelter configuration. Equipment is capable of rapid dismounting for utilization within bunkers or tentage.

B. **SYSTEM DESCRIPTION**: MIFASS is a real-time display/information processing system designed to provide selective automation of command and control functions required for integrated employment of supporting arms assets available to the MAGTF Commander. In operation by the staff organization, MIFASS receives data from position location systems, digital message devices, or radio; generates dynamic situation displays and/or paper copies; computes appropriate fire direction/control data; stores data; and interacts with both lower and upper echelons to coordinate/ control all fire and air support for the MAGTF.

C. **SYSTEM/EQUIPMENT REPLACED**: AN/TSQ-122, Operations Central

TAMCN: A1111

REMARKS: N/A

MIFASS (Continued)

D. MAJOR SYSTEM COMPONENTS:

1. DESCRIPTION: Dynamic Situation Display (DSD)

WT: 126 lbs
CU: 2.75 ft^3

REMARKS: Primary interface between an operator and the system.

2. DESCRIPTION: Communications Control Panel (CCP)

WT: 29 lbs
CU: 1.0 ft^3

REMARKS: The CCP is the MIFASS operator's intercom and interface with the Landing Force Integrated Communications System (LFICS).

3. DESCRIPTION: MASS Memory (MM)

WT: 42 lbs
CU: .66 ft^3

REMARKS: Provides computer program storage, computation parameters, and intermediate records for use in computations.

4. DESCRIPTION: Digital Communications Equipment (DCE)

WT: 58 lbs
CU: 1.3 ft^3

MIFASS (Continued)

REMARKS: Provides the interface between MIFASS and a variety of tactical communications equipment.

5. DESCRIPTION: Battery Box (BB)

WT: 10 lbs
CU: .62 ft^3

REMARKS: Provides backup or emergency power for MIFASS.

6. DESCRIPTION: Fire Direction/Survey Calculator (FD/SC)

WT: 10 lbs
CU: .5 ft^3

REMARKS: Provides a means of entering data, performing technical fire direction and survey calculations, and data display. No longer considered a part of MIFASS.

7. DESCRIPTION: Microcomputer (MC)

WT: 54.5 lbs
CU: .91 ft^3

REMARKS: Provides fully computational resources to support MIFASS.

8. DESCRIPTION: Mass Storage Device (MSD)

WT: 28.5 lbs
CU: .62 ft^3

REMARKS: Provides digital storage required for the program loading sequence, mission history files, simulation scenarios, and other system bulk data.

9. DESCRIPTION: Type 1 Printer

WT: 17 lbs
CU: .4 ft^3

REMARKS: Provides system operators with printed copies of any selected incoming or outgoing messages.

10. DESCRIPTION: Type 2 Printer

WT: 42.6 lbs
CU: .9 ft^3

REMARKS: Provides system operators with single printed copies of any incoming or outgoing messages.

11. DESCRIPTION: Power Module

WT: 52 lbs
CU: 1.05 ft^3

REMARKS: Provides DC power for data and communications processing elements.

MIFASS (Continued)

E. SYSTEM ACCESSORIES:

1. Two shelter units 8 x 8 x10 shelter employed at regimental FSCC and FDC.

WT: 8,014 lbs
CU: 1,280 ft^3

REMARKS: Battalion Fire and Air Support Centers and Fire Direction Centers will not employ shelters.

F. RELATED EQUIPMENT:

Standard USMC 5-ton truck and trailer

REMARKS: N/A

G. EMBEDDED COMPUTER:

1. DESCRIPTION: AN/AYK-14
LANGUAGE: CMS-2M
PDSS AGENCY: MCTSSA
QUANTITY: 1

H. COMMUNICATION SECURITY (COMSEC):

1. DESCRIPTION: TSEC/KG-82 Loop Key Generator (LKG)
QUANTITY: TBD

REMARKS: Provides full-duplex encryption/decryption of signaling and digital traffic.

MIFASS (Continued)

2. DESCRIPTION: TSEC/KY-65, Parkhill Narrow Band Speech Encryption Equipment
QUANTITY: TBD

REMARKS: N/A

3. DESCRIPTION: TSEC/KG-30, Electronic Key Generator
QUANTITY: TBD

REMARKS: Synchronous, full-duplex device used on point-to-point, netted, and broadcast circuits.

4. DESCRIPTION: TSEC/KG-31, Key generator
QUANTITY: TBD

REMARKS: N/A

5. DESCRIPTION: TSEC/KY-68, Digital Subscriber Voice Terminal (DSVT)
QUANTITY: TBD

REMARKS: N/A

6. DESCRIPTION: TSEC/KY-57, VINSON Speech Encryption Equipment
QUANTITY: TBD

REMARKS: N/A

I. **BATTERIES**:

1. Rechargeable nickel-zinc batteries are MIFASS-peculiar and designed to meet the back-up power requirements (4 hours) of MIFASS.

2. Internal battery bank will accommodate the total power requirements of the center configuration.

J. EXTERNAL POWER:

1. Commercial Power 120V/208VAC, 3-phase

2. Mobile Electric Power: 115/200 V, 3-phase, 4-wire, 400 Hz (MEP 005A Generator Set 3 DW 60 Hz 6115-00-118-1240 and MEP-016A Generator Set 3 KW 60 Hz 6115-00-017-8237).

3. Shipboard

REMARKS: Power requirements can be absorbed by the organic generators of using units.

K. ENVIRONMENTAL CONTROL UNIT (ECU):

1. TAMCN: B0005 4120-00-350-0814
QUANTITY: 1

REMARKS: External skid-mounted 36,000 BTU per hour

L. OTHER SYSTEM/EQUIPMENT INTERFACES:

Position Location Reporting System (PLRS)
Tactical Air Operation Module (TAOM)
Tactical Combat Operations (TCO)
Unit Level Message Switch (ULMS)
Digital Communications Terminal (DCT)

MIFASS (Continued)

M. FIRST FMF DELIVERY: FY91/FY92

N. REFERENCES:

1. Integrated Logistics Support Plan for the Marine Integrated Fire and Air Support System (MIFASS), 3 December 1976 (rev. 30 October 1981).

2. Letter of Adoption and Procurement for Marine Integrated Fire and Air Support (MIFASS) LAP 42-76 Rev. 3, 7 May 1985.

3. MCDEC Tactical Data System/Equipment Management Plan, Volume II, 1 April 1985.

O. REMARKS: N/A

MAGTF C4 SYSTEM REFERENCE DATA SHEET - TCC

A. **SYSTEM NOMENCLATURE**: Marine Corps Tactical Communications Center (TCC), AN/TGC-( )/AN/MSC-63A

TAMCN: A2520 WT: 7,000 lbs
NSN: TBD CU: 640 ft^3

REMARKS: 7,000 lbs is the fully equipped transport mode

B. **SYSTEM DESCRIPTION**: The TCC is a shelter mounted, high capacity, semi-automated, computer controlled, store and forward record message processing system. The system receives, stores, writes, transmits, formats, error checks, reproduces, and distributes record messages primarily at higher level headquarters.

C. **SYSTEM/EQUIPMENT REPLACED**: The TCC will replace the AN/TGC-37(V) Communications Central and the AN/TYC-5A(V) Data Communications Terminal

AN/TGC-37

TAMCN: A0268 WT: 20,000 lbs
CU: 1,343.9 ft^3

AN/TYC-5A(V)

TAMCN: A0437 WT: 7,800 lbs
CU: 831.5 ft^3

D. **MAJOR SYSTEM COMPONENTS:**

1. DESCRIPTION: TCC Shelter (8 x 8 x 10 ISO)

TAMCN: C61107 WT: 2,950 lbs
NSN: TBD CU: 640 ft^3

REMARKS: Provides Electromagnetic Interference (EMI) protection, environmental control, electrical power distribution, and electronic equipment cabinets.

2. DESCRIPTION: Communication subsystem

NSN: WT:
CU:

REMARKS: Provides up to seven (7) full-duplex secure communication channels plus a spare channel. Two secure telephone access circuits. Support up to eight (8) operating positions external to the TCC for external message handling. Interfaces with other systems at data rates of 75, 150, 300, 600, 1200, or 2400 bps.

3. DESCRIPTION: Data Processing Subsystem (See Paragraph G)

NSN: WT:
CU:

REMARKS: Provides store and forward processing of General Service (GENSER) message traffic.

TCC (Continued)

E. SYSTEM ACCESSORIES:

AN/UGC-74 Communications Terminal (Qty: 3)

AN/1089 Modem (interface with IAC)

F. RELATED EQUIPMENT:

Reproduction/Distribution Facility (R/DF)

Shelterized assemblage of equipment containing reproduction machines, document shredder, and teletype printers. Provides a rugged, high volume message reproduction facility at MAF/DIV/WING/FSSG.

G. EMBEDDED COMPUTER:

1. DESCRIPTION: Data Processing Set AN/UYK-44
LANGUAGE: CMS-24, DEC-FORTRAN, ULTRA/16, WHITESMITH "C"
PDSS AGENCY:MCTSSA
QUANTITY: Two (2) per TCC

H. COMMUNICATION SECURITY (COMSEC):

1. DESCRIPTION: TSEC/KG-84A, Dedicated Loop Encryption Device (DLED)
QUANTITY: Eight (8) per TCC

REMARKS: Provides for encryption/decryption of Teletypewriter (TTY) and data traffic on netted and point-to-point circuits in addition to accessing TRI-TAC.

TCC (Continued)

2. DESCRIPTION: TSEC/KY-68 Digital Secure Voice Terminal (DSVT)
QUANTITY: Two (2) per TCC

REMARKS: Provides secure voice communications

I. BATTERIES: Not required

J. EXTERNAL POWER:

1. DESCRIPTION: TBD. (Standard USMC 60 Hz Mobile Electric Power Engine Generator Set)

REMARKS: Power Requirement: 120/208 Vac ± 10%, three-phase, 12 KVA

K. ENVIRONMENTAL CONTROL UNIT (ECU):

1. (Standard USMC) TAMCN B005, external 36,000 BTU-per hour, 60Hz vertical, skid-mounted.

L. OTHER SYSTEM/EQUIPMENT INTERFACES:

1. TCC (AN/MSC-63A)
2. AUTODIN Switching Center (ASC)
3. AN/TYC-39 Message Switch
4. Intelligence Analysis Center (IAC) (AN/TYQ-19)
5. Reproduction/Distribution Facility (RDF)
6. End-User Computer (EUC)
7. Fleet Broadcast Channel (from SSR-1/TSC-96)
8. Common User Digital Information Exchange (CUDIX) (from ON-143/TSC-96)
9. An/UGC-74(V)(3) Terminal, Communications

TCC (Continued)

M. FIRST FMF DELIVERY: FY90

N. REFERENCES:

1. System Specification (Type A) for the AN/MSC-63A Tactical Communications Center, 6 June 85

O. REMARKS: Hardware for the TCC is identical to that of the AN/MSC-63A, Special Security Communications Center (SSCC) (less TSEC/KWR-46); difference is software reflecting SSCC requirements.

MAGTF C4 SYSTEM REFERENCE DATA SHEET - TCO

A. **SYSTEM NOMENCLATURE**: Tactical Combat Operations (TCO) System

TAMCN: A2534 WT: To be determined

NSN: TBD CU: TBD

B. **SYSTEM DESCRIPTION**: The Tactical Operations (TCO) System is an on-line, secure display/information processing system. It is an integrated subsystem of the Marine Tactical Command and Control System (MTACCS) used by the G3/S3 and G2/S2 within the Marine Air-Ground Task Force (MAGTF). The TCO System contains the capability for information retrieval and storage, word processing and report generation, data base, graphic displays of friendly and enemy unit locations with map background, and a hard copy output for rapid decision making in tactical situations. All MAGTF unit combat operations centers with the exception of the Rifle and Recon Companies, will be equipped with TCO Terminals. The elements of the system are connected by a digital communications network as well as voice channels which are external to the TCO System.

C. **SYSTEM/EQUIPMENT REPLACED**: *None*

D. **MAJOR SYSTEM COMPONENTS**:

TBD

E. **SYSTEM ACCESSORIES**:

TBD

F. RELATED EQUIPMENT:

Single Channel Radios:	SINCGARS-V	
	HF family:	AN/PRC-104
		AN/GRC-193
		AN/MRC-138
		AN/PRC-105
	Multichannel Radio:	AN/TRC-170
		AN/TSC-95

G. EMBEDDED COMPUTER:

1. DESCRIPTION: TBD
   LANGUAGE: TBD
   PDSS AGENCY: TBD
   QUANTITY: TBD

H. COMMUNICATION SECURITY (COMSEC):

1. DESCRIPTION: TBD
   QUANTITY: TBD

   REMARKS: TBD

I. BATTERIES:

1. DESCRIPTION: TBD
   QUANTITY: TBD

   REMARKS: TBD

TCO (Continued)

J. EXTERNAL POWER:

1. Commercial or Shipboard:
2. Mobile Electric Power Generating Sources
3. Dedicated external batteries
4. Thermal electric generators: 500 watts output

K. ENVIRONMENTAL CONTROL UNIT (ECU):

TBD

L. OTHER SYSTEM/EQUIPMENT INTERFACES:

1. Marine Integrated Fire and Air Support System (MIFASS)
2. Digital Communication Terminal (DCT)
3. Position Location Reporting System (PLRS)

M. FIRST FMF DELIVERY: FY93/FY94

N. REFERENCES: N/A

O. REMARKS: The TCO System is being revised and expedited. A new system baseline definition will be forthcoming in FY87.

ANNEX D

PLANNED ORGANIZATIONAL (T/E-T/O)

ALLOCATION FOR END USER COMPUTING EQUIPMENT

Allowances shown herein represent tentative allocations provided by the sponsor. Where two sets of numbers are shown in one block, the upper number represents the EUCE for a single unit. The lower number represents the total number of EUCEs for that unit.

1st MARINE BRIGADE

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
B 1131	HQ CO, INF REGT 1st MAB	1	2	3	2		1		8	8
B 1182	H&S CO, INF REGT 1st MAB	3	1 3	3 9	2 6				6	18
B 2309	HQ BTRY, D/S (T) BN (M198), ARTY REGT, 1st MAB	1	1	2	2				5	5
B 2308	155 MM BTRY, D/S (T) BN (M198), ARTY REGT, 1st MAB	3		4 12					4	12
B 3311	H&S CO, BRIGADE SERVICE SUPPORT, GROUP-1	1	5	12	2		1		20	20
B 3321	SUP CO, BRIGADE SERVICE SUPPORT, GROUP-1	1	2	8					10	10
B 3331	MAINT CO, BRIGADE SERVICE SUPPORT, GROUP-1	1	4	4					8	8
B 3351	ENGR CO, BRIGADE SERVICE SUPPORT, GROUP-1	1	1	2					3	3
B 3361	MT CO, BRIGADE SERVICE SUPPORT, GROUP-1	1	1	2					3	3
B 3371	MED CO, BRIGADE SERVICE SUPPORT, GROUP-1	1	1	2					3	3

1st MARINE BRIGADE

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
B 3381	DENTAL CO, BRIGADE SERVICE SUPPORT, GROUP-1	1	1	2					3	3
B 4917	1st MARINE AMPHIBIOUS BRIGADE (MAB)	1	14	28	2				44	44
B 4034	COM SPT CO. COMM BN, 3d MAF	1	1	2	2				5	5
B 8633	MACS/MTDS	1	3	4	2	4			13	13
B 8813	H&MS (VA VF VF AN) 1st MAB	1	4	8	2				14	14
B 8849	MARINE FIGHT/ATK SQUADRON, 1st MAB	3	1 2	4 12	2 6		1 3		8	23
B 8938	HMM (12 CH-46E)	4	1 4	8 32	2 8		1 4		12	48
B 8945	MARINE HEAVY HELO SQUADRON, 1st MAB	1	1	2	2		1		6	6
B 8702	MFWSS-173, MWSG 17 1st BRIGADE	1			2				2	2
B 8643	MATCS-18 DET-B 1st BRIGADE	1			2				2	2

MARINE DIVISION

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
A 1613	ASSAULT AMPHIB CO TV BN 1st MAR DIV	1		12					12	12
N 1012	HQ CO, HQ BN 1st MAR DIV	1	10	20	4	18	1		53	53
N 1017	RPV CO, HQBN 1st MAR DIV	1	1	2					3	3
N 1022	HQ CO, HQ BN 2nd MAR DIV	1	11	34	6	18	1		70	70
N 1027	RPV CO, HQ BN 2nd MAR DIV	1	1	2					3	3
N 1032	HQ CO, HQ BN 3rd MAR DIV	1	11	22	2	18	1		54	54
N 1037	RPV CO, HQ BN 3rd MAR DIV	1	1	2					3	3
N 1042	HQ CO, HQ BN 4th MAR DIV	1	11						11	11
N 1047	RPV CO, HQ BN 4th MAR DIV	1	1						1	1
N 1111	HQ CO, INF REGT 1st MAR DIV	3	2 6	12 36	2 6	6 18	1 3		23	69

MARINE DIVISION

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
N 1112	HQ CO, 27th MARINES	1	1	2	2	6	1		12	12
N 1121	HQ CO, INF REGT 2nd MAR DIV	3	2 6	3 9	2 6	6 18	1 3		14	42
N 1131	HQ CO, INF REGT 3rd MAR DIV	2	2 4	3 6	2 4	6 12	1 2		14	28
N 1141	HQ CO, INF REGT 4th MAR DIV	3	2 6						2	6
N 1162	H&S CO, INF BN, INF REGT, 1st MAR DIV	9	1 9	4 36	2 18		1 9		8	72
N 1172	H&S CO, INF BN, INF REGT, 2nd MAR DIV	9	1 9	4 36	2 18		1 9		8	72
N 1182	H&S CO, INF BN, INF REGT, 3rd MAR DIV	6	2 12	4 24	2 12		1 6		9	54
N 1192	H&S CO, INF BN, INF REGT, 4th MAR DIV	9	1 9						1	9
N 1261	HQ BTRY, ARTY REGT. 4th MAR DIV	1				11			11	11
N 1274	HQ BTRY, 8" GS BN, ARTY REGT, 4th MAR DIV	1				2			2	2

MARINE DIVISION

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
N 1311	H&S CO, CBT ENGR BN 1st MAR DIV	1	2	4	2		1		9	9
N 1321	H&S CO, CBT ENGR BN 2nd MAR DIV	1	2	6	2		1		9	9
N 1331	H&S CO, CBT ENGR BN 3rd MAR DIV	1	2	6	2		1		9	9
N 1341	H&S CO, CBT ENGR BN 4th MAR DIV	1	1						1	1
N 1411	H&S CO, RECON BN 1st MAR DIV	1	1	2	2		1		6	6
N 1421	H&S CO, RECON BN 2nd MAR DIV	1	1	2	2		1		6	6
N 1431	H&S CO, RECON BN 3rd MAR DIV	1	1	2	2		1		6	6
N 1441	H&S CO, RECON BN 4th MAR DIV	1	1						1	1
N 1511	H&S CO, 1st TANK BN 1st MAR DIV, FMF	1	2	4	2		1		9	9
N 1521	H&S CO, 2nd TANK BN 2nd MAR DIV, FMF	1	2	6	2		1		9	9

MARINE DIVISION

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
N 1531	H&S CO, 3rd TANK BN 1st MAR DIV, FMF	1	2	4	2		1		9	9
N 1541	H&S CO, 4th TANK BN 4th MAR DIV, FMF	1	1						1	1
N 1581	H&S CO, 8th TANK BN 4th MAR DIV, FMF	1	1						1	1
N 1611	H&S CO, ASSAULT AMPHIB TRAC BN, 1st MAR DIV FMF	1	3	6	2		1		12	12
N 1621	H&S CO, ASSAULT AMPHIB TRAC BN, 2nd MAR DIV FMF	1	2	6	2		1		11	11
N 1631	H&S CO, TRACKED VEHICLE BN, 3rd MAR DIV FMF	1	1	2	2		1		6	6
N 1711	H&S CO, 1st LAV BN 1st MAR DIV, FMF	1	2	4	2		1		9	9
N 1721	H&S CO, 2nd LAV BN 2nd MAR DIV, FMF	1	2	4	2		1		9	9
N 1731	H&S CO, 3rd LAV BN 1st MAR DIV, FMF	1	2	4	2				8	8
N 1734	H&S CO, 3rd LAV BN (REIN) 1st MAR DIV, FMF	1	1	4					5	5

MARINE DIVISION

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
N 1741	H&S CO, 4th LAV BN 4th MAR DIV FMF	1	2						2	2
N 2101	HQ BTRY, ART REGT 1st MAR DIV FMF	1	2	4	2	11	1		20	20
N 2109	HQ BTRY, D/S (T) BN, ARTY REGT, 1st MAR DIV	3	1 3	6 18	2 6	2 6	1 3		12	36
N 2119	HQ BTRY, G/S (T) BN, ARTY REGT, 1st MAR DIV	1	1	2		2	1		6	6
N 2139	HQ BTRY, G/S (SP) BN, ARTY REGT, 1st MAR DIV	1	1	4		2	1		8	8
N 2201	HQ BTRY, ARTY REGT 2nd MAR DIV	1	1	4	2	11	1		19	19
N 2202	TARGET ACQUISTION BTRY, ARTY REGT, 2nd MAR DIV	1	1	2	2				5	5
N 2209	HQ BTRY, D/S (T) BN, (M198) ARTY REGT, 2nd MAR DIV	3	1 3	6 18	2 6	2 6	1 3		12	36
N 2219	HQ BTRY, G/S (T) BN, (M198) ARTY REGT, 2nd MAR DIV	1	1	2	2	2	1		8	8
N 2239	HQ BTRY, G/S (SP) BN, ARTY REGT, 2nd MAR DIV	1	1	4	2	2	1		10	10

MARINE DIVISION

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
N 2301	HQ BTRY, ARTY REGT, 3rd MAR DIV	1	1	4	2	11	1		19	19
N 2309	HQ BTRY, D/S (T) BN, ARTY REGT, 3rd MAR DIV	2	1 2	4 8	2 4	1 2	1 2		9	18
N 2319	HQ BTRY, G/S (T) BN, ARTY REGT, 3rd MAR DIV	1	1	2		2	1		6	6
N 2308	155 MM (M198) BTRY, D/S (T) BN, ARTY REGT 3rd MAR DIV	6		4 24					4	24
N 2339	HQ BTRY, G/S (SP) BN ARTY REGT, 3rd MAR DIV	1				2			2	2
N 2409	HQ BTRY, D/S (T) BN (M198) ARTY REGT, 4th MAR DIV	3	1 3			2 6			3	9
N 1271	HQ BTRY, 155 MM (SP) GS BN ARTY REGT, 4th MAR DIV	1				2			2	2
N 1016	TRUCK CO, H&S BN 1st MAR DIV	1			2				2	2
N 1035	COMM CO HQ BN 3rd MAR DIV	1			2				2	2

FORCE SERVICE SUPPORT GROUPS

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
N 3111	H&S CO, H&S BN 1st FSSG	1	29	60	2	31	2		124	124
N 3121	H&S CO, SUP BN 1st FSSG	1	9	28	2		1		40	40
N 3131	H&S CO, MAINT BN 1st FSSG	1	7	18	6		1		32	32
N 3141	H&S CO, LDG SPT BN 1st FSSG	1	2	2	2		1		7	7
N 3151	H&S CO, ENGR SUPT BN 1st FSSG	1	2	4	2		1		9	9
N 3161	H&S CO, MT BN 1st FSSG	1	1	2	2		1		6	6
N 3171	H&S CO, MED BN 1st FSSG	1	1	2	2		1		6	6
N 3181	H&S CO, DENT BN 1st FSSG	1	1	2	2		1		6	6
N 3211	H&S CO, H&S BN 2nd FSSG	1	40	100	10	31	2		183	183
N 3221	H&S CO, SUP BN 2nd FSSG	1	8	20	2		1		31	31

FORCE SERVICE SUPPORT GROUPS

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
N 3231	H&S CO, MAINT BN 2nd FSSG	1	9	18	2		1		30	30
N 3241	H&S CO, LDG SPT BN 2nd FSSG	1	2	4	2		1		9	9
N 3251	H&S CO, ENGR SUPT BN 2nd FSSG	1	2	6	4		1		13	13
N 3261	H&S CO, MT BN 2nd FSSG	1	1	6	2		1		10	10
N 3271	H&S CO, MED BN 2nd FSSG	1	1	2	2		1		6	6
N 3281	H&S CO, DENT BN 2nd FSSG	1	1	2	2		1		6	6
N 3311	H&S CO, H&S BN 3rd FSSG	1	28	70	4	31	2		135	135
N 3321	H&S CO, SUP BN 3rd FSSG	1	9	18	2		1		30	30
N 3331	H&S CO, MAINT BN 3rd FSSG	1	7	14	2		1		24	24
N 3341	H&S CO, LDG SPT BN 3rd FSSG	1	2	4	2		1		9	9

FORCE SERVICE SUPPORT GROUPS

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
N 3351	H&S CO, ENGR SUPT BN 3rd FSSG	1	2	4	2		1		9	9
N 3361	H&S CO, MT BN 3rd FSSG	1	1	4	2		1		8	8
N 3371	H&S CO, MED BN 3rd FSSG	1	1	2	2		1		6	6
N 3381	H&S CO, DENT BN 3rd FSSG	1	1	2			1		4	4
N 3411	H&S CO, H&S BN 4th FSSG	1				31			31	31
N 3441	H&S CO, LDG SPT BN 4th FSSG	1	2						2	2

MARINE AIRCRAFT WINGS

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M38	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
A 8633	MACS/MTDS MAGG 3D MAW	1	2	8		3			13	13
N 8611	MWHS MAW (MWHS-1,2,3,4)	4	11 44	22 66	8 24	17 68	1 6		59	208
N 8612	MARINE COMM SQUADRON, MACG, MAW	4	1 4	3 12	10 6		1 3		15	25
N 8615	H&HS, MACG MAW	4	3 12	5 18	2 6		1 3		11	39
N 8618	H&HS BTRY, (Improved Hawk) LAAM BN, MAW	4	2 8	3 12	2 4		1 1		8	25
N 8625	FAAD BTRY MACG, MAW FMF	4	2 8	3 12	3 6				8	26
N 8631	MACS-4 MACS/MTDS, 1st MAW	1	2	4	2	3	2		13	13
N 8632	MACS-5&6 MACS/MTDS, 2nd MAW	2	2 4	8 16	2 4	3 6	1 2		16	32
N 8633	MACS-7 MACS/MTDS, 3rd MAW	1	2	8	2	3	2		17	17
N 8634	MACS-23&24 MACS/MTDS, 4th MAW	2	2 4						2	4

MARINE AIRCRAFT WINGS

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
N 8643	MATC SQD MACG, MAW	4	1 4	2 6	4 16		1 3		8	29
N 8655	MAR TACT PHOTO RECON SQD (VMFP), MAW (21 RF48)	1	2	2	4		1		9	9
N 8657	MAR TACT WARF SQD, (VMAQ), MAW, (7EA-7B)	1	2	4	6		1		13	13
N 8671	MASS-2 MACG, 1st MAW	1	1	2	2	1	1		7	7
N 8672	MASS-1 MACG, 2nd MAW	1	1	2	2	1	1		7	7
N 8673	MASS-3 MACG, 3rd MAW	1	1		2	1	1		5	5
N 8674	MASS-4 MACG, 4th MAW	1				1			1	1
N 8675	MASS-6 MACG, 4th MAW	1				1			1	1
N 8701	HEADQUARTERS MARINE WING SUPPORT GROUP	3	2 6		2 6		1 3		5	15
N 8702	MARINE FIXED WING SUPPORT SQUADRON	11	1 10		2 22				3	22

MARINE AIRCRAFT WINGS

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
N 8703	MARINE ROTARY WING SUPPORT SQUADRON	3	4 12						4	12
N 8730	HQ & GRND MAINT SQUAD MWSG, 1st MAW	1	8	30			3		41	41
N 8734	ENGR SQDN MWSG, 1st MAW	1	1	2			3		6	6
N 8735	MOTOR TRANSPORT SQUAD MWSG, 1st MAW	1	1	2			3		6	6
N 8740	HQ & GRND MAINT SQD MWSG, 2nd MAW	1	10	36					46	46
N 8744	ENGR SQN MWSG, 2nd MAW	1	1	2					3	3
N 8745	MOTOR TRANSPORT SQD MWSG, 2nd MAW	1	1	2					3	3
N 8750	HQ & GRND MAINT SQD MWSG, 3rd MAW	1	9	24	2				35	35
N 8754	ENGR SQD MWSG, 3rd MAW	1	1	2					3	3
N 8755	MOTOR TRANSPORT SQD MWSG, 3rd MAW	1	1	2					3	3

MARINE AIRCRAFT WINGS

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
N 8760	HQ & GRND MAINT SQD MWSG, 4th MAW	1	5						5	5
N 8764	ENGR SQD MWSG, 4th MAW	1	1						1	1
N 8765	MOTOR TRANSPORT SQD MWSG, 4th MAW	1	1						1	1
N 8775	MAR AIR REF SQDN, VMGR (18-KG-130), 2nd MAW	1	1	2	4		1		8	8
N 8777	MAR AERIAL REF SQD VMGR-252, 3rd MAW	1	1	2	4		1		8	8
N 8780	MAR AIR REF SQD (12 KG-130) VMGR, 4th MAW	1	2						2	2
N 8783	MAR AIR REF SQD (12 KG-130) VMGR 1st MAW	1	1	2	2				5	5
N 8813	MARINE AIR BASE SQD (VA/VF/VA (AW))	12	10 45	12 140	2 24		1 8		25	217
N 8820	MARINE AIR BASE SQD (VA/VF/VA (AN))	10	2						2	2
N 8847	MARINE FIGHT/ATK SQD MAG 4th MAW (A12 F4N)	2	1 2		2 6				3	8

MARINE AIRCRAFT WINGS

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
N 8851	MAR FIGHT ATTACK SQDN (VMFA) (12-F18) MAG, MAW	8	1 8	5 60	2 16		1 9		9	93
N 8852	MAR ATTACK SQDN (VMA) (19-A4), MAW	9	2 18	12 100					14	118
N 8856	MAR ATTACK SQDN (VMA(AW))	5	1 5	4 26	2 28		1 5		8	64
N 8859	MARINE ATTACK SQDN (VMA) MAG MAW (20 AV8B)	8	1 4	2 11			1 8		4	23
N 8914	H&MS MAG/VH MAW SINGLE SITE	3	4 12	8 8					12	20
N 8915	H&MS, MAG MAG/VH, MAW	2	5 10	8 16			1 5		14	31
N 8916	H&MS, MAG/VH (HMA/HML/ VMO) MAW	1	4	8	6				18	18
N 8919	H&MS, MAG, (SATELLITE AIRFIELD)	1	4	8					12	12
N 8921	MARINE AIR BASE SQD (MABS), MAG/VH MAW	1	2						2	2
N 8938	MARMED HELO SQD (HMM (12 CH 46E)	12	6 14	12 144	2 24				20	182

MARINE AIRCRAFT WINGS

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
N 8945	MARMED HELO SQD (HMH) MAG/VH MAW (16-CH-530)	3	1 3	2 4					3	7
N 8946	HMH, MAG/VH, MAW (16-CH-53E)	8	1 8	6 50	2 16		1 11		10	85
N 8965	MAR LIGHT HELO SQD (HML) MAW (24UHIN)	3	1 3	4 10	2 4		1 3		8	20
N 8968	MARINE OBSERVATION SQD (VMO) MAW (18-OV10A)	3	1 3	2 4			1 2		4	9
N 8971	MAR HELO ATTACK SO (HMA) MAW (24 AH1JK)	4	1 4	2 10	6 8		1 3		10	25
N 8712	MAR WING (WPNS UNIT MAW, FMF	1			2				2	2

OTHER FMF ELEMENTS

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
M 4623	FORCE RECON CO FMF (I, II & III MAF)	3	1 4	1 4	2 2		1 3		5	13
M 4853	1st ANGLICO (-) FMF PAC	1	1	2	2				5	5
M 4918	HQ, MARINE AMPHIBIOUS FORCE (I, II & III)	3		2 6					2	6
M 4919	H&S CO, MAF (I, II & III MAF)	3	1 3	2 6	2 2	16 48			21	59
M 4926	HQS CO, H&S BN/CAMP SMITH (SMALL ARMS ONLY)	1					1		1	1
M 4957	HQS CO, H&S BN FMF LANT	1	2	4		19	1		26	26
M 8570	MATS VMAT, (15 A-4/5 TA-4) MCCRTG MAW	1	1	2					3	3
M 8571	MATS VMFAT, (12 F4J/21 F4J) MCCRTG, MAW	1	1	2	2				5	5
M 8572	MACS, VMAT (8 AV-8 A/7 TAV-8A MCCRTG MAW	1	1	2	6				9	9
M 8573	MAR AVN WEAPONS AND TACTICS SQUADRON	1	1	2					3	3

OTHER FMF ELEMENTS

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
M 8580	H&MS MCCRTG-10 MAW	1	4	8					12	12
M 8586	VMAT (AW) (13A6/3 TC4C) MAW	1	1	2					3	3
M 8591	HMT 10 CH 46/9 CH 53 MAW FMF	1	4	4					8	8
M 8594	HMLTE 4 AH1J	1	1	2					3	3
N 4011	HQ CO, COMM BN 1st MAF	1	2	8	2	5			17	17
N 4021	HQ CO, COMM BN 2nd MAF	1	1	4		5			10	10
N 4031	HQ CO, COMM BN 3rd MAF	1	5	10	2	3			20	20
N 4041	HQ CO, COMM BN 4th MAF	1	1			5			6	6
N 4737	H&S CO RADIO BN, FMF	2	1 2		2 4	8 16			11	22
N 4916	HQ MARINE AMPHIBIOUS UNIT (MAU)	6	2 12		2 12	6 35	1 6		11	65

OTHER FMF ELEMENTS

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
N 4917	HQ, MARINE AMPHIBIOUS BRIGADE (MAB)	5	2 10	4 20	2 10	11 77	1 5		20	122
N 4735	"A" CO, RADIO BN, FMF	2		4 8					4	8
N 4736	"B" CO, RADIO BN, FMF	2		4 8					4	8
P 4852	2nd ANGLICO, FMF LANT	1			2				2	2

NON-FMF ELEMENTS

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
4961	HQ, FMF EUROPE	1				11			11	11
5050	MARCOR FIELD SERVICE ASGN (SAO)	3		2 6					2	6
5150	HQ BN, WASH, D.C.	1		12					12	12
5980	LANDING FORCE TRAINING COMMAND ATLANTIC (LFTC LANT)	1		40		10	28		78	78
5981	LANDING FORCE TRAINING COMMAND PACIFIC (LFTC PAC)	1		2		10	28		40	40
7102	CAMP H.M. SMITH, HI HQ, FMF PAC	1	2	49		19			70	70
7411	H&S BN, MCDEC QUANTICO, VA	1		107					107	107
7434	EDUCATION CENTER, MCDEC QUANTICO, VA	1		2		30			32	32
7441	DEVELOPMENT CENTER, MCDEC, QUANTICO, VA	1				5		58	63	63
7442	MCTSSA QUANTICO, VA	1				5			5	5

NON-FMF ELEMENTS

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
7450	TBS, EDCTR, MCDEC QUANTICO, VA	1		9					9	9
7510	HQ BN, MCB, CAMP LEJEUNE, N.C.	1		344					344	344
7520	RR, MCB CAMP LEJEUNE, N.C.	1		9					9	9
7530	SUPBN, MCB CAMP LEJEUNE, N.C.	1		16					16	16
7540	MC ENGR SCHOOL, MCB CAMP LEJEUNE, N.C.	1		9					9	9
7550	MC SERV SPE SCHOOL,MCB CAMP LEJEUNE, N.C.	1		291					291	291
7610	H&S BN, MCB CAMP PENDLETON, CA	1		163					163	163
7711	MC AIR-GRND CMBT TRNG CTR EQUIP ALW POOL (EAP)	1	1	37					38	38
7720	COMM-ELEC SCHOOL, MCAGCC 29 PALMS, CA	1		6					6	6
7800	MCB, CAMP SMEDLEY D. BUTLER, OKINANA, JAPAN	1		86					86	86

NON-FMF ELEMENTS

T/E NO.	NAME OF UNIT/TYPE	NO. OF UNITS	ALLOWANCES							
			ADPE-FMF REPLACE	M3S	REAL FAMIS	COMM (JAMS)	CAEMS	TEST BED	UNIT TOTAL	TOTALS PER UNIT TYPE
8411	H&HS, MCAS CHERRY POINT, N.C.	1		87					87	87
8421	H&HS, MCAS EL TORO, CA	1		87					87	87
8441	H&HS, MCAS (H) TUSTIN, CA	1		9					9	9
8451	H&HS, MCAS IWAKUNI, JAPAN	1		3					3	3
8461	H&HS, MCAS, NEW RIVER JACKSONVILLE, N.C.	1		5					5	5
8471	H&HS, MCAS, KANEOHE BAY OAHU, HI	1		3					3	3
8475	H&HS, MCAS YUMA, AZ	1		6					6	6
8485	H&HS, MCAS BEAUFORT, S.C.	1		77					77	77
7900	I&I STAFF, 4th FORCE RECON CO	1			2				2	2

ANNEX E

PERSONNEL REQUIREMENTS

INTRODUCTION

This annex presents personnel requirements tables for the operation and support of the following C4 systems:

SYSTEM	TABLE	PAGE
ADPE-FMF	E-1	E-3
FMF-EUCE	E-2	E-4
DFASC/MASC	E-3	E-5
IAC	E-4	E-6
DCT	E-5	E-7
PLRS	E-6	E-8
BCS	E-7	E-9
TCC	E-8	E-10
ULCS AN/TTC-42	E-9	E-11
ULCS SB 3865	E-10	E-12
TAOM	E-11	E-13
MIFASS	E-12	E-14
ULMS	E-13	E-15
ISIS	E-14	E-16
TCO	E-15	E-17

Each system is addressed separately. Personnel and MOS requirements are developed for both the custodial or employing unit, non-custodial support units, Post Deployment Software Support (PDSS), Schools and Depot Maintenance. Information provided on the PDSS is the best available, however, it may not reflect the results of a major change which was still under consideration and is not currently available for use as of publication.

SYSTEM PERSONNEL REQUIREMENT

CUSTODIAL UNIT	MAGTF NON-CUSTODIAL SUPPORT UNIT	POST DEPLOYMENT SOFTWARE SUPPORT (PDSS)	SCHOOLS -
BATTALION, SQUADRON AND HIGHER	N/A: COMMERCIAL CONTRACT	MCCDPA	

ANALYSIS: The ADPE-FMF system consists of IBM Series 1 (ruggedized) [illegible] processing equipment packaged. It provides a deployable capability for input to existing automated information [illegible] and provides automated support for FMF staff.

Does not require increase of personnel to unit T/O's nor new MOS skills.

Skill qualifications which are normally required include basic clerical skills, typing, [illegible] ability. Experience in the use of filing systems and record keeping is also desirable.

NEL REQUIREMENTS - ADPE-FMF

Table E-1. ADPE - FMF

DSS)	SCHOOLS - INSTRUCTORS	DEPOT MAINTENANCE	OTHER REQUIREMENTS
	N/A	N/A	N/A

...ing equipment specially
...nformation system (AISs)

...ping, and communication
... .

FOOTNOTES:

SYSTEM PERSONNEL REQUIREMENTS

CUSTODIAL UNIT	MAGTF NON-CUSTODIAL SUPPORT UNIT	POST DEPLOYMENT SOFTWARE SUPPORT (PDSS)	SCHOOLS - INS[illegible]
Battalion, Separate Company Squadron, or Higher	N/A	MCCDPA - Quantico System Software Assigned [illegible] - Application Software	System & [illegible] CSS, MDEC, [illegible] End User [illegible] Formal [illegible] Informal [illegible]

ANALYSIS:

ANALYSIS: [illegible] will perform [illegible] computers, automated work [illegible] program will eventually [illegible] microcomputers. The fifteen [illegible] application of the system [illegible] battalion/squadron level. [illegible] on a basis of one [illegible] sections will [illegible] setup [illegible] use of this equipment [illegible] is required for maintenance. [illegible] more than adequate for support.

Table E-2. FMF - EUCE

NEL REQUIREMENTS - FMF EUCE

SS)	SCHOOLS - INSTRUCTORS	DEPOT MAINTENANCE	OTHER REQUIREMENTS
	System & language software - SS, MDEC, Quantico, VA End Users - subject MOS formal school Information Centers at Major mmand level		Enforcement of HW/SW standards to support AIS work stations.

...tomation, personal ... acquired; under this ... ventory of mini and ... ated to a much wider ... ffice systems at the ... while the EUCE will be ... 4 Supply, Maintenance ... new MOS skills for ... ailable in the Marine ... ent at C-E Schools is

FOOTNOTES:

CUSTODIAL UNIT	MAGTF NON-CUSTODIAL SUPPORT UNIT	POST DEPLOYMENT SOFTWARE SUPPORT (PDSS)	SCHOOLS - IN
SERVICE CO, FSSG			SCHOO
BILLET / RANK / MOS / #	Elect Equip Spec / Sgt / 1142 / 1	MCCDPA	AS REQ
Director / Maj / 4002 / 1	Tractor-Trailer / Cpl / 3533 / 2		
Installation Chief / MGySgt / 4038 / 1	NOTE 1		
Admin Clerk / Cpl / 0151 / 1			
Supply Clerk / Sgt / 3043 / 1			
Processing Off / Capt / 4002 / 1			
Processing Chief / MSgt / 4038 / 1			
Shift Supr / SSgt / 4038 / 3			
Prod - I/O Supvr / Sgt / 4038 / 3			
Prod - I/O Cntrl Clk / Cpl / 4034 / 3			
Computer Opr / Cpl / 4034 / 4			
Computer Opr / LCpl / 4034 / 4			
Librarian / LCpl / 4034 / 1			
Programming Off / LT/WO / 4010 / 1			
Programming Chief / GySgt / 4071 / 1			
Programmer / Sgt / 4063 / 2			
Programmer / Cpl / 4063 / 1			
DBMS Specialist / Sgt / 4071 / 1			
System Prgr Chief / MSgt / 4064 / 1			
System Prgr / GySgt / 4063 / 1			
TP Specialist / Sgt / 4041 / 1			
TOTAL OFF 3 ENL 30			

ANALYSIS: The MASC is an independent complex of ADPE integrated into two MILSTD semi-trailer vans to form a central control processor/mass storage trailer and an ADP operations trailer which supports MAGTF ADP requirements.

To be fielded only to 1st, 2d, 3d FSSGs and MCDEC.

Skills required include computer systems analysis, software design, and computer/peripheral equipment operator functions in support of Marine Corps information systems.

Computer operators must attend the Basic Operators Course or complete six months of managed on-the-job training (MOJT) in computer operations. Formal training is also required for other MOS's depicted.

NNEL REQUIREMENTS - DFASC/MASC

Table E-3, DFASC/MASC

NT PDSS)	SCHOOLS - INSTRUCTORS	DEPOT MAINTENANCE	OTHER REQUIREMENTS
	SCHOOLS AS REQUIRED	ADPE repaired by contractor	TBD

semi-trailer vans to
trailer which supports

r/peripheral equipment

managed on-the-job
MOS's depicted.

FOOTNOTES:

Note: 1 - Personnel to be [illegible] as required upon deployment.

CUSTODIAL UNIT

HQBN MARDIV

BILLET	MOS	#PER SHIFT	#PER SYSTEM
Watch Off	0202/0203	1	3
OOB Off	0202/0203	1	3
Targets Off	0202/0203	1	3
Analyst	0231	[illegible]	[illegible]
EOOB	2631	1	3
Log Journal Clk	0231	1	3
ADP/COMM Supv	4034	1	3
Maint Chief	5977	1	3
Maint Tech	5977	1	3
TOTALS		[illegible]	[illegible]

Notes: [illegible]

Net Increase [illegible] systems.

MAGTF NON-CUSTODIAL SUPPORT UNIT

MOS	BILLET
1142	Electr Equip Repairer
1161	Refrig Mech
1341	Engr Equip Tech
2811	Telephone Tech
2871	Test Meas/Diag Equip Tech
2874	Metrology Tech
2881	COMSEC Equip/Tech

POST DEPLOYMENT SOFTWARE SUPPORT (PDSS)

NSWC-DAHLGREN, VA

Prog Mgr	1
Lead Supt Engr	1
SW Engr	8
Comptr Tech	2
Lead HW Engr	1
Sys Engr	2
Cnfig Cntrl Spec	2
Data Tech	1
Valid/Verif Tech	2
TOTALS	[illegible]

Net Increase [illegible]

SCHOOLS

NAVY MARINE
DAM NEC

BILLET
Instr/Chf
Instr
Instr/Tech
Chf
Instr
IAC ADP/ COMM Instr

Net increa

ANALYSIS: IAC segment of MAGIS consists of personnel, equipment, software, and procedures that all-source intelligence activities for the MAGTF. Provides a capability for direction and manag the collection effort and for dissemination of intelligence. Designed for deployment with servi (MAF, MAB).

Two specific MOS's affected by production of IAC are 4034 and 5977. Quantity of 13-4034s and IAC requirements for MOS 4034 and 5977 are seven per deployable IAC (2-4034/4-5977).

Inventory objective of six IAC's calls for four deployable system, one trainer, and one reserve.

NNEL REQUIREMENTS - IAC

Table E-4. IAC

JT PDSS)	SCHOOLS - INSTRUCTORS	DEPOT MAINTENANCE	OTHER REQUIREMENTS
	NAVY MARINE INTELLIGENCE TRG DAM NECK VA BILLET RANK MOS # Instr/Chf Capt 0202 1 Instr GySgt 0231 1 Instr/Tech GySgt 5977 1 Chf Instr GySgt 5977 1 IAC ADP/ SSgt 4034 1 COMM Instr Net increase OFF ENL 1 4	TBD	TBD

t procedures that support
irection and management of
loyment with senior MAGTFC

of 13-4034s and 20-5977s.
977).

leer, and one maintenance

FOOTNOTES:

SYSTEM PERSONNEL REQUIREMENTS

CUSTODIAL UNIT	MAGTF NON-CUSTODIAL SUPPORT UNIT	POST DEPLOYMENT SOFTWARE SUPPORT (PDSS)	SCHOOLS - IN
RIFLE CO & HIGHER BILLET RANK MOS FLD RAD OPR PFC-Sgt 2531[1]	MOS BILLET 5911 Microminiature Circuit Repair Specialist[2] 2861/ Radio Tech[2] 2841 Ground Radio[2] Repairman	MCTSAA Will plan, develop, and conduct training as required for software support	MCCES Operational Subcourse maintenance "CLB Albany. 5th echelon course

ANALYSIS: DCT is a hand-held programmable input/output unit used for composing, editing, transmitting, receiving, and displaying messages in conjunction with standard military radios. The terminal [illegible] the user to transmit/receive messages in short digital bursts. The DCT and it's [illegible] provide source data to a tactical data system.

The DCT will not require operational personnel additions to unit T/Os.

MCCES will include DCT as a sub-course as part of the normal 2531, 2841/2861, and [illegible] curricula. Will not require additional instructors.

Two new depot maintenance billets will be required, one 2841/2861 and one 5911.

ONNEL REQUIREMENTS - DCT

Table E-5. DCT

ENT (PDSS)	SCHOOLS - INSTRUCTORS	DEPOT MAINTENANCE	OTHER REQUIREMENTS
pp, n-	MCCES Operational and Maintainer Subcourse (1st-4th echelon maintenance) MCLB Albany, GA 5th echelon maintenance course	MOS 5911 Micro miniature Rprmn[3] 2861/ Radio Tech 2841 Ground Radio Rprmn PFC-SSgt[3]	

, editing, transmitting, . The terminal enables it's accessories can

, and 5911 training

FOOTNOTES:

Note 1: Added responsibility does not require additional T/O personnel. To be operated by individual assigned to operate radio to which it is attached. To be operated primarily by radio operator, but not limited to this skill.

Note 2: Added responsibility does not require additional T/O personnel.

Note 3: Does not initially require additional T/O personnel.

CUSTODIAL UNIT	MAGTF NON-CUSTODIAL SUPPORT UNIT	POST DEPLOYMENT SOFTWARE SUPPORT (PDSS)	SCHOOLS - INS
COMM CO, HQBN, DIVISION MOS RANK # BILLET 2502 Lt 1 Pltcmdr 2537 SSgt 3 Tm Ldr 2531 Sgt/CPL 18 PLRS Opr 2861 Sgt 3 PLRS Maint Tech[1] 5977 Sgt 3 PLRS Maint Tech[1] 2841 Cpl 3 PLRS Maint Tech[1] OFF ENL 1 30	ELMACO, FSSG MOS BILLET 2818 TTY Tech 2841 User Unit Maint 2861 User Unit Tech 2881 COMSEC Equip Tech 1161 Refrig Mech 1342 Engr Equip Mech 35XX Mech HEADQUARTERS AND MAINTENANCE SQDN[2] MOS BILLET 631X/632X COMM NAV TECH 6412 COMM NAV TECH (VF/VA) 6413 COMM NAV TECH (VH)	MCTSSA, CAMP PENDLETON, CA	TBD

ANALYSIS:

PLRS consists of two elements. The Master Station (MS) [illegible] which performs centralized network management functions, automatic processing [illegible] identification information for each user. The second element consists of user units (UU's). [illegible] individually identifiable to the MS and performs reception, transmission, [illegible] signal and message processing functions necessary for [illegible] operation and [illegible] the system. PLRS is assigned to COMM CO., HQBN, DIVISION.

Operation of UU not restricted to any specific MOS. [illegible] operated by any [illegible] formal or OJT operational training.

REQUIREMENTS - PLRS

Table E-6. PLRS

SCHOOLS - INSTRUCTORS	DEPOT MAINTENANCE	OTHER REQUIREMENTS
TBD	[illegible] TOBYHANNA, PA	TBD

[illegible] sensor system
[illegible], navigation, and
[illegible]. Each UU is
[illegible]ment, and various
[illegible] operation within

[illegible] received appropriate

FOOTNOTES:

Note [illegible]: [illegible], limited [illegible] maintenance.

Note [illegible]: Responsibility for User Maintenance with the air combat element.

CUSTODIAL UNIT	MAGTF NON-CUSTODIAL SUPPORT UNIT	POST DEPLOYMENT SOFTWARE SUPPORT (PDSS)	SCHOOLS - IN
FDC SECTION, HQ BTRY, ARTY BN BILLET / RANK / QTY / MOS Fire Dir Off / LT / 1 / 0802 Ops Chf / SSgt / 1 / 0848 Ops Asst / Sgt / 1 / 0844 Fire Cntrl Man / CPL / 1 / 0844 Fire Cntrl Man/Drvr / LCPL / 2 / 0844 Fire Cntrl Man / PVT / 2 / 0844 Total 1 Oficer, 7 Enlisted Total 1 Officer, 7 Enlisted All FDC sections are identically organized and equipped. No personnel directly attributable to BCS.		USAFAS Ft. Sill, OK[1]	USA-CECOM Ft. Sill, OK[1]

ANALYSIS: The BCS is a computer-based which provides for technical information recordin[illegible], computation, manual entry, display, control, and digital transmission of tactical and/or tech[illegible] data from the Fire Direction Center (FDC) to individual weapons.

There is a reduced personnel requirement in battery FDC sections resulting from BCS fieldin[illegible]. [illegible] no longer required in battery FDC sections will be redistributed to battalion and [illegible] sections. No manpower savings is attributed to BCS fielding.

The BCS will be maintained by the using FADAC Repairer, MOS 2888. No requirement to modify [illegible] skills criteria. Organization of the Arty Regt, B/ BTRY maintenance section will be modified [illegible] create a capability to provide maintenance support for a maximum requirement of two separate MABs and one non-deployed Arty BN, or maintenance support to units in three different [illegible] locations.

Table E-7. BCS

SS)	SCHOOLS - INSTRUCTORS	DEPOT MAINTENANCE	OTHER REQUIREMENTS
	USA-CECOM Ft. Sill, OK[2]	TOBYHANNA Army Depot[3]	Arty Elec Maint Sect Sect Ldr WO 2830 1 Maint Chf MSgt 2889 1 Maint Tm (3 ea) Team Ldr SSgt 2889 1 BSC Repairer CPL 2885 1 Arty Elect Rpr Sgt 2885 1 Arty Elect Rpr LCPL 2885 1 Section Total: 1 Officer, 16 Enlisted 2 enlisted in above section attributable to BCS.

...ording, processing,
...for technical firing

... fielding. Personnel
... and regimental FDC

... modify the existing
... modified. This will
... separately deployed
... different geographic

FOOTNOTES:

Note 1: USAFAS provides BCS operator training for MOS's 0802 & 0844. Intermediate maintenance trng will be accomplished during FA Computer Repairer's course, MOS 2885.

2: No additional USMC personnel required.

3. No USMC personnel identified.

CUSTODIAL UNIT	MAGTF NON-CUSTODIAL SUPPORT UNIT	POST DEPLOYMENT SOFTWARE SUPPORT (PDSS)	SCHOOLS - IN
DIVISION, WING, FSSG	FSSG	MCTSSA	

Custodial Unit — Division, Wing, FSSG

BILLET	RANK	MOS	#
Supvr	Sgt/SSgt	2549	1
Opr	PFC/CPL	2542	1

MAGTF Non-Custodial Support Unit — FSSG

MOS	RANK	BILLET
2827		System Technician[1]
2827		Mobile Data Term Tech [1]
2829		Mobile COMM Contrl Tech[1]
2881		COMSEC Equip Tech

ANALYSIS. The [illegible] shelter mounted, high [illegible] [illegible] controlled, [illegible] record [illegible] processing system. The system receives, [illegible], writes, [illegible], [illegible], reproduces, and distributes record messages primarily [illegible] level [illegible].

Each [illegible] requires one supervisor MOS 2549 and a minimum of [illegible], MOS [illegible]. [illegible] date system for a dedicated systems level [illegible] level).

:L REQUIREMENTS - TCC

Table E-8. TCC

:S)	SCHOOLS - INSTRUCTORS	DEPOT MAINTENANCE	OTHER REQUIREMENTS
	MCCES	"B, Albany, GA	FED

FOOTNOTES:

CUSTODIAL UNIT	MAGTF NON-CUSTODIAL SUPPORT UNIT	POST DEPLOYMENT SOFTWARE SUPPORT (PDSS)	SCHOOLS - I[illegible]
DIV, WING, FSSG MOS BILLET 2512 Field Wireman Call SVC Attendant Pvt/LCpl 2515 Supvr/Maintainer Sgt/GySgt[1]	FSSG MOS BILLET 1161 Refrig 1342 Engr Eqmt Mech 2822 Electr Switching Eqmt Tech[2] 5911 Microminiature Circuit Repairman 2811 Telephone Tech[2] 2881 [illegible] Equip Tech	FT. MONMOUTH GRADE # GS-9 2 GS-11 1 GS-14 1.5 GS-13 1 Prod Mgr GS-12 13 Proj SWT GS-11 2 Prgmr Intpetr GS-10 2 Config Tape [illegible] GS-5 3 Admin Asst. GS-7 [illegible] Tape Repr Tech GS-9 3 Doc [illegible]/Intermed Lvl Maintenance GS-1[illegible] [illegible] HW/SW Integration Sys Engr GS-11 [illegible] QA [illegible] Not [illegible]	USA-FT. [illegible] Supvr [illegible] GRADE GS-[illegible] GS-[illegible] GS-[illegible]

ANALYSIS: A [illegible] line, shelterized [illegible], telephone central office [illegible] and subscriber service functions to the TRI-TAC family of four-wire, [illegible] and terminal telephone instruments. Interoperable with [illegible] and AN/[illegible] telephone switches at MAF HQ, FSSG, division and wing level.

The AN/TTC-42 will be attended by two types of personnel. The Call Service Attendant [illegible] assistance to subscribers. This function will be performed by MOS 2512 personnel [illegible] school training is anticipated. [illegible], AN/TTC-42 Supervisor/Maintainer [illegible] system. The Supervisor/Maintainer will be responsible for initial installation, organizational maintenance and proper operation of the [illegible] equipment. All [illegible] performed using the facilities of the switch Maintenance Supervisor [illegible]. Typical [illegible] test programs to check switching system [illegible], replacement of [illegible] of electronic switching systems with other communications elements. [illegible] initiative to add thirteen [illegible], twenty-five [illegible], and fifteen [illegible]. This MOS will require formal school training [illegible].

...SONNEL REQUIREMENTS - ULCS (AN/TTC-42)

...IENT ...T (PDSS)	SCHOOLS - INSTRUCTORS	DEPOT MAINTENANCE	OTHER REQUIREMENTS
	USA-FT. GORDON, GA Supvr/Maintainer GRADE # BILLET GS-12 1 Chf Instr GS-11 7 Instr GS-9 8 Instr	MCLB, ALBANY, GA GRADE # BILLET GS-13 1 Elec Engr GS-12 3 Contr Spec GS-11 6 Elect/Eqmt Contr Spec Supply GS-9 1 Supply Cataloger GS-5 1 Sup Clk/Typist Note [illegible]	HQMC Life-Cycle-Log Support GRADE # BILLET GS-13 1 Engr/Log Mgr GS-6 1 Sect GS-4 2 Sect GS-14 1 Eqmt Spec GS-15 4 LCLS Anal Spec GS-12 2 Tech Pub/QA Spec GS-11 1 Config Mgmt/Tech Tech Data Spec

[illegible]

FOOTNOTES:

Note 1: Input from M[illegible]
Note 2: [illegible] or intermediate level maintenance
Note 3: Depot responsibility for all services

CUSTODIAL UNIT	MAGTF NON-CUSTODIAL SUPPORT UNIT	POST DEPLOYMENT SOFTWARE SUPPORT (PDSS)	SCHOOLS
BN/SQDN & HIGHER MOS BILLET RANK [illegible] Inst/Maintainer [illegible][1] [illegible] Wireman (Call SVC Attendant) PVT/CPL	FSSG MOS BILLET 2811 Telephone[2] Tech [illegible] Electronic Switching Equip Tech[2] [illegible] Microminiature Circuit Repair [illegible]	FT. MONMOUTH, NJ GRADE QTY [illegible]	[illegible]

ANALYSIS: [illegible]

SONNEL REQUIREMENTS - ULCS (SB-3865)

Table E-10. ULCS SB-3865

MENT T (PDSS)	SCHOOLS - INSTRUCTORS	DEPOT MAINTENANCE	OTHER REQUIREMENTS
		MCLB ALBANY,GA	TBD

FOOTNOTES:

CUSTODIAL UNIT	MAGTF NON-CUSTODIAL SUPPORT UNIT	POST DEPLOYMENT SOFTWARE SUPPORT (PDSS)	SCHOOLS - I
MACS MOS RANK # + CHG 7210 Maj 1 1 - Capt 5 4 -1 1st/WO 13 10 -3 Total Officers 19 15 -4 7236 MSgt 1 -1 7234 SSgt 3 - -3 Sgt 3 3 - Cpl 6 6 - L/Cpl/PF 12 9 -3 7236 Maj 1 1 Capt 3 3 1st 6 6 - 2nd 9 6 -3 Total Radiators 44 33 -11 GRAND TOTAL 63 48 -15 Notes: The table reflects only [illegible] personnel. *[illegible]	N/A	MCTSSA, CAMP PENDLETON, CA PERSONNEL-TBD	

ANALYSIS:

A real-time C³ system which [illegible], operates the MAI[illegible] [illegible], or [illegible] positive air control service, [illegible] specified airspace management [illegible] or [illegible] independently or in conjunction with [illegible] C²P.

All operator and maintenance personnel will [illegible].

No new MOSs are required. M[illegible] [illegible] [illegible] requirement for performance [illegible].

The projected decrease in [illegible] overall decrease in [illegible].

A decrease of [illegible] [illegible].

PERSONNEL REQUIREMENTS - TAOM

Table E-11. TAOM

…LOYMENT …PORT (PDSS)	SCHOOLS - INSTRUCTORS	DEPOT MAINTENANCE	OTHER REQUIREMENTS
…NDLETON, CA	MCCESS[1]	TBD[2]	MACS ELECTRONIC MAINT UNIT MOS / RANK / # 5970 / WO / 1 5994 / MGySgt / 1 5979 / MSgt/Sgt / 4 5963 / Sgt/LCpl / 6 1 OFF/7 ENL Note: [illegible] directly [illegible] maintenance. [illegible]

… the [illegible] anti-air warfare … [illegible] tasks. The TAOM

… Duty Description … reflect … by the operators.

… will … long-term

… maintenance

FOOTNOTES:

Note 1: 50% decrease in existing instructors is possible.

Note 2: Depot level personnel requirements to be determined by the contractor during production.

CUSTODIAL UNIT	MAGTF NON-CUSTODIAL SUPPORT UNIT	POST DEPLOYMENT SOFTWARE SUPPORT (PDSS)	SCHOOLS –
DIV/REGT/BN COC MOS BILLET[1] TBD	TBD	MCTSSA TBD	MCCES MOS RANK XX02 Capt[illegible] XX11 S[illegible]

ANALYSIS: MIFASS is a real-time display/information processing system [illegible] to provide automation of command and control functions required for [illegible] of supporting [illegible] available to the MAGTF commander. MIFASS receives data from [illegible] systems, [illegible] devices, or radio; generates dynamic situation displays and [illegible] fire [illegible] data, and interacts with both senior and subordinate [illegible] all [illegible] support for the MAGTF.

MIFASS may require fewer personnel than [illegible] operation.

MOS [illegible] and [illegible] will possibly be deleted.

This system may generate a requirement for [illegible] peripherals and other associated equipment.

Table E-12. MIFASS

SONNEL REQUIREMENTS - MIFASS

IENT T (PDSS)	SCHOOLS - INSTRUCTORS	DEPOT MAINTENANCE	OTHER REQUIREMENTS
	MCCES MOS RANK XX02 Capt/LT Instr XX11 Sgt/Cpl Instr	[illegible]LB, ALBANY, GA	TBD

[illegible] to provide selective
[illegible]nt of supporting arms assets
[illegible]ion systems, digital message
[illegible] fire direction/control
[illegible]ntrol all fire and air

[illegible]

[illegible] integrated computers,

FOOTNOTES:

[illegible] a new occupational
[illegible] secondary MOS [illegible]
[illegible] proposed.

[illegible] technician.

CUSTODIAL UNIT	MAGTF NON-CUSTODIAL SUPPORT UNIT	POST DEPLOYMENT SOFTWARE SUPPORT (PDSS)	SCHOOLS - IN
DIV/REGT & WG/GROUP MOS BILLET 2512 Fld Wireman (Attendant) 2514 Dig.SW Equip Opr/Supvr/ Maintainer	FSSG MOS BILLET 2822 Electr Switch Equip Tech 2881 COMSEC Equip Tech 2861 Dig Subscr Terml Tech 5911 Microminiature Repair Spec	MCTSSA	

ANALYSIS:

A 12-line message switch capable of near real-time service for data traffic. The [illegible] configured into two-man transportable modules. Capable of forming independent networks [illegible] conjunction with other TRI-TAC equipment. Shares hardware commonality with SB-3865 modules. regiment/group and higher levels.

Creation of new MOS's 2514 and [illegible] (same requirement as MLC's).

INEL REQUIREMENTS - ULMS

Table E-13. ULMS

r 'DSS)	SCHOOLS - INSTRUCTORS	DEPOT MAINTENANCE	OTHER REQUIREMENTS
	TBD	MCLB, Albany	TBD

traffic. The AN/GYC-7 i..
ent networks alone or in
..-3365 modules. Used at

FOOTNOTES:

CUSTODIAL UNIT	MAGTF NON-CUSTODIAL SUPPORT UNIT	POST DEPLOYMENT SOFTWARE SUPPORT (PDSS)	SCHOOLS
DIV/BN, WG/SQDN BILLET TCO Sys Cntrlr TCO Opr TCO Maintainer	TBD	MCTSSA	BILLET TCO Sy Cntrl TCO Op TCO M OFF +1

ANALYSIS: TCO is an on-line, secure display/information processing system, used by the [illegible] within the MAGTF. TCO contains the capability for information retrieval and storage, [illegible] report generation, data bases, graphic displays of friendly and enemy unit location with [illegible] and a hard copy output for rapid decision making in tactical situations.

Personnel support from approximately 147 organizations where the TCO is employed.

Personnel increases are reflected in the establishment of [illegible] operator billets. Compensatory reduction, or [illegible], [illegible] at current levels.

Table E-14. ISIS

INEL REQUIREMENTS - TCO

T >DSS)	SCHOOLS - INSTRUCTORS	DEPOT MAINTENANCE	OTHER REQUIREMENTS
	BILLET TCO Sys Cntrl + 5 TCO Opr +5 TCO Maint (TBD) OFF ENL +1 +6	TBD	TBD

[illegible] G-3/S-3 and G-2/S-2 [illegible] word processing, [illegible] with map backgroun[illegible]

[illegible] User billets and 95? [illegible] personnel strengths

FOOTNOTES:

SYSTEM PERSONNEL REQUIREMENTS

CUSTODIAL UNIT	MAGTF NON-CUSTODIAL SUPPORT UNIT	POST DEPLOYMENT SOFTWARE SUPPORT (PDSS)	SCHOOLS - INS
RADIO BATTALION	TBD	TBD FCA is PDSA For TCAC	FT. GEORGE TCAC

ANALYSIS: The ISIS is a computer based, communications-collecting, direction-finding, and [illegible] intelligence analysis system, which supports the MAGTF commander. Each ISIS consists of two prime segments, the Stand-Alone Analysis Subsystem (SAAS) and the Communications Collection Outstation (CCO). The SAAS analyzes intercepted communications and DF data. The CCO detects and collects HF, VHF, and [illegible] signals and performs short-range radio direction finding in the VHF range. The Technical Control & Analysis Center (TCAC) AN/TSQ-130(V) is an interim replacement for SAAS and three per Radio BN will be fielded.

In operational use, 2-4 interactive SAAS's will support the MAGTF from the command post area. Additional SAAS's may be deployed with divisions or regiments.

Radio BN T/O will be adjusted to include personnel (TBD) dedicated to ISIS hardware and software [illegible]. No requirement exists for new operator MOS's. Marines of MOS's 2502 (LT/WO), 2649, 2629, 2648, 2689, 2691 (MSGT/CPL) will man supervisory and operator positions. Maintenance personnel requirements must be analyzed to based on skill levels required. It is expected that a new maintenance MOS will be required in addition to OF 28 personnel now reflected in the T/O.

Table E-15. TCO

EL REQUIREMENTS - ISIS

SS)	SCHOOLS - INSTRUCTORS	DEPOT MAINTENANCE	OTHER REQUIREMENTS
	FT. DEVANS, MASS - TCAC Operators	TBD	TBD

...ding, and signals-
...sts of two primary
...Substation (CCO).
...in HF, VHF, and UHF
...chnical Control and
...r Radio BN will be

...area. Additional

...software support.
..., 2643, 2649, and
...requirements must be
... will be required in

FOOTNOTES:

ANNEX F

MAGTF C4 SYSTEMS OCCUPATIONAL FIELDS AND SPECIALTIFS

MAGTF C4 SYSTEMS MILITARY OCCUPATIONAL SPECIALTIES

INTRODUCTION

During the course of this study, an analysis of skills and personnel requirements of units within the various tables of organization has been conducted. This annex presents both the occupational fields and the military occupational specialties which are impacted by the introduction of the fourteen selected C4 systems into the Fleet Marine Force.

OCCUPATIONAL FIELD 02
INTELLIGENCE

The intelligence occupational field manages the collection, processing and dissemination of intelligence. Areas of intelligence operations include analysis, counterintelligence, imagery interpretation and interrogation-translation. Qualifications required include basic clerical skills, typing, communication abilities and specific technical skills dependent upon the particular assigned intelligence specialty. Marine intelligence specialists are required to learn and master a variety of analytical and technical skills. All Marines assigned to the intelligence occupational field are required to perform intelligence analyst functions. There are a wide variety of billets available, ranging from duty at all levels of the division and wing, as well as joint staff, to duty with unified and specified commands.

MOS 0202 INTELLIGENCE OFFICER

Intelligence officers function as advisors to the commander and assist in carrying out intelligence responsibilities. They formulate plans, policies and functions pertaining to intelligence and counterintelligence operations at all levels.

MOS 0231 INTELLIGENCE SPECIALIST MSgt through Pvt

Intelligence specialists have a basic familiarity with all phases and facets of intelligence with emphasis on tactical intelligence. Typical duties of intelligence specialists are assisting in collecting, recording, evaluating, interpreting and disseminating intelligence. Intelligence specialists may manage the administration of intelligence sections up to and including a Marine Amphibious Brigade (MAB).

OCCUPATIONAL FIELD 08
FIELD ARTILLERY

The field artillery occupational field is divided among 3 functional areas: firing battery, field artillery operations and field observation/liaison. Qualifications include ability and learned skills to operate and maintain artillery equipment and basic technical and mathematical skills for computing, communicating and executing fire commands.

MOS 0802 FIELD ARTILLERY OFFICER

Field artillery officers command, or assist commanders in directing field artillery units, and coordinating a unit's fire with other artillery units, air and naval units.

MOS 0844 FIELD ARTILLERY FIRE CONTROL MAN Sgt through Pvt

Field artillery fire control personnel perform duties essential to the delivery of accurate artillery fire to include position survey and fire direction computation. Fire control computation includes the use of computer equipment systems plotting survey data on firing charts, determination of target coordinates, and the conversion of target coordinates and observer's reports into firing data and commands. MOS 0844 is assigned either upon

completion of formal school or appropriate on-the-job training. Upon promotion to SSgt appropriate formal schooling/on-the-job training will be required.

MOS 0848 FIELD ARTILLERY OPERATIONS MAN MGySgt through SSGt

Field artillery operations personnel perform the various duties associated with the operation of a field artillery fire direction center or operations and training section.

OCCUPATIONAL FIELD 25
OPERATIONAL COMMUNICATIONS

The operational communications occupational field includes the installation, interconnectivity, and operation of electrical and electronic equipment and systems used to transmit messages and data.

MOS 2505 COMMUNICATION OFFICER

Communication officers command or assist in commanding a communication unit or element. Supervise and coordinate all aspects of the installation, operation, and maintenance of telecommunications systems.

MOSs 2512 AND 2513 FIELD WIREMAN Sgt through Pvt

Personnel holding this designation construct, operate and maintain wire networks to link key outposts, control points and headquarters with reliable paths for the transmission of telephone, teletype, facsimile and digital data messages.

MOS 2519 WIRE CHIEF GySgt through Sgt

Wire chiefs supervise the activities of personnel assigned to install, operate and maintain field wire systems or the outside plant facilities of a base telephone system.

MOS 2531 FIELD RADIO OPERATOR Sgt through Pvt

Field radio operators are personnel who employ radio to send and receive messages. Typical duties include the set up and tuning of radio equipment, including antennas and power sources; establishing contact with distant stations; processing and logging of messages; making changes to frequencies or cryptographic codes; and maintaining equipment at the first echelon level.

MOS 2537 through 2539 RADIO CHIEF GySgt through Sgt

Radio chiefs are Marine NCOs who are qualified to supervise the installation and operation of fixed and field radio stations, microwave stations and visual signaling stations.

MOS 2542 COMMUNICATION CENTER OPERATOR Sgt through Pvt

Communication center operators work in message and communication centers in the Fleet Marine Forces and at posts and stations. They process, record, and type messages, data cards and tape so that they can be sent or received. Duties include operating teletypewriters, optical character readers, tape transports and terminal consoles as well as logging, correcting, and retrieving messages.

MOS 2549 COMMUNICATION CENTER CHIEF GySgt through Sgt

Communication center chiefs are qualified to supervise the installation and operation of a communication center. Such centers link Marine Corps organizations worldwide with high speed, secure, record-type communications.

MOS 2591 OPERATIONAL COMMUNICATION CHIEF MGySgt through GySgt

Operational communication chiefs, as senior operational communication noncommissioned officers, directly assist the cognizant communications-electronics officer. To qualify as a 2591, a Marine must first qualify as either a wire chief, a radio chief or a communication center chief and be a graduate of the Marine Corps formal Operational Communication Chiefs School.

OCCUPATIONAL FIELD 26
SIGNAL INTELLIGENCE/GROUND ELECTRONIC WARFARE

The signals intelligence ground electronic warfare (SIGINT/EW) occupational field includes the operation of signals intelligence collection and communications equipment. Marines in this field conduct analyses of collected data and manage collection, production and communication facilities. There is a wide variety of billets available in the occupational field ranging from duty with the Marine Support Battalion at Naval Security Group field stations, the Fleet Marine Force radio battalions and the staff sections of the Marine divisions and wings.

MOS 2602 SIGNALS INTELLIGENCE/ELECTRONIC WARFARE OFFICER

Signals intelligence/electronic warfare officers command, or assist in commanding, a signals intelligence/ground electronic warfare unit and/or perform signals intelligence/electronic warfare (SIGINT/EW) officer duties of a technical nature.

MOS 2621 MANUAL MORSE INTERCEPT OPERATOR Sgt through Pvt

Manual Morse intercept operators use every phase of manual Morse communications intercept, including installation of equipment, laying out of antenna fields, conducting preventive maintenance on assigned equipment and the collection of manual Morse communication signals. Secondary duties and tasks include most aspects of electronic warfare/communications security (EW/COMSEC) operations and direction finding operations.

MOS 2629 SIGNALS INTELLIGENCE ANALYST GySgt through Sgt

Signals intelligence analysts duties encompass all facets of signals analysis and supervision of selected collection and EW/COMSEC operations.

MOS 2631 NON-MORSE INTERCEPT OPERATOR/ANALYST GYSgt through Pvt

Non-Morse intercept operators/analysts duties encompass all facets of non-Morse communications intercept and analysis, including operational and preventive maintenance. Operators must be familiar with non-Morse intercept receivers, recorders, demultiplexers and associated power supplies.

MOS 2632 NON-MORSE INTERCEPT OPERATOR/ANALYST GySgt through Pvt

Non-communications intercept operators/analysts duties encompass all the functions of non-communications electronic intercept operations and analysis to include installation, operation and preventive maintenance of associated equipment. Operators perform non-communications electronic signal search missions, record the intercept of signals utilizing photographic/electronic means, and measure, classify, and evaluate the signal with the goal of providing technical data on such electronic transmitters as those associated with early warning radar, target acquisition radar and gun laying radar. Operators perform signals analysis and prepare the electronic order of battle, operational appraisals, and map overlays as required.

MOS 2643 CRYPTOLOGIC TRANSLATOR GySgt through Sgt

Cryptologic translators duties encompass the monitoring, collection, transcription and translation of intercepted target communications. Translators first install and operate receiving, recording and associated power equipment; then translators search for, monitor, record, translate and report designated foreign voice transmissions. Translators also maintain certain records concerning operational and technical characteristics of transmissions monitored. Finally, analysts develop and maintain working aids as required, and supervise or assist in the supervision of the installation and operation of applicable signals collection and analysis facilities.

MOS 2649 CRYPTANALYST GySgt through Sgt

Cryptanalysts analyze, identify, decrypt, solve or assist in the recovery and solution of cryptographic systems. Analysts also categorize encrypted messages, identify characteristics of individual systems, and then prepare reports and record information of technical importance.

MOS 2651 SPECIAL INTELLIGENCE COMMUNICATOR MGSgt through Pvt

Special intelligence communicators' duties encompass all aspects of special intelligence communications including the utilization of equipment, conducting preventive maintenance on assigned equipment and the transmission and receiving of special intelligence via the Defense Special Security Communication System (DSSCS). Communicators also maintain files, logs and special intelligence communications related publications and perform other operational and administrative tasks.

MOS 2669 CRYPTOLOGIC SUPPORT SPECIALIST MSgt through Pvt

Cryptologic support specialists operate in support of cryptologic, signals intelligence and electronic warfare operations.

MOSs 2671 through 2675 CRYPTOLOGIC LINGUIST GySgt through Pvt

Cryptologic linguists monitor, transcribe and translate intercepted target communications, perform analysis and exploitation of designated foreign radio communications, and install, operate and perform preventive maintenance of radio intercept equipment.

MOS 2691 SIGNALS INTELLIGENCE/ELECTRONIC WARFARE CHIEF MGySgt and Msgt

Duties of the signals intelligence/electronic warfare chiefs encompass management and supervision of the various cryptologic disciplines to include collection, production and analysis. SIGINT/EW chiefs supervise the activities of personnel engaged in performing communications intercept, electronic reconnaissance, radio direction finding, analysis and reporting functions, communications security and other electronic warfare roles.

OCCUPATIONAL FIELD 28
DATA/COMMUNICATIONS MAINTENANCE

The data/communications maintenance occupational field includes the diagnosis, repair, adjustment and calibration of electronic equipment and systems used by Marine Corps ground forces. The equipment and systems include various types of communications hardware, data terminals, cryptographic devices, small missile systems, ground radar, and a wide range of test equipment and calibration devices. Qualifications to work in this field include manual dexterity, normal color vision, the ability to understand involved technical material and to comprehend somewhat complex mathematical and logic principles. Types of entry-level jobs available include work as a telephone technician, teletype technician, ground radio repairer, test measurement and diagnostic equipment technician, and ground radar repairer. Formal schooling is provided to all Marines entering this field. In general, entry-level training consists of basic electronics, fundamentals instruction and an equipment oriented phase at either a Marine Corps or other service school.

Advancing from the entry-level MOS may involve either related supervisory-level training or a lateral move to another MOS within the field. Billets for data/communications maintenance personnel are found throughout the Marine Corps but are concentrated within units having specific electronic or service support missions. Marines in this field may serve within division or wing units, at a force service support group or at a depot effecting the complete overhaul of electronic equipment. Instructor billets are found at the formal schools and on inspector-instructor staffs. Marines entering this field will be assigned MOS 2800, Basic Data/Communications Maintenance Marine.

MOS 2811 through 2814 TELEPHONE TECHNICIAN MSgt through Pvt

The telephone technician MOS and its related skill designators identify Marines who repair telephones, switchboards and related equipment. The MOS is assigned upon completion of the telephone-switchboard repair course. Additional training is required for assignment of MOS 2813 or 2814. In the NCO grades, telephone technicians plan extensive telephone and switching systems in conjunction with other technician specialists or may supervise a shop providing maintenance support to other units. Application may be made to move laterally to MOS 2822, Electronic Switching Equipment Technician, upon promotion to sergeant.

MOSs 2818 AND 2819 TELETYPE TECHNICIAN MSgt through Pvt

Teletype technicians repair teletype equipment used by communication centers throughout the Marine Corps. The 2818 Marine may apply for lateral movement to other MOSs in Occupational Field 28 as a reenlistment option.

MOS 2822 ELECTRONIC SWITCHING EQUIPMENT TECHNICIAN MSgt through Pvt

Electronic switching equipment technicians are qualified to maintain computer-controlled electronic switching systems. Typical duties are the use of a maintenance panel or test equipment to check switching system status,

replacement of inoperative components or parts and interconnection of electronic switching systems with other communication elements. Electronic switching equipment technicians must understand programming codes to establish system modes of operation or to execute diagnostic routines.

MOS 2827 MOBILE DATA TERMINAL TECHNICIAN MSgt through Cpl

Mobile data terminal technicians are qualified to emplace, interconnect and maintain Mobile Data Terminal Equipment, AN/TYC-5A. The AN/TYC-5A is a tactical, computer-controlled, data/communications link with the worldwide Automatic Digital Network (AUTODIN). Prior to entering training on the AN/TYC-5A, the Marine must have had training and experience in the maintenance of equipment based on digital logic principles, including peripheral equipment. Typical duties are diagnosing system troubles and replacing components, printed circuit boards and parts. Technicians must also be familiar with teleprinters, magnetic tape transports, card readers, and tape punches as means of accessing the special purpose computer of the AN/TYC-5A.

MOS 2829 MOBILE COMMUNICATONS CENTER TECHNICIAN MSgt through Cpl

Prior to entering training for mobile communications center technician, Marines must be qualified in the maintenance of fixed-plant teletype equipment. After further training on Mobile Communications Central AN/TGC-37, Marines are assigned MOS 2829. The AN/TGC-37 is a shelterized, dolly-transportable, fixed-plant teletype exchange complete with cryptographic provisions and patch panels. It is used as a message processing facility at tactical headquarters. Mobile communications center technicians adjust and repair fixed-plant teletype equipment within the AN/TGC-37. They also assist operational personnel in connecting the AN/TGC-37 with transmission media and instruct in the capabilities of this mobile communications central.

MOS 2830 GROUND RADAR MAINTENANCE OFFICER

Ground radar maintenance officers directly supervise installation, operation, maintenance, and repair of all electronics equipments within the ground radar fields to include artillery data computer equipment.

MOS 2841 GROUND RADIO REPAIRER Sgt through Pvt

Ground radio repairers install and repair radio equipment, including multichannel radio equipment, used by ground and aviation forces. 2841s also perform troubleshooting on combinations of radio sets, terminals, control units, and related devices to ensure reliable service to users. Typical duties include the repairing, aligning and calibration of radio equipment and secure voice systems; requisitioning o' components and parts; completion of repair requests and records; and the interconnection of equipment to provide special capabilities. MOS 2841 is assigned upon completion of the ground radio repair courses at entry level.

MOSs 2861 RADIO TECHNICIAN MSgt through Sgt

Radio technicians are qualified to install and make authorized repairs and modifications to single channel and multichannel radio systems used by the Marine Corps. These technicians supervise radio maintenance activities and instruct in the use and repair of radio related equipment and systems. MOS 2861 coordinates equipment repair with other communication and electronic activities, evacuates unrepairable components and completes requisitions, deadline reports, and other required documentation.

MOS 2874 METROLOGY TECHNICIAN MGySgt through Cpl

Metrology technicians encompass every facet of metrology with the exception of radiological measurements. Typical duties of metrology technicians include calibrating precision electronic, mechanical, physical, optical, infrared and

laser test, measurement and diagnostic equipment (TMDE) through use of measurement standards having a higher order of accuracy.

MOSs 2881 AND 2882 COMMUNICATION SECURITY EQUIPMENT TECHNICIAN MSgt through Pvt

Communication security equipment technicians are qualified to perform unlimited cryptographic maintenance on KL-7, KW-7, KY-28 and KY-38. The skill designator, MOS 2882 incorporates these skills and KG-30 unlimited cryptographic maintenance in addition. These technicians diagnose malfunctions in and make authorized repairs and modifications to communication security (COMSEC) equipment. MOS 2891 will be assigned upon promotion to master gunnery sergeant.

MOS 2884 GROUND RADAR REPAIRER SSgt through Pvt

Ground radar repairer and maintenance specialists encompass both operations and maintenance tasks. Typical duties include installing, inspecting, testing, repairing and crewing lightweight search radar sets (AN/PPS-15) and radar transponders (AN/PPN-18 and AN/UPN-32). MOS 2884 is assigned upon the completion of a formal ground radar repair course. Upon promotion to SSgt and the successful completion of the Ground Radar Technician Theory Course, MOS 2889 will be assigned.

MOS 2885 FADAC RADAR REPAIRER SSgt through Pvt

FADAC radar repairers are members of a highly skilled occupational field specializing in the repair and maintenance of digital computer systems (M-18) used in artillery fire direction and survey data reduction. Typical duties include inspecting, testing, servicing and repair of field artillery data computers and computer systems. MOS 2885 is assigned upon completion of the (Army) Fire Control Computer Repair Course. Upon promotion to SSgt and the

successful completion of the Ground Radar Technician Theory Course, MOS 2889 will be assigned. This MOS will repair the Battery Computer System when fielded as a replacement for the FADAC M-18.

MOS 2886 ARTILLERY ELECTRONIC REPAIRER SSgt through Pvt

Artillery electronic repairer's duties include both operational and maintenance support tasks. Typical duties include installing, inspecting, testing, and repairing crew and operating artillery electronic equipment (M-90, GMD-1, MRA-301 and GSQ-184). MOS 2886 is assigned upon the completion of the Artillery Electronic Equipment Repair Course. Upon promotion to SSgt and the successful completion of the Ground Radar Technician Course, MOS 2889 will be assigned.

MOS 2891 DATA/COMMUNICATIONS MAINTENANCE CHIEF MGySgt

Data/communications maintenance chiefs perform staff duties in formulating and implementing maintenance and supply plans, provisioning data/communications items and preparing or reviewing publications and training materials.

OCCUPATIONAL FIELD 40
DATA SYSTEMS

The data systems occupational field includes computer systems analysis, software design, and computer and peripheral equipment operation functions in support of Marine Corps information systems. Types of entry-level jobs available include work as a programmer or as a computer and associated peripheral equipment operator. There is a wide variety of billets available in the occupational field at divisions, wings, force service support groups, major posts and stations and Headquarters Marine Corps.

MOS 4002 DATA SYSTEMS OFFICER

Data systems officers manage the activities of a data system activity which encompass systems for recording, collecting, controlling, verifying, interpreting, and presenting data used in planning and directing automated Marine Corps data systems.

MOS 4010 DATA SYSTEMS SOFTWARE OFFICER

In conjunction with a functional systems analyst, the Data Systems Software officer analyzes objectives, policies, procedures, organization and administrative workflow within a functional area. Produces computer programs and documentations required to support the development and implementation of automated data systems.

MOS 4034 COMPUTER OPERATOR MSgt through Pvt

Computer operators work a computer console and associated peripheral equipment to process data in accordance with scheduled operations.

MOS 4038 DATA CONTROL COORDINATOR MGySgt through Cpl

Data control coordinators perform duties requiring detailed knowledge of the computer systems operations in a multi-programming environment.

MOS 4041 TELEPROCESSING SPECIALIST MGySgt through Sgt

Teleprocessing specialists perform technical analysis and programming required to generate and maintain the teleprocessing system. This MOS is designed to identify those Marines with teleprocessing software skills.

MOS 4063 (COBOL), MOS 4065 (ALC) AND MOS 4066 (EDL) PROGRAMMER MGySgt through Pvt

Programmers prepare, design, and write computer application programs, procedures, and systems. Programmers also provide customer assistance in dealing with the products of the computer program; delete outmoded systems, troubleshoot programs, load software, and maintain programmer libraries.

MOS 4069 SYSTEMS PROGRAMMER MGySgt through Sgt

Systems programmers perform technical analysis and programming required to effect systems generation, analyze and evaluate system releases and versions for effect on application programs, and effect operating system generating according to installation needs.

MOS 4071 DATA BASE MANAGEMENT SYSTEM (DBMS) SPECIALIST MGySgt through Sgt

Data base management system specialists perform technical analysis and programming required to effect DBMS generation; analyze and evaluate DBMS releases and versions for effect on application programs according to installation needs.

OCCUPATIONAL FIELD 59
ELECTRONICS MAINTENANCE

The electronics maintenance occupational field encompass the repair of all organic electronics equipment peculiar to the Marine Air Command and Control System (MACCS). Marines entering this occupational field will receive the Basic Electronics Maintenance Marine, MOS 5900. After completion of formal schooling, they will be assigned a particular 5900 MOS designating them to a specific job in the electronics maintenance field.

MOS 5911 MICROMINIATURE CIRCUIT REPAIR SPECIALIST MGySgt through Cpl

Microminiature circuit repair specialists analyze failed microminiature circuits and determine and apply appropriate repair procedures. Only Marines possessing this MOS are authorized to perform the actual repair of microminiature circuits.

MOSs 5962 through 5964 TACTICAL DATA SYSTEMS REPAIRER SSgt through Pvt

Tactical data system repairers install, align, inspect, test, maintain and repair electronic modules, assemblies and subassemblies of the Tactical Air Command Central (TACC) AN/TYQ-1, the Tactical Air Operations Central (TAOC), AN/TYQ-2, or the Tactical Data Communications Central (TDCC) AN/TYQ-3A. The appropriate tactical data systems repairer MOS is assigned upon completion of Basic Electronics School and one of the tactical data systems schools at Marine Corps Communications-Electronics School.

MOS 5970 DATA SYSTEMS MAINTENANCE OFFICER

Supervises and coordinates the siting, installation, operation, maintenance, and repair of automated data systems.

MOSs 5974, 5978 AND 5979 TACTICAL DATA SYSTEM TECHNICIAN MSgt through Sgt

Tactical data system technicians perform, supervise and instruct on the installation, inspection, testing, maintenance and repair of all analog and digital circuitry of the tactical data systems (TDS) and associated peripheral equipment.

MOS 5977 TACTICAL GENERAL PURPOSE COMPUTER TECHNICIAN MSgt through Sgt

Tactical general purpose computer technicians are responsible for all the technical duties required for the maintenance of the tactical general purpose computer equipment within the Fleet Marine Forces.

MOS 5994 TACTICAL DATA SYSTEMS MAINTENANCE CHIEF MGySgt

Tactical data systems maintenance chiefs coordinate the maintenance activities of the enlisted personnel engaged in tactical data systems maintenance, and supervise and instruct these personnel in electronic maintenance functions. Maintenance chiefs also perform staff duties in formulating and implementing maintenance and supply plans for provisioning electronic items and preparing publications and training materials.

OCCUPATIONAL FIELD 63/64
AVIONICS

The avionics occupational field includes direct and indirect support of all aviation weapon systems. The following examples are provided: direct support - repair accomplished at the organizational maintenance activity (OMA) which is normally accomplished "on aircraft"; e.g., replacement of the radar antenna on the aircraft; indirect support - repair accomplished at the intermediate maintenance activity (IMA) which is normally accomplished "off aircraft"; e.g., radar system module repair, repair/calibration of the radar support equipment. Marines entering the field receive MOS 6300, Basic Avionics Marine, then progress through specific hard skill MOSs.

MOSs 6312, 6313, 6314, 6215, 6316, 6317, 6322, 6323 AND 6324 AIRCRAFT COMMUNICATIONS/NAVIGATION SYSTEMS TECHNICIAN, OMA, GySgt through Pvt

Aircraft communications/navigation systems technicians install/remove, inspect, test, maintain and repair components, subsystems and ancillary equipment of installed aircraft communication/navigation (COMM/NAV), deceptive electronic countermeasures (DECM) systems at the organizational maintenance activity (OMA) level. Candidate MOSs for installation and maintenance of the PLRS Basic User Unit.

MOSs 6412, 6413 AIRCRAFT COMMUNICATIONS SYSTEM TECHNICIAN, FIGHTER/ATTACK AND HELICOPTER/KC-130/OV-10, IMA, GySgt through PVT

Satisfactorily complete appropriate Naval Air Maintenance Training Group Schools or equivalent IMA maintenance course on fighter/attack, or helicopter/KC-130/OV-10 aircraft communications systems, or have completed a sufficient period of on-the-job training to qualify as an Aircraft Communications Systems Technician, IMA. Candidate MOSs for installation and maintenance of the PLRS Basic User Unit.

OCCUPATIONAL FIELD 72
AIR CONTROL/AIR SUPPORT/ANTIAIR WARFARE

The air control, air support and antiair warfare occupational field includes the operation and management of the air command and control functions associated with the Marine aircraft wing. Qualifications required include manual dexterity for man-machine interfaces, visual/auditory/speech skills, radio transmission abilities and the capability to work closely as a member of a command and control team. The duties involve technical skills and procedures that are initially learned through formal schools and enhanced by individual and team training. Air control, air support and antiair warfare Marines will be required to learn the emplacement, cabling, orientation and operation of air command, control and antiair warfare defense systems

equipment. Types of entry-level jobs available include work as a FAAD gunner, HAWK missile system operator, air command and control electronics operator and air support operations operator. There is a wide variety of billets available in the occupational field ranging from duty at the group, squadron/battalion, or battery level within the Marine Air Command and Control System, to duty with the Marine Corps Development Center, Marine air reserve training detachments and various Category "B" billets (MOSs 8000-9599). Marines entering the occupational field will receive MOS 7200, Basic Air Control/Air Support/Antiair Warfare Marine. They will participate in routine air command and control functions while training for a designated MOS within the occupational field.

MOS 7210 AIR DEFENSE CONTROL OFFICER

Directs fighter aircraft in the interception of hostile aircraft. Coordinates the employment of surface-to-air missiles. Provides en route control and navigational assistance to aircraft in area of responsibility. Supervises the emplacement of air defense radars and associated command and control system. Provides ECM evaluation and guidance on ECCM utilization. Provides coordination in the exchange of tactical air plot in real time for joint and allied operations. Operates and evaluates status of automated equipment required to conduct air defense operations. Acts as planning officer for detailed planning of air defense operations. Must be a graduate of Air Defense Control Officer Course, Twenty-nine Palms, CA, or have previously been qualified in MOS 7236, Tactical Air Controller.

MOS 7234 AIR COMMAND AND CONTROL ELECTRONICS OPERATOR MGySgt through Pvt

Air command and control electronics operators perform duties incident to the operation of tactical air command and control systems and supervise and participate in the movement, emplacement, cabling, orientation and operation of tactical air command and control systems. Operators are cable of filling

any operational billet appropriate to grade in MACS, TACC or MACG Headquarters. Satisfactorily complete the Air Control Electronic Operator Course.

MOS 7236 TACTICAL AIR DEFENSE CONTROLLER MGySgt through Sgt

Tactical air defense controllers direct aircraft in the interception of hostile aircraft, provide positive control of friendly aircraft, and participate in the coordination of surface-to-air weapons and interceptors in an antiair warfare environment. Must be currently qualified in MOS 7234. Satisfactorily complete the Tactical Air Defense Controller (MOS 7236) Course at Twenty-nine Palms, CA.

ANNEX G

COMMUNICATIONS SECURITY (COMSEC) EQUIPMENT DESCRIPTION

ANNEX G

COMMUNICATIONS SECURITY (COMSEC) EQUIPMENT DESCRIPTION

This annex catalogs both current and projected COMSEC equipment that is to be used in the C4 systems under study. A brief general description is presented in the following subparagraphs on each COMSEC device identified in the main text. More specific details and technical characteristics for each individual device can be found in the KAO-193A/TSEC, Guidelines for the Use and Operation of TRI-TAC COMSEC Equipment (U); KAO-162A/TSEC, Operating Instructions for TSEC/KY-68 and HYX-68 (V-1) TSEC (U); and the KAO-180A/TSEC, Operating Instructions for TSEC/KG-82, TSEC/KGX-93, and the TSEC/KG-93 (U).

1. TSEC/KG-13, Electronic Key Generator

The KG-13 is a transistorized, full-duplex, digital key generator. It operates in the synchronous mode and receives and transmits data at rates of 150, 300, 600, 1200, and 2400 baud. The KG-13 interfaces with a Type II modem and is currently used in the AN/TYC-5A Data Communications Terminal and the Ground Mobile Forces Satellite program.

2. TSEC/KG-22, Key Generator

The KG-22 is an accessory key generator used on the Link-11 Naval Tactical Data System/Airborne Tactical Data System (NTDS/ATDS).

3. TSEC/KG-27, Key Generator

The KG-27 is a full-duplex, on-line, trunk encryption device used with multichannel pulse code modulation (PCM) systems which include the AN/GRC-201 and the Ground Mobile Forces (GMF) Satellite program. The KG-27 normally operates with individual TD-660/G multiplexers throughout the PCM system to encrypt/decrypt six or twelve-channel voice groups. Multiple TD-660/Gs and KG-27s used with TD-754, TD-202, and TD-976 digital multiplexers can provide higher trunk data rates and can handle groups with more channels.

4. TSEC/KG-30, Electronic Key Generator

The KG-30 is a miniaturized, synchronous, full-duplex, security device used on point-to-point, netted, and broadcast circuits. It provides security for multichannel teletypewriter, digital data, voice or facsimile signals when used with appropriate ancillary equipment.

5. TSEC/KG-40, Key Generator

The KG-40 is used in the Naval Tactical Data System/Airborne Tactical Data System (NTDS/ATDS) for encryption of data on the Tactical Digital Information Link (TADIL) "A" link.

6. TSEC/KG-81, Trunk Encryption Device (TED)

The KG-81 is a full-duplex, on-line key generator. It provides bulk encryption and decryption of either digital trunk line traffic or multichannel data links between circuit and message switches. It can pass traffic data ranging from 9.6 Kbps to 20 Mbps. The KG-81s will replace the KG-27s. The KG-81 is a component of the AN/TTC-42 and is used for bulk encryption/decryption of multichannel digital trunks and loop groups.

7. TSEC/KG-82, Loop Key Generator (LKG)

The KG-82 is a digital loop security device that can be plugged onto the line. It is a component of the AN/TTC-42, Unit Level Circuit Switch and the AN/GYC-7, Unit Level Message Switch. It provides full-duplex encryption/decryption of the signaling and traffic serial bit streams between these switches and the TSEC/KG-68s, the TSEC/KG-84/KG-84A, and other TSEC/KG-82s. It also provides an encryption interface for circuit switch to message switch trunks.

8. TSEC/KG-84, Dedicated Loop Encryption Device (DLED)

The KG-84 is a stand-alone device. It provides for full-duplex encryption/decryption of teletypewriter and data traffic on netted and point-to-point circuits. It also provides access to TRI-TAC switches. It can interoperate with a TSEC/KG-82 loop key generator (LKG) housed in the

switch, with another KG-84 or with a TSEC/KG-84A (a designated replacement for the KG-84). The KG-84 can operate in any of four modes: full-duplex, simplex, transmit-only, and receive-only. The KG-84 can be operated by local control or can be remotely controlled. It incorporates all necessary cryptographic electronics including: key generators, variable storage, processing and control, key-generation controls for both transmit/receive, and clock and data recovery. The KG-84 can handle up to 64 Kbps of synchronous digital or up to 9.6 Kbps of teletypewriter data.

9. TSEC/KG-93, Tactical Trunk Encryption Device (TAC-TED)

The KG-93 is a full-duplex on-line key generator. It can encrypt and decrypt digital data at rates of up to 1.544 Mbps. It is a ruggedized, stand-alone device used to bulk encrypt/decrypt digital trunk groups from the SB-3865 unit level circuit switch (ULCS). It can only encrypt/decrypt one trunk group at a time. The KG-93 may, in time, replace the TSEC/KG-27 key generator.

10. TSEC/KG-94, Trunk Encryption Device (TED)

The KG-94 is a full-duplex, on-line cryptographic device. It provides bulk encryption/decryption of either trunk line traffic or multichannel data links between TRI-TAC automatic switches. The KG-94 is similar in function to the KG-81. The two are cryptographically interchangeable

when operating in the same data range. As it becomes available to the field units, the KG-94 will in time replace the KG-81. The KG-94 will also replace the KG-27.

11. TSEC/KGV-6, Security Device

The KGV-6 is the internal source data unit or integrated COMSEC device for the receiver-transmitter set (RTS) of the User Unit (UU) of the Position Location Reporting System (PLRS). The security device is a component of the PLRS, RT-1343/TSQ-129.

12. TSEC/KGX-93, Automatic Key Distribution Center (AKDC)

The KGX-93 is a component of the AN/TTC-42, ULCS. It provides automatic key distribution, key variable generation, COMSEC clock generation and distribution, and interface and common support functions for up to 8 TSEC/KG-82s.

13. TSEC/KW-7, Electronic Tactical Teletypewriter Security Equipment

The KW-7 is a half-duplex, on-line, asynchronous, security device for netted or point-to-point teletypewriter terminals. It operates with standard military teletypewriter terminal equipment. The KW-7 is transistorized and can operate in the high-level, 20 or 60 Ma current, loop mode. A full-duplex circuit will require a total of two KW-7s.

14. TSEC/KY-57, 58, VINSON

The KY-57/58, developed under the VINSON program and SAVILLE logic, are wideband (16 Kbps) digital voice/data encryption/decryption devices that utilize CVSD voice processing and provide security for certain UHF and VHF radio links. The KY-57 and 58 encrypt digital voice orderwires and voice transmission over combat net radios. The KY-57 is designed for manpack use, while the KY-58 is used for airborne/fixed-plant applications.

15. TSEC/KY-65, 75, PARKHILL

The KY-65/75 are narrowband analog voice security devices which can be used with existing high frequency (HF) radios and wireline circuits. The KY-65 is for manpack/vehicle use, and may be powered from a battery or vehicle power adapter. The KY-75 is utilized for remote aircraft/shipboard use, and requires a source of 115-200 VAC or 24 VAC.

16. TSEC/KY-67, BANCROFT

The KY-67 is a wideband (16 Kbps), VHF/FM, digital voice radio set, incorporating integral COMSEC circuitry, and is designed for manpack use. The KY-67 equipment is compatible with VINSON secure voice radios. The KY-67 has the following characteristics:

- o Frequency range: 30-76 Mhz
- o Channel spacing: 25 Khz
- o Number of channels: 1,840
- o Transmission range: 9.6 Km (6 miles)
- o Modulation: FM
- o Transmission rate: 16 Kbps
- o Prime power required: 18 watts

17. TSEC/KY-68, Digital Subscriber Voice Terminal (DSVT)

The KY-68 is a ruggedized field telephone with audio processing, signaling, and cryptographic functions. It also contains a diphase modem that provides secure and nonsecure voice and data transfer at 16 or 32 Kbps. The KY-68 can operate with all the TRI-TAC automatic switches in a digital network. It can run on common battery power supplied by the local circuit switch or on external power from the HYP-71/TSEC auxiliary power supply. A self contained battery maintains variable storage.

The KY-68 can operate on a point-to-point connection full-duplex and in the half-duplex push-to-talk (PTT) mode. The 16-key (4x4) keyboard provides keys for the digits 0 through 9, 4 precedence keys, a conference key, and an operator recall key. The KY-68 has visual indicators for the ring or busy signal and for a nonsecure warning (NSW). A data port on the rear of the equipment can accommodate tactical digital facsimile (TDF) and other compatible data terminal equipment (DTE).

ANNEX H

GLOSSARY

GLOSSARY

ACG	Acquisition Coordinating Group
ADP	Automatic Data Processing
ADPE-FMF	Automated Data Processing Equipment-FMF
AIS	Automated Information System
ALO	Advanced Logistic Order
AMS	Alternate Master Station (PLRS)
ASIP	All Source Imagery Processor
ASPO	Acquisition Sponsor Project Officer
ATE	Automatic Test Equipment
BCS	Battery Computing Equipment
BITE	Built-In Test Equipment
BN	Battalion
BUU	Basic User Units (PLRS)
C2	Command and Control
C3I	Command, Control, Communications and Intelligence
C4	Command, Control, Communications, and Computer
CAEMS	Computer Aided Embarkation Management System
CCP	Communications Control Panel (MIFASS/TCO)
C-E	Communications-Electronics
COC	Combat Operations Center
COMSEC	Communications Security
COPTIR	Concept for Organizational, Personnel and Training Integration Requirements
COTS	Commercial-off-the-Shelf
CPU	Central Processing Unit
CRITICOMM	Critical Communications Network
CSS	Computer Sciences School

DASC	Direct Air Support Center
DCT	Digital Communications Terminal
DFASC	Deployable Force Automated Services Center
DNVT	Digital Non-Secure Voice Telephone
DSVT	Digital Secure Voice Telephone
ELMACO	Electronics Maintenance Company
EO	Electro-Optic
EPS	Enlisted Planning System
ERO	Equipment Repair Order
EUC	End-User Computer
EUCE	End-User Computer Equipment
FADAC	Field Artillery Digital Automatic Computer
FDC	Fire Direction Center
FMF	Fleet Marine Force
FSIC	Fire Support Information Center
FSCC	Fire Support Coordination Center
FSD	Full Scale Development
FSSG	Force Service Support Group
H&S	Headquarters and Service
HQCO	Headquarters Company
IAC	Intelligence Analysis Center
IC	Information Center
II	Imagery Interpretation
ILS	Integrated Logistic Support
ILSP	Integrated Logistic Support Plan
IO	Inventory Objective
ISC	Information System Coordinator
ISIS	Integrated Signals Intelligence System
ISMO	Information Systems Management Officer

JAMPS	JINTACCS Automated Message Processing System
JUMPS	Joint Uniform Military Pay System
K-93	Tactical Trunk Encryption Device
LAP	Letter of Adoption and Procurement
LFICS	Landing Force Integrated Communications System
LFOSS	Landing Force Organization System Study
LORA	Level of Repair Analysis
LRU	Lowest Replaceable/Repairable Unit
LSA	Logistic Support Analysis
M3S	Marine Corps Standard Supply System
MAB	Marine Amphibious Brigade
MACG	Marine Air Control Group
MACS	Marine Air Control Squadron
MAF	Marine Amphibious Force
MAGIS	Marine Air-Ground Intelligence System
MAGTF	Marine Air Ground Task Force
MASC	MAGTF Automated Services Center
MAU	Marine Amphibious Unit
MAW	Marine Aircraft Wing
MCCDPA	Marine Corps Central Design and Programming Activity
MCDEC	Marine Corps Development and Education Command
MCLRP	Marine Corps Long-Range Plan
MCPDM	Marine Corps Program Decision Memorandum (formerly MSARC)
MIFASS	Marine Integrated Fire and Air Support System
MILOGS	Marine Integrated Logistic System
MILSTD	Military Standard
MIMMS	Marine Integrated Maintenance Management System
MIPS	Marine Integrated Personnel System
MMROP	Marine Corps Mid-Range Objectives Plan
MMS	Maintenance Mangement System

MOS	Military Occupational Specialty
MPS	Maritime Preposition Shipping
MS	Master Station (PLRS)
MS-DOS	A Computer Operating System
MSC-63A	Communications Central
MTACCS	Marine Tactical Command and Control System
NIPSTRAFAC	Naval Intelligence Processing System Training Facility
OF	Occupational Field
OIC	Officer-in-Charge
PDSS	Post Deployment Software Support
PLI	Position Location Information
PLRS	Position Location Reporting System
PM	Program Manager
PSC-2	Digital Communications Terminal
QDR	Quality Deficiency Report
R/DF	Reproduction/Distribution Facility
RDF	Radio Direction Finding
REAL FAMMIS	Real Time Financial and Manpower Management Information System
RFP	Request for Proposal
S-280	2 1/2 Ton Shelter
SAAS	Stand Alone Analyst Subsystem
SAC	Study Advisory Committee
SASSY	Supported Activities Supply System
SB-3865	Switching Unit, Telephone, Automatic
SDA	Source Data Automation
SIGINT	Signal Intelligence
SLAR	Side Looking Acquisition/Aperture Radar

SMR CODES	Source, Maintainability, and Recoverability Codes
SMUG	Subject Matter User Group
SOW	Statement of Work
SPINTCOMM	Special Intelligence Communications
SSCC	Special Security Communications Center
T/E	Table of Equipment
T/O	Table of Organization
TAC	Tactical Air Commander
TACC	Tactical Air Command Center
TACFIRE	Tactical Fire Direction System (Army)
TAOC	Tactical Air Operations Center
TAOM	Tactical Air Operations Module
TBD	To Be Determined
TCAC	Technical Control and Analysis Center (Army)
TCC	Tactical Communications Central
TCO	Tactical Combat Operations
TDS	Tactical Data System
TEMPEST	DoD/NSA Security Initiative for Computers and Related Hardware
TERPES	Tactical Electronic Recon Processing and Evaluation System
TGC-37	Communications Central (Teletype)
TRITAC	Joint Tactical Communications Office
TSQ-130	Technical Control and Analysis Center (Army)
TTC-42	Central Office, Telephone, Automatic
TYC-5A	Data Communications Terminal (AUTODIN)
TYQ-19	Intelligence Analysis Center
ULCS	Unit Level Circuit Switch
ULMS	Unit Level Message Switch
UU	User Unit (PLRS)