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FINAL EXECUTIVE SUMMARY AND TECHNICAL REPORT (A007 & A009) VOLUMES I & III

All Source Analysis System (ASAS)
Block I
Abbreviated HARDMAN Analysis
(- Tradeoff Analysis)
(Delivery Order Number 0041)

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Volume I is the Technical Report on the results obtained from application of the HARDMAN Comparability Methodology (HCM) to the Army's All Source Analysis System (ASAS) Block I configuration. The HCM was used to determine manpower, personnel, and training (MPT) requirements of the Block I ASAS, as well as the impacts of those requirements on the Army's current and future resources.

Volume III is the Executive Summary of the ASAS Block I HARDMAN Analysis.

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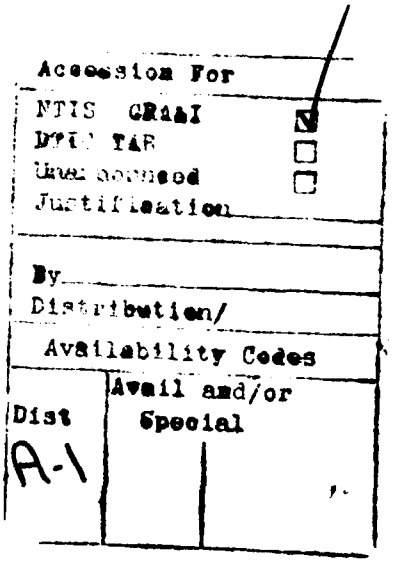

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1.0 EXECUTIVE SUMMARY

This Abbreviated HARDMAN analysis has been performed to provide early identification of the Manpower, Personnel and Training (MPT) impact caused by the fielding of the All Source Analysis System (ASAS) to the total force. This configuration is known as the Block I Configuration. Manpower Requirements, in this analysis, are the human resources needed to accomplish specified workloads associated with operating and maintaining the ASAS Block I configuration.

The objectives of the Manpower Requirements Analysis are:

a. To provide CDR, USAIC-FH, the ASAS Project Manager (PM), and other decision makers with estimates of manning requirements by MOS and pay grade for use in decision making.

b. To provide the ASAS PM and USAIC-FH with input for the ASAS Block I manning requirements, to include TOE analysis.

c. To provide USAIC-FH training resource analysts with operator and maintainer military occupational specialty (MOS) requirements, duty position requirements, and skill level requirements for which personnel will have to be trained to support the total fielding of the ASAS.

d. To provide Army personnel analysts with the number of system position requirements by MOS and pay grade for each echelon of the ASAS Block I total fielding plan.

1.1 MISSION OF ASAS

ASAS is a software intensive distributed processing system which will provide Intelligence and Electronic Warfare (IEW) and limited Operations Security (OPSEC) support to the battlefield commander. Further, it will increase the speed and accuracy of intelligence collection and analysis and will speed distribution of intelligence to air and ground commanders by automating many of the current manual intelligence functions.

1.2 UNITS AFFECTED

For Block I, ASAS will be fielded to one Airborne Corps, two Heavy Corps, five Heavy Divisions and three Light Divisions. This volume details the Manpower, Personnel, and Training (MPT) requirements for these four types of units.

1.3 SYSTEM HARDWARE

1.3.1 TSE Hardware

The system hardware for the ASAS TSE at all echelons consists of the following:

a. Workstation, Computer Graphics (WCG). The TSE WCG is the primary man-machine interface and consists of a processor, two graphics generators, two high resolution color monitors, a keyboard, a cursor control device, hard disks, optical disk reader, printer, and a LAN interface. It is type-classified as AN/TYQ-37(V)5. Maintenance significant assemblies are shown in Appendix A.

b. Data Processor Set (DPS). The TSE DPS provides the computing resources for the processing software and with the WCG is designed to allow the operator to record, store, correlate, and analyze vast amounts of intelligence data in an accurate and

timely manner. It is type-classified as AN/TYQ-36(V)3. Maintenance significant assemblies are shown in the Appendix B.

c. Communications Control Set (CCS). The CCS is the primary communications interface between ASAS enclaves and area communications systems. It can also serve as an intelligence message concentrator for battalion IEW assets operating in the forward area of the battlefield. The CCS shelter contains radio transmitters and receivers, cryptographic equipment, communications processors, user terminals, and voice communication equipment. It is type-classified as AN/TYQ-40(V)2. Maintenance significant assemblies are shown in Appendix C.

d. Supplemental Equipment (SUP). Supplemental Equipment is the phrase used to capture all the trucks, trailers, generators, electronic equipment and miscellaneous equipment. The Corps and Heavy Division TSE sets are named SUP 1; the Light Division TSE set is named SUP 3. See paragraph 1.3.3 for further explanation.

1.3.2 ASAS TCAE Hardware

The system hardware for the TCAE consists of the following:

a. TCAE Workstation (TCAE W/S). The TCAE W/S was formerly called Hawkeye, or Artificial Intelligence Module Test Bed (AIMTB) as part of the Balanced Technology Initiative. The TCAE W/S system is comprised of ruggedized commercial computer hardware with a combination of commercial off-the-shelf (COTS) and government/contractor developed software applications. The TCAE W/S terminals will be used in the TCAE Enclave to process intelligence messages passed via the Technical Control and Analysis Center (TCAC) in the Corps and Heavy Division configurations, or the CCS in the Light Division configuration. Two clusters of Sun workstations, monitors, disk drives and peripheral equipment make up one TCAE W/S system. It is type-

classified as AN/TYQ-52(). Maintenance significant assemblies are shown in Appendix D.

b. Technical Control and Analysis Center (TCAC). The TCAC system consists of an S-280 shelter containing electronic equipment mounted on a five-ton truck, a trailer-mounted generator and cabling to receive power and interconnect with other TCAC shelters. For the Block I application, the TCAC will provide communications, power and message release capabilities for the TCAE enclave at Corps and Heavy Division. It is type-classified as AN/TSQ-130(V). Maintenance significant assemblies are shown in Appendix E.

c. CCS See paragraph 1.3.1.c above. In the Light Division TCAE configuration, the CCS replaces the TCAC for communications interface with collectors, sensors, and EW management systems and provides transmission of high priority information between area communications systems.

d. Supplemental Equipment (SUP). The Corps and Heavy Division TCAE sets are named SUP 2; the Light Division TCAE set is named SUP 4. See paragraph 1.3.3 below.

1.3.3. Supplemental Equipment (SUP)

The Supplemental Equipment (SUP) includes the Supplementary Equipment, Electronic (SEE) support items of equipment necessary to integrate the workstations with the host processor and communications interface facilities. It also includes the Additional Support Items Of Equipment (ASIOE) such as trucks, generators, and trailers. Connectivity and transportation for and within the enclaves is provided by the Supplemental Equipment. The Supplemental Equipment in the Division CEWI Battalion and Corps Operation Battalion also include an electronic maintenance shelter (ESS) which provides operational space and storage for system spares and 4 Contact Test Sets for direct support level

ASAS maintenance at the TCAE and TSE enclaves. Maintenance-significant assemblies are shown in Appendices G-1 through G-4. See Section 2 of the Technical Report for detailed information.

1.4 SYSTEM SOFTWARE

1.4.1 ASAS TSE System Software

The TSE system software, Version 2.06G, is the Baseline software. The TSE Block I software will provide functional capabilities in the following areas:

a. All Source Processing
b. Situation Development
c. Target Development
d. Intelligence Collection Management
e. Intelligence Message Processor
f. Message Release Authority
g. Functional Manager
h. Query Support
i. User Support
j. Interactive Parsing

1.4.2 ASAS TCAE System Software

The Baseline software for the ASAS TCAE system is Version 2.1. This software will provide the following functional capabilities:

a. Collection Management
b. Asset Management
c. COMINT Processing and Analysis
d. ELINT Processing and Analysis
e. Target Development

1.5 CONFIGURATIONS

The Baseline Comparison System for this analysis is the IOTE Configuration. This configuration was analyzed in detail as part of the ASAS HARDMAN, December 1988, and provides an established departure point for this Abbreviated HARDMAN analysis.

Figure 1.5 shows the unique equipment configurations for Block I ASAS.

	HEAVY						LIGHT	
	CORPS MI OPS BN		DIVISION		CORPS MI OPS BN (ABN)		DIVISION	
	TA&P CO	CTOC SPT CO	MI BN HHS	DIV HHC	OPS CO	OPS CO	MI BN HHS	DIV HHC
	TCAE	TSE	TCAE	TSE	TCAE	TSE	TCAE	TSE
TSE WCG		6		6		6		6
DPS		2		2		2		2
CCS		1		1		1	1	1
TCAE WCG CLUSTER	2		2		2		2	
TCAC	2		2		2			
SPT PKG	1	1	1	1	1	1	1	1

Figure 1.5
ASAS Block I Configurations

1.6 MANPOWER ANALYSIS

For purposes of this analysis, the following TOE were used to model equipment utilization, manpower allocation and personnel utilization:

a. Airborne Corps: Operations Battalion, MI Brigade, TOE 34305L,
b. Heavy Corps: MI Battalion (Operations), TOE 34405L,
c. Heavy Division TSE: HHC, Heavy Division, TOE 87004L,
d. Heavy Division TCAE: MI Battalion, TOE 34285L,
e. Light Division TSE: HHC, Light Division, TOE 77004L,
f. Light Division TCAE: MI Battalion, TOE 34295L

1.6.1 Operator Manpower/MOS/Grade Determination

The operator selections were constrained by the MOS/grades authorized in the above TOE for the units receiving the equipment. Organizational functions and operator functions vary by enclave and TOE section within enclaves. Operator MOS and grades vary by function, enclave and unit. USAIC-FH manning rules require one operator per 12 hour shift. Wartime operations require two 12 hour shifts per 24 hour period. Therefore each TSE WCG, TCAE W/S and CCS requires a minimum of two operators. The TCAC vans are fielded as a pair and each van requires two operators per shift for a total of eight persons per 24 hours. The manpower numbers do not include backups. Additionally, there are off-line support positions available in the TOE. These positions represent additional manpower to perform the functions not covered by the software such as section command and control as well as off-line support to the operators, e.g., off-line analysis of data.

Hardware modules requiring operators, based on the System Analysis, include the TSE Workstation (TSE WCG), the Communications Control Set (CCS), the TCAE Workstation (TCAE W/S) and the Technical Control and Analysis Central (TCAC). The

primary task and workload drivers are the TSE WCG and TCAE W/S, with the TCAC and CCS secondary.

1.6.2 TSE WCG Operators

The distribution of TSE WCG operators by enclave, workstation and grade is shown in Section 3 of this document. All positions developed are based on the capabilities of a soldier who is fully trained, qualified, and motivated. In past HARDMAN analyses, the Corps on-line intelligence analysis was judged to be of such a critical and time-sensitive nature in the TSE that Captains and Warrant Officers were assigned to workstations. As officers comprise the majority of manpower slots available in the Heavy and Airborne TSE TOE, this assumption was continued for this analysis. The number of TSE WCG operators for the ASAS Block I Configuration fielding is 132.

1.6.3 CCS Operators

USAIC-FH directed the use of CMF98 and 98C MOS if possible for all CCS operators. CCS operational modes include the Airborne and Heavy Corps TSE enclave, the Heavy and Light Division TSE, and the Light Division TCAE. The number of CCS operators required for the total fielding by the Block I Configuration is 28. See Section 3 for more details.

1.6.4 TCAE W/S Operators

The distribution of TCAE W/S operators by enclave, workstation and grade is shown in Section 3 of this report. USAIC-FH and PM CAC guidance on TCAE operator assignments was to use enlisted personnel for operator positions whenever possible. The number of TCAE W/S operators for the ASAS Block I fielding is 132.

1.6.5 TCAC Operators

USAIC-FH directed the use of CMF98 and 98C MOS if possible for all TCAC operators. TCAC operational modes include the Airborne and Heavy Corps TCAE enclave and the Heavy Division TCAE. The number of TCAC operators required for the total fielding by the Block I Configuration is 64. See Section 3 for more details.

1.6.6 ASAS Block I Operator Recap

Figure 1.6.6 below depicts the ASAS Operator manpower requirements for the Block I fielding. Total operator manpower requirement for the ASAS Block I fielding is 356.

TSE		
	WCG OPERATOR	
	OFFICER	9
	WARRANT OFFICER	47
	ENLISTED	76
	CCS	22
TSE TOTAL		154
TCAE		
	TCAE W/S OPERATOR	
	OFFICER	0
	WARRANT OFFICER	24
	ENLISTED	108
	CCS	6
	TCAC	64
TCAE TOTAL		202
GRAND TOTAL		356

Figure 1.6.6
ASAS Operator Manpower Requirements, Force Level

1.6.7 Supervisor Requirement

Off-line supervisors are identified for information purposes only since they are not included in manpower and personnel numbers but do require ASAS unique training. Supervisors were selected based on the requirement for supervision at section or higher organizational levels, e.g., Mission Supervisor, Section or Shift Leader, or OIC. Supervisory manpower training requirements at force level are 44.

1.6.8 Maintainer Manpower Requirement

To calculate the total Maintainer Manpower requirement, the component parts of each module (TSE WCG, TCAE W/S, CCS, TCAC, DPS, and Enclave Supplemental Equipment) were broken down and workload determined by MOS and echelon for each component. ASAS unique equipment maintenance workload was based on the ASAS LSAR data and an operating tempo of 20.7 hours per day for a mission profile of 7555.5 hours of operation per year. All GFE workload came from MARC data. If the unit workload by MOS at each maintenance level was greater than .50 manyears, an additional TOE space was identified as a requirement.

Maintenance manpower requirements by MOS are depicted for an Airborne Corps, a Heavy Corps, a Heavy Division, and a Light Division for unit, direct support and general support in Figures 1.6.8A and B. Note that the 33T requirements do not actually come into existence until FY94 when the DS-level maintenance work is transferred from Interim Contractor Support to the unit 33T.

In the case of the Light Division TCAE, the inclusion of the CCS in place of the two TCACs immediately justifies the additional 33T due to the unit-level 33T maintenance manhours associated with the CCS. But adding the CCS eliminates the expensive TCAC Contractor support, one MOS 63B, one 52C and one 52D.

ABN CORPS MI BN		
33T	(E5)	1*
52C	(E4)	1
52D	(E5)	1
63B	(E5)	1
TOTAL:		4

HVY CORPS MI BN		
33T	(E3)	1*
52C	(E4)	1
52D	(E4)	1
63B	(E3)	1
TOTAL:		4

* With Direct Support FY94

Figure 1.6.8A
Corps Maintenance Manpower Increases, Unit Level

LIGHT DIV HHC	
33T	0*
52C	0
52D	0
63B (E3)	1

HVY DIV HHC	
33T	0*
52C	0
52D	0
63B (E4)	1

LIGHT DIV MI BN	
33T (E3)	1*
52C	0
52D	0
63B (E5)	1
TOTAL:	3

HVY DIV MI BN	
33T (E4)	1*/**
52C	0
52D	0
63B (E4)	1
TOTAL:	3

* 33T'S in CEWI BN Support HHC
** With Direct Support FY94

Figure 1.6.8B
Division Maintenance Manpower Increases, Unit Level

The total manpower requirement for maintainers is 36.

1.6.9 Total Manpower Requirements

The total manpower requirement to field the ASAS Block I Configuration of 1 Airborne Corps, 2 Heavy Corps, 5 Heavy Divisions and 3 Light Divisions (11 fielded systems) is 392 personnel as shown in Figure 1.6.9 below. Details are shown by TSE Operator, TCAE Operator and Maintainer in Section 3 of this report.

MANPOWER REQUIREMENTS
FORCE LEVEL SUMMARY

	OPERATOR	MAINTAINER	TOTAL
OFFICER	9	0	9
WARRANT OFFICER	71	0	71
ENLISTED	276	36	315
TOTAL	356	36	392

Figure 1.6.9
Total ASAS Block I Manpower Requirements

1.7 PERSONNEL ANALYSIS

The two major objectives of the Personnel Requirements Analysis are to determine personnel pipeline requirements for the MOSs in the proposed system and to determine the number of personnel which must be trained per year to support manpower requirements.

1.7.1 Personnel Requirements Analysis

The Personnel Requirements Analysis determines the number of personnel needed in the inventory to support system specific manpower requirements.

1.7.2 THS Personnel Requirements Analysis

The THS Personnel Requirements Analysis is used to determine the number of personnel required in the inventory by MOS and grade to support system specific manpower requirements. It includes determination of the percentage of personnel above the manpower requirement needed to cover Transient, Holdee, and Student (THS) requirements.

1.7.3 Required Training Graduate Analysis

The on hand inventory is constantly changing due to personnel leaving the MOS and/or Army and promotions to the next higher grade. Those losses must be replaced by trainees, warrant officers and officers graduating from Initial Entry Training (IET), Warrant Officer Basic Courses, and Officer Basic Courses. The Training Graduates Analysis determines the number of graduates required each year to replace losses assuming the historical attrition and promotion rates will prevail in the future. Whenever ASAS unique training is required (operator, supervisor, ASAS maintainer), replacement personnel training requirements were determined.

1.7.3.1 Operator Required Graduate Analysis

The replacement methodology was used for this report. Details of the methodology is contained in Section 4.

1.7.3.2 Total Personnel and Graduate Requirements

The total manpower, personnel and annual graduate requirements are as follows:

	MANPOWER	PERSONNEL	GRADUATES
Operators			
Officer	9	10.7	2.3
Warrant	71	77.2	20.0
Enlisted	276	282.6	98.2
Subtotal	356	370.5	120.5
Maintainers			
Enlisted	36	37.2	18.6
Supervisors *			11.0
Total	392	407.7	139.1
Less: non-ASAS trained Maintainers	0	0	12.8
	395	410.7	138.7

* Supervisor manpower (44) and personnel (51) are not a requirement against ASAS. Graduates are shown for training purposes only.

Figure 1.7.3.2
Total ASAS M/P/G Requirement

1.8 GENERAL TRAINING RESOURCE REQUIREMENT ANALYSIS (GTRRA)

The GTRRA is normally conducted in two steps: a course requirements analysis and a training cost and resources determination. For this abbreviated analysis, the ASAS course requirements were based on the USAIC-FH ASAS Institutional Training Resource Requirements Analysis (ITRRA) Report prepared by Hay Systems Inc.(HSI) for U.S. Army Training and Doctrine Command (TRADOC) in August, 1991. Key assumptions and constraints are below. See Section 5 of this report for more information.

1.8.1 Assumptions

(1) An ASAS PDI has been approved. This will allow tracking of ASAS-trained soldiers for near-term utilization.

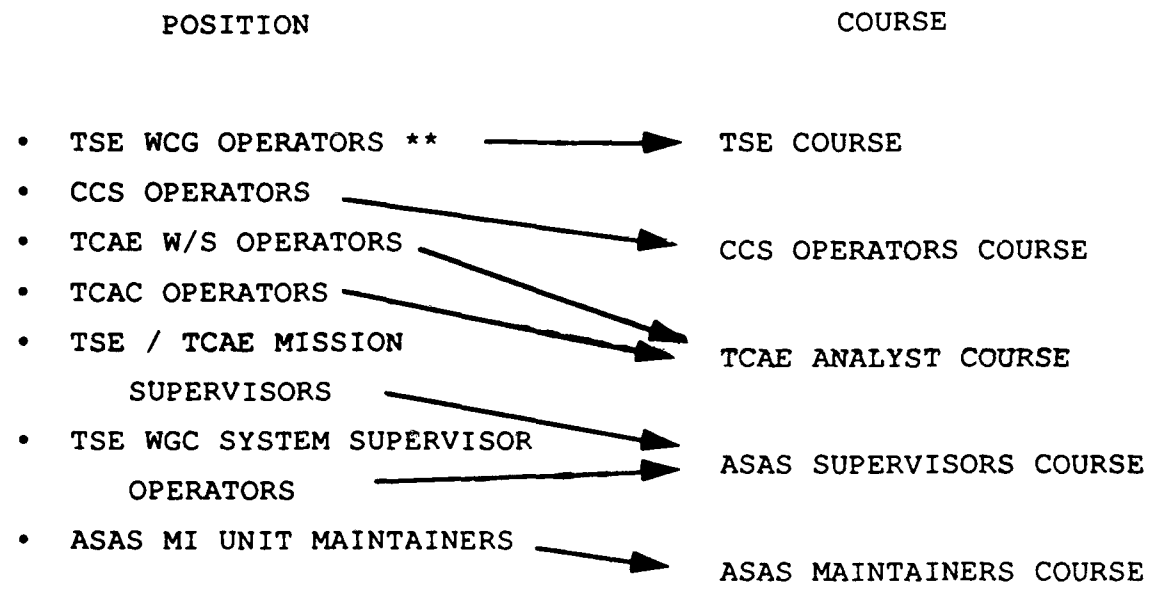
(2) Only replacement personnel need to receive ASAS training. Otherwise the entire MOS would be trained to ensure an ASAS trained replacement was available.

(3) ASAS specific training will be in addition to current POI training.

(4) The courses in this study are based on the USAIC-FH ASAS ITRRA Report. The ITRRA report used the ASAS New Equipment Training (NET) POI developed by ManTech as a beginning point, then developed a Quasi-POI which brought the multiple Functional Identities (FIs) into the training concept. The courses and course information are in Section 5.

1.8.2 ASAS Training Strategy

The ASAS Training Strategy is depicted in Figure 1.8.2 below. TSE WCG operators will attend the nine week TSE Operators course. CMF 98 personnel designated to be CCS operators will attend the 6 week CCS Operators Course. TCAE W/S operators and TCAC operators will attend the 5 week TCAE Analyst course. All Mission Supervisors and TSE System Supervisors will attend the 5 week ASAS Supervisor course. The ASAS 33T unit-level maintainers will attend the ASAS Maintainers course.



** Less System Supervisors

Figure 1.8.2
ASAS HARDMAN Training Strategy

1.8.3 Training Cost and Resource Determination

Training cost and resources were developed using the Department of the Army approved Man Integrated Systems Technology (MIST) methodology that has been incorporated into the ASAS HARDMAN MPT model described in Section 5.1.4.

1.8.4 Operator/Supervisor/33T Training

Training costs and resources determination were done using the following training costing strategy. The Block I required operator graduates were run through the 96B10 IET course and either the TSE WCG Operator course, the CCS Operator course, or the TCAE Analyst course. The required warrant officer operator graduates were run through the MI Warrant Officer Basic course and either the TSE WCG Operator course or the TCAE Analyst course. Finally, the required officer operator graduates were programmed through the MI Officer Basic course and TSE WCG Operator course. All required CCS operators were run through the 96B10 IET course and the CCS Operator course. All required TCAC operators were programmed through the TCAE Analyst course. The training costing strategy for supervisors was similar. Required supervisors from both the TSE and TCAE enclaves, to include TSE System Supervisors, were programmed through the Advanced NCO course, Advanced MI Warrant Officer course or Advanced MI Officer course as appropriate and through the ASAS Supervisor course. The process for analyzing maintainer costs and resources were the same as that used above. For all maintainer MOS, only the required Block I graduates were run through each particular course.

1.8.5 General Training Resource Requirements Summary

The training costs are broken out in terms of operator, supervisor, and maintainer training and then totalled. The annual training cost to field the ASAS Block I configuration to 1 Airborne Corps, 2 Heavy Corps, 5 Heavy Divisions and 3 Light Divisions is 138.7 graduates per year at an estimated annual cost of $1,187,000 and 11.8 new instructor manyears. Further details are contained in Figure 1.8.5 below.

COURSE	REQUIRED GRADS	ANNUAL COST ($K)	NEW INSTRUCTORS
TSE WCG OPERATOR COURSE	31.0	$ 394	4.0
CCS OPERATOR COURSE	10.8	$ 96	1.2
TCAE ANALYST COURSE	73.9	$ 509	5.4
ASAS SUPERVISOR COURSE	16.1	$ 139	0.6
ASAS MAINTAINER COURSE	6.9	$ 49	0.6
TOTAL	138.7	$ 1,187	11.8

Figure 1.8.5
General Training Resource Requirements Summary

1.9 IMPACT ANALYSIS

The major objectives of the impact analysis are to establish resource availability, determine critical resources and assess the force level impact. Tradeoffs were subsequently conducted to evaluate alternatives that might impact the baseline options.

1.9.1 Impact Analysis Process

Resource availability was based on TOEs, POIs, PERSCOM Force Management Books (Volumes I and II), proponent school estimates of available training resources and other materials listed in Section 6 of this report. The impact analysis compares current manpower, personnel and training resources with those required for the ASAS Block I fielding. The determination of critical requirements is based on projected supply versus projected demand for resources.

1.9.2 Total Force Level Manpower Impact

The ASAS MOS requirement has minimal impact on the officer and enlisted MOS structure. Warrant Officer requirements for MOS 350B, 352C, 352G, and 352J do significantly effect the current status. ASAS requires 29% of the Army inventory of the Order of Battle Technician, MOS 350B. The PERSCOM projection for this MOS is good however, with over 100% projected strength for FY 93-94. Details are shown in Section 6 of this report.

1.9.3 MOS Availability

Operator manpower came from within existing TOE authorizations for the TSE and TCAE workstation operators, CCS/TCAC operators, and supervisors.

Maintainer manpower requires an increase of 36 spaces in MOS 33T, 53C, 52D and 63B with no offsets identified at this time.

1.9.4 Critical Resource Requirements

1.9.4.1 Manpower

Operators for the ASAS Block I configuration are within the projected TOE authorizations, but MOS and grades are not optimal for ASAS operators. TOE structures should be reviewed once ASAS is fielded. The 36 additional maintenance positions must be resourced. The Light Division TOE is the most severely impacted by introduction of ASAS Block I.

1.9.4.2 Personnel

ASAS Block I causes minimal personnel impact on officers in the TOEs evaluated. Warrant Officer utilization is high, but the analysis tools available via ASAS will enhance the technician's role in the TSE and TCAE enclaves. The FY92 projected MOS availability ratio in the officer and warrant officer Career Management Field 35 exceeded 100% except for MOS 352J Emanations Analyst Technician at 87.0%. The CMF 35 personnel picture is projected to improve through FY93. The ASAS personnel percentage requirement for officers is 0.2% of total strength and 20.7% of warrant officer strength. Impact on the enlisted force is minimal with a 3.9% requirement of projected operating strength. FY 90 statistics show CMF 96 at 107% strength and CMF 98 at 104% strength. Maintainer MOSs are at or near 100% availability.

1.9.4.3 Training

ASAS Block I is a resource impact on USAIC-FH to provide five new courses, train 138.7 required graduates annually at a yearly estimated cost of $1,187,000, and provide 11.8 new instructors.

2.0 SYSTEM ANALYSIS

2.1 SYSTEM ANALYSIS PROCESS

The major objectives of the system analysis process are to:

a. Identify the mission needs which require the development of the new ASAS system.

b. Determine the major system functions required to meet the mission needs.

c. Identify the Proposed System, including actual or projected new system design concepts and equipment configuration.

d. Determine the reliability and maintainability parameters for the Proposed Systems.

e. Determine the generic operator and maintainer functional tasks and workload.

2.2 ASSUMPTIONS AND CONSTRAINTS

2.2.1 Assumptions

a. The ASAS equipment will operate 20.7 hours per day for 7555 hours per year.

b. Operator workload is based on 12 hour shifts.

c. The workload for maintainers will be based on maintenance man hours per system/component. The source for maintenance manhours will be the LSAR Data Base for ASAS unique items. This data will be derived from predictive data. All other workload data will reflect MARC values. The MARC September 1991 data was used in this analysis.

d. Maintenance support for government furnished equipment (GFE) is in accordance with established Army procedures within organic Army units using four levels of maintenance. Maintenance support for contractor furnished equipment (CFE) will be

accomplished in two phases which are structured to three maintenance levels.

(1) In Phase I (FY92-93), ASAS TSE and TCAE equipment (CFE and GFE) will be supported by organic personnel at the unit level. An exception is the TCAC CFE equipment, which will be maintained via Life Cycle Contractor Support (LCCS) for its life cycle through all levels of maintenance. Test Program Sets are supported with organic assets in the Electronic Maintenance Company of the Division Support Command or the COSCOM which supports the MI Brigade. Direct Support for ASAS TSE will be accomplished using Interim Contractor Support (ICS). Depot support for ASAS will be provided by a designated Army Depot. The ASAS TCAE will use LCCS for both DS and Depot-level maintenance.

(2) In Phase II (FY94 and beyond), ICS DS-level maintenance will transition to the government. TCAC, TCAE Workstation and TPS will continue to be supported as cited in Phase I.

(3) Due to the short timeframe for Phase I, it was deemed not feasible to apply both the Phase I and Phase II Maintenence Concepts to the manpower requirements analysis. Therefore, this HARDMAN analysis used the Phase II Maintenence Concept to calculate the manpower needs for ASAS.

Figure 2.2.1.1 illustrates the ASAS maintenance concept.

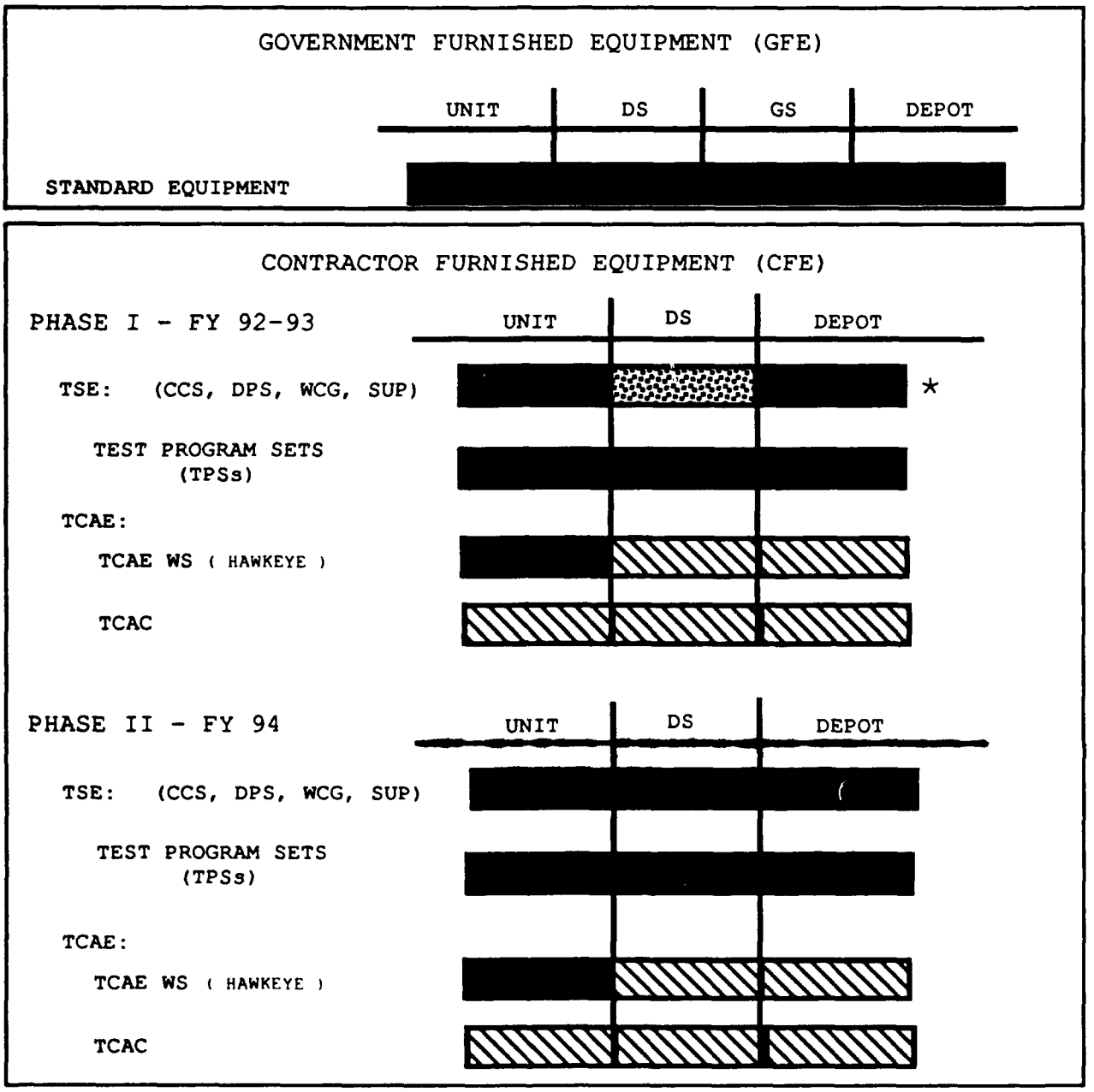


Figure 2.2.1.1

ASAS Maintenance Concept

e. The maintenence and supply concept is depicted in Figure 2.2.1.2 below. Contact Teams from the MI Battalion come to the TSE or TCAE, repair or replace broken parts, then return defective LRU's to the Battalion Maintenence Activity for repair or forwarding to DISCOM or Depot.

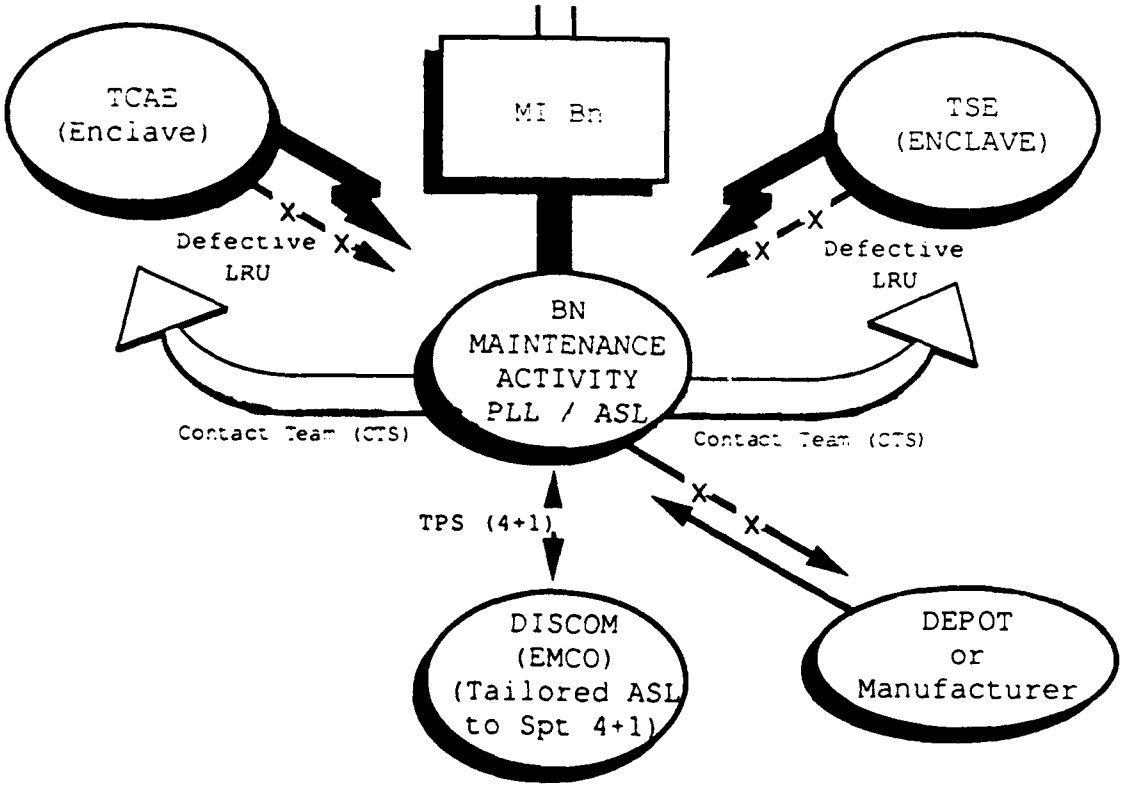


Figure 2.2.1.2
ASAS Maintenance and Supply Flow

e. For Block I, ASAS will be fielded to one Airborne Corps, two Heavy Corps, five Heavy Divisions and three Light Divisions. For purposes of this analysis, the following TOE's were used to model equipment utilization, manpower allocation and personnel utilization:

(1) Airborne Corps: Operations Battalion, MI Brigade, TOE 34305L,

(2) Heavy Corps: MI Battalion (Operations), TOE 34405L,

(3) Heavy Division TSE: HHC, Heavy Division, TOE 87004L,

(4) Heavy Division TCAE: MI Battalion, TOE 34285L,

(5) Light Division TSE: HHC, Light Division, TOE 77004L,

(6) Light Division TCAE: MI Battalion, TOE 34295L

f. The number of ASAS modules by type unit and equipment are based on the Block I Fielding Configurations as depicted in Figures 2.2.1.3 and 2.2.1.4.

g. The ASAS unique equipment configurations are shown in Figure 2.2.1.5.

h. The four ASAS Supplemental Equipment Sets (SUP) are broken out in Appendix G.

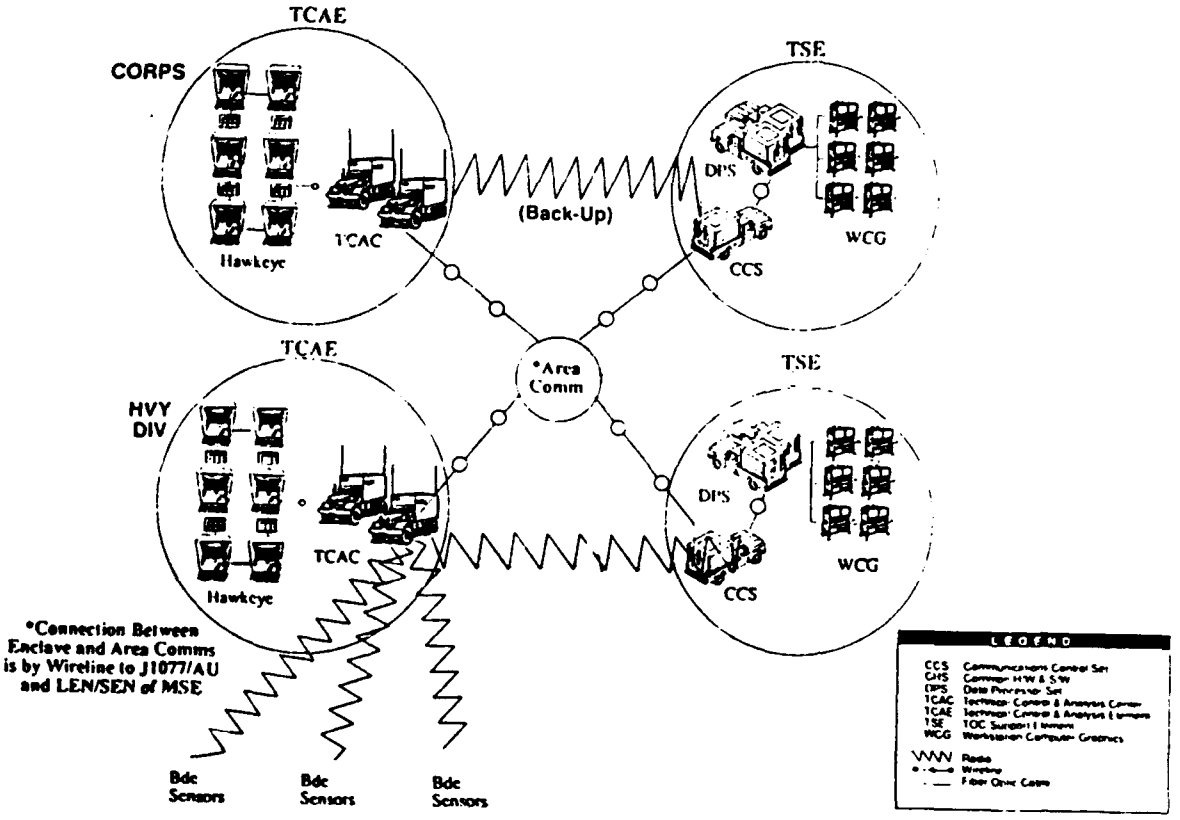


Figure 2.2.1.3
ASAS Block I Heavy Configuration

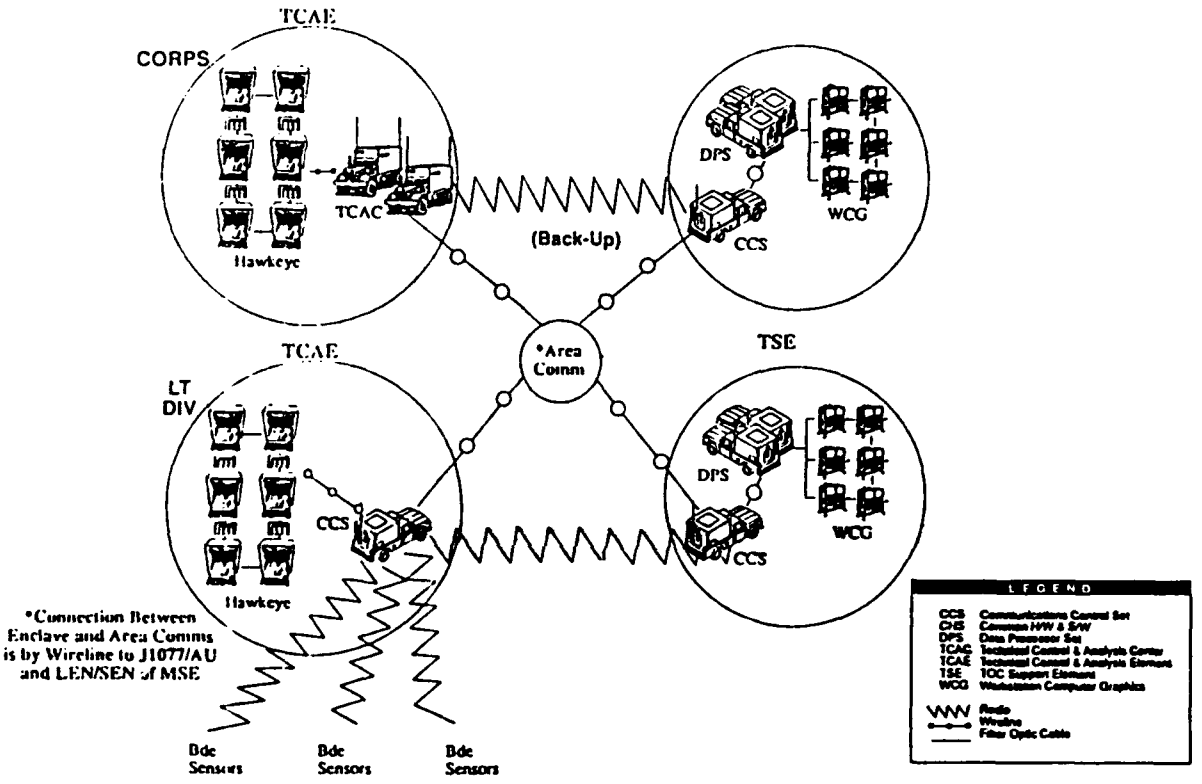


Figure 2.2.1.4
ASAS Block I Light Configuration

	HEAVY						LIGHT	
	CORPS MI OPS BN		DIVISION		CORPS MI OPS BN (ABN)		DIVISION	
	TA&P CO	CTOC SPT CO	MI BN HHS	DIV HHC	OPS CO	OPS CO	MI BN HHS	DIV HHC
	TCAE	TSE	TCAE	TSE	TCAE	TSE	TCAE	TSE
TSE WCG		6		6		6		6
DPS		2		2		2		2
CCS		1		1		1	1	1
TCAE WCG	2		2		2		2	
CLUSTER TCAC	2		2		2			
SPT PKG	1	1	1	1	1	1	1	1

Figure 2.2.1.5
ASAS Block I Unique Equipment Configurations

2.2.2 Constraints

a. Maintainer workload analysis will be based on the Army Manpower Requirements Criteria (MARC) Maintenance Data Base wherever possible. MARC will take priority over predicted Logistic Support Analysis Record (LSAR) data in all cases.

b. Operator manpower will be constrained to TOE authorizations.

2.3 ASAS MISSION ANALYSIS

2.3.1 Major Mission

The mission of the ASAS is to provide the U.S. Army a means for gaining a timely and comprehensive understanding of opposing force deployments, capabilities, and potential courses of action. With this knowledge, the battle managers will more effectively conduct the AirLand Battle. The ASAS system will increase the speed and accuracy of intelligence collection and analysis and its time sensitive distribution to air and ground commanders by automating many of the current manual intelligence functions. The ASAS is a software intensive, distributed processing system intended to provide Intelligence and Electronic Warfare (IEW) and Operations Security (OPSEC) support to the battlefield commander. Subordinate missions include Intelligence Data Analysis and command and control communications.

2.3.2 Functions

The functional requirements of BLOCK I ASAS are:

a. Mission and System Management
b. Communications
c. Data Processing and Analysis
d. Situation Development
e. Target Development
f OPSEC Support
g. SIGINT Analysis and Reporting
h. System Survivability
i. System Sustainability

2.4 EQUIPMENT COMPARABILITY ANALYSIS

2.4.1 Interim System

The ASAS Block I configuration is the first step in the evolutionary acquisition process to build a series of ASAS systems that are capable of satisfying the Required Operational Capability (ROC) criteria. The Block I system allows analysis and processing of collected data to produce enemy order of battle and situation data, target nomination, COMINT, ELINT, and other intelligence information necessary to the tactical commander and staff in the Tactical Operation Center (TOC) Support Element (TSE). The system also supports Division and Corps Technical Control & Analysis Elements (TCAE) and TSE's. It manages organic Combat Electronic Warfare and Intelligence (CEWI) resources in SIGINT collection and EW missions. It provides the MI battalion or brigade with an ADP assisted interface between a TCAE and the collection and jamming resources.

2.4.2 Baseline Comparison System (BCS)

The 1988 ASAS HARDMAN Analysis Technical Report (1988 IOT&E configuration) is the Baseline Comparison System. This analysis is a revision of the earlier report, using the government's latest Block I equipment configuration and the latest version of TOE's for the user organizations.

2.4.3 Proposed System

In the Block I configuration, the Heavy Corps and and Airborne Corps MI Operations Battalion will have ASAS TSE enclaves with six WCGs, two DPSs, one CCS, and one set of supplemental equipment. The ASAS TCAE enclaves will have six TCAE W/S and two TCACs. In the Heavy and Light Division Headquarters and Headquarters Company (HHC), the TSE enclaves will have the same equipment sets as above. The Heavy Division MI Battalion TCAE will have six TCAE

W/S and two TCACs, but the Light Division TCAE will substitute a CCS for the TCACs. See previously shown Figures 2.2.1.3 and 2.2.1.4 for details.

Later configurations, being developed under an Evolutionary Acquisition strategy, will satisfy the remaining requirements of the ROC. Conversion to ATCCS Common Hardware and Software, and improvements in field operability (rapid set-up and tear-down, enhanced analysis and jump capability) will be satisfied incrementally in succeeding Blocks of the EA project.

2.4.4 System Hardware

2.4.4.1 TSE Hardware

The system hardware for the ASAS TSE at all echelons consists of the following:

a. Workstation, Computer Graphics (WCG). The TSE WCG is the primary man-machine interface and consists of a processor, two graphics generators, two high resolution color monitors, a keyboard, a cursor control device, hard disks, optical disk reader, printer, and a LAN interface. It is type-classified as AN/TYQ-37(V)5. Maintenance significant assemblies are shown in Appendix A.

b. Data Processor Set (DPS). The TSE DPS provides the computing resources for the processing software and with the WCG is designed to allow the operator to record, store, correlate, and analyze vast amounts of intelligence data in an accurate and timely manner. It is type-classified as AN/TYQ-36(V)3. Maintenance significant assemblies are shown in the Appendix B.

c. Communications Control Set (CCS). The CCS is the primary communications interface between ASAS enclaves and area communications systems. It can also serve as an intelligence

message concentrator for battalion IEW assets operating in the forward area of the battlefield. The CCS shelter contains radio transmitters and receivers, cryptographic equipment, communications processors, user terminals, and voice communication equipment. It is type-classified as AN/TYQ-40(V)2. Maintenance significant assemblies are shown in Appendix C.

d. Supplemental Equipment (SUP). Supplemental Equipment is the phrase used to capture all the trucks, trailers, generators, electronic equipment and miscellaneous equipment. The Corps and Heavy Division TSE sets are named SUP 1; the Light Division TSE set is named SUP 3. See paragraph 2.4.4.3 for further explanation.

2.4.4.2 ASAS TCAE Hardware

The system hardware for the TCAE consists of the following:

a. TCAE Workstation (TCAE W/S). Formerly called Hawkeye, or Artificial Intelligence Module Test Bed (AIMTB) as part of the Balanced Technology Initiative. The TCAE W/S system is comprised of ruggedized commercial computer hardware with a combination of commercial off-the-shelf (COTS) and government/contractor developed software applications. The TCAE W/S terminals will be used in the TCAE Enclave to process intelligence messages passed via the Technical Control and Analysis Center (TCAC) in the Corps and Heavy Division configurations, or the CCS in the Light Division configuration. Two clusters of Sun workstations, monitors, disk drives and peripheral equipment make up one TCAE W/S system. It is type-classified as AN/TYQ-52(). Maintenance significant assemblies are shown in Appendix D.

b. Technical Control and Analysis Center (TCAC). The TCAC system consists of an S-280 shelter containing electronic equipment mounted on a five-ton truck, a trailer-mounted generator and cabling to receive power and interconnect with other TCAC

shelters. For the Block I application, The TCAC will provide communications, power and message release capabilities for the TCAE enclave at Corps and Heavy Division. It is type-classified as AN/TSQ-130(V). Maintenance significant assemblies are shown in Appendix E.

c. CCS. See paragraph 2.4.4.1.c above. In the Light Division TCAE configuration, the CCS replaces the TCAC for communications interface with collectors, sensors, and EW management systems and provides transmission of high priority information between area communications systems.

d. Supplemental Equipment (SUP). The Corps and Heavy Division TCAE sets are named SUP 2; the Light Division TCAE set is named SUP 4. See paragraph 2.4.4.3 below.

2.4.4.3 Supplemental Equipment (SUP)

The Supplemental Equipment (SUP) includes the Supplementary Equipment, Electronic (SEE) support items of equipment necessary to integrate the workstations with the host processor and communications interface facilities. It also includes the Additional Support Items Of Equipment (ASIOE) such as trucks, generators, and trailers. Connectivity and transportation for and within the enclaves is provided by the Supplemental Equipment. The Supplemental Equipment in the Division CEWI Battalion and Corps Operation Battalion also include an electronic maintenance shelter (ESS) which provides operational space and storage for system spares and 4 Contact Test Sets for direct support level ASAS maintenance at the TCAE and TSE enclaves. Maintenance-significant assemblies are shown in Appendices G-1 through G-4.

2.4.5 System Software

2.4.5.1 ASAS TSE System Software

The TSE system software, Version 2.06G, is the Baseline software. The TSE Block I software will provide functional capabilities in the following areas:

a. All Source Processing
b. Situation Development
c. Target Development
d. Intelligence Collection Management
e. Intelligence Message Processor
f. Message Release Authority
g. Functional Manager
h. Query Support
i. User Support
j. Interactive Parsing

2.4.5.2 ASAS TCAE System Software

The Baseline software for the ASAS TCAE system is Version 2.1. This software will provide the following functional capabilities:

a. Collection Management
b. Asset Management
c. COMINT Processing and Analysis
d. ELINT Processing and Analysis
e. Target Development

2.5 RELIABILITY AND MAINTAINABILITY (R&M) ANALYSIS

ASAS Block I reliability was analyzed by component or assembly to determine the duration or probability of failure-free performance under stated conditions. Maintainability is a product of the

frequency of scheduled maintenance actions, corrective maintenance actions, and trouble shooting actions multiplied by the number of times these actions occur in one year under the wartime operating cycle. BCS maintenance workload was taken from the original ASAS HARDMAN analysis.

The basis for the Reliability and Maintainability analysis was the ASAS equipment, proposed maintenance concept, maintainer Annual Workload capabilities, and Reliability and Maintainability Data (including MARC data). Many of the components in the ASAS proposed equipment lists are GFE with MARC data available. Due to the number of GFE items and the amount of MARC workload associated with them, MARC data represents the majority of the proposed ASAS maintenance workload.

Predicted workload was used for ASAS unique items at the organizational maintenance and the direct support maintenance levels. Predicted workload was extracted from the LSA-01, 02, and 06 reports for maintenance significant items by component. Predicted maintenance workload is based on 20.7 hr/day operation for 7555 hours/year.

Total annual available maintenance manhours (AMMH) per year used for predicted and MARC maintenance manhours were: 2500 AMMH for Division HHC at Organizational level; 2700 AMMH for Corps and Division MI units at organizational level; 2700 AMMH for Direct Support (GFE only); and 3100 AMMH for General Support (GFE only).

a. TSE WCG Maintenance Workload. For the WCG, the total maintenance workload requirement is 26.0 hours/year for Organizational maintenance. Direct Support maintenance is 58.8 AMMH for a total of 84.8. DS is provided by Interim Contractor Support until FY 94, when it reverts to Army maintenance. There is no GS maintenance for the WCG.

b. CCS Maintenance Workload. The required AMMH to support a CCS are 1063.2 hours/year for Organizational; 181.0 hours/year for Direct Support; and 102.3 hours/year for General Support for a total of 1346.5 AMMH. DS is provided by Interim Contractor Support until FY 94, when it reverts to Army maintenance.

c. DPS Maintenance Workload. For the DPS, the total maintenance workload requirement is for 304.6 hours/year for Organizational; 181.1 hours/year for Direct Support; and 87.5 hours/year for General Support for a total of 573.1 AMMH. DS is provided by Interim Contractor Support until FY 94, when it reverts to Army maintenance.

d. TCAE W/S Maintenance Workload. For the TCAE W/S, there are no AMMH for Organizational maintenance. Any required maintenance will be done by the operator, who will pull and replace the defective part as taught in the operator task training. DS and GS maintenance is provided by Life Cycle Contractor Support.

e. TCAC Maintenance Workload. For the paired TCACs, the total maintenance workload requirement is 957.2 hours/year for Organizational, 364.0 hours/year for Direct Support (GFE only) and 219.6 hours/year for General Support (GFE only) for a total of 1540.8 AMMH. All CFE equipment is under Life Cycle Contractor Support for unit, DS and GS maintenance.

f. Supplemental Equipment (SUP)

(1) SUP 1 (AN/TYQ-42(V)12) supports the ASAS TSE enclave assets at Corps and Heavy Division. The total maintenance workload requirement for SUP 1 is 2557.1 hours/year for Organizational, 818.2 hours/year for Direct Support and 715.0 hours/year for General Support for a total of 4090.3 hours/year.

(2) SUP 2 supports the TCAE enclave assets at Corps and Heavy Division. The total maintenance workload requirement for each SUP 2 TCAE package is 3230.1 AMMH for Organizational, 1344.7 AMMH for Direct Support and 906.2 AMMH for General Support for a total of 5481.0 AMMH.

(3) SUP 3 (AN/TYQ-42(V)13) supports the Light Division TSE assets. The total maintenance workload requirement for SUP 3 is 2626.0 hours/year for Organizational, 882.2 for Direct Support and 514.8 hours/year for General Support for a total of 4023.0 hours/year.

(4) SUP 4 (AN/TYQ-42(V)14) supports the Light Division TCAE assets. The total maintenance workload requirement for SUP 4 is 2385.9 hours/year for Organizational, 855.2 hours/year for Direct Support (GFE only) and 550.8 hours/year for General Support (GFE only) for a total of 3791.9 hours/year.

3.0 MANPOWER REQUIREMENTS ANALYSIS

Manpower Requirements, in this analysis, are the human resources needed to accomplish specified workloads associated with operating and maintaining ASAS hardware and software for the Block I fielding.

The objectives of the Manpower Requirements Analysis are:

a. To provide CDR, USAIC-FH, the ASAS Project Manager (PM), and other decision makers with estimates of manning requirements by MOS and pay grade for use in decision making.

b. To provide the ASAS PM and USAIC-FH with input for the ASAS Block I manning requirements, to include TOE analysis.

c. To provide USAIC-FH training resource analysts with operator and maintainer military occupational specialty requirements, duty position requirements, and skill level requirements for which personnel will have to be trained to support the total fielding of the ASAS.

d. To provide Army personnel analysts with the number of system position requirements by MOS and pay grade for each echelon of the ASAS Block I total fielding plan.

3.1 OPERATOR ANALYSIS

The operator manpower analysis addressed the hardware and software for the Block I Configuration within the context of the organizations and functions it will support. Hardware modules requiring operators, based on the System Analysis, include the TSE Workstation (TSE WCG), the Communications Control Set (CCS), the TCAE Workstation (TCAE W/S) and the Technical Control and Analysis Central (TCAC). The primary task and workload drivers are the TSE WCG and TCAE W/S with the TCAC and CCS secondary. Operator

manpower analysis was constrained to the manpower (MOS, grades, and quantities) authorized in the various TOE.

3.1.1 Operator Manpower Requirements Analysis Process

3.1.1.1 Assumptions

The operator manpower analysis was based on the following significant assumptions:

a. Army of Excellence (AOE) Tables of Organization and Equipment (TOEs) provide the MOS, grades and numbers of personnel available to perform organizational missions and functions and operate ASAS. Therefore, ASAS operator workload requirements can be filled from within TOE and the organization will still be able to perform its missions.

b. Three types of operators are required. One operator per shift is required for each workstation within each enclave. In addition, both enclaves require an operator that also serves as a system administrator/supervisor for the overall workflow and health of the system. There is also a need for CCS/TCAC operators. The requirement is one operator per shift for each enclave CCS and two operators per shift for each TCAC. An additional concern is the need for two people per shift due to TS/SCI security requirements. This requirement is not a problem for either enclave since the operators will be co-located with other organic sections capable of providing the requisite security.

c. Operators will work 12 hour shifts. This assumption reflects USAIC-FH manning and TOE development guidance. Its viability was questioned by the ASAS HARDMAN analysts. Current studies in human factors journals challenge the productivity assumed when requiring shifts of this duration. These studies further question operator analytical capability when the operator

is the recipient of a high volume of data over a protracted period of time.

d. Maintenance for the TSE enclave will be performed by maintainers with MOS within the current Army structure. An exception is made for the TCAE enclave. The TCAE W/S operators will perform operator maintenance tasks on CFE equipment, then use Life Cycle Contractor Support (LCCS) for DS and above. TCAC maintenance tasks will be performed by LCCS for the CFE equipment. See Section 2.2.1 for a more complete maintenance description.

e. Operators will be required to have security clearances commensurate with the highest level of security to which they could be exposed while working with ASAS. Personnel may require Top Secret/SCI clearances even though current Army regulations may not require the MOS to be at that level.

f. All positions developed are based on the capabilities of a soldier who is fully trained, qualified, and motivated. In past HARDMAN analyses, the Corps on-line intelligence analysis was judged to be of such a critical and time-sensitive nature in the TSE that Captains and Warrant Officers were assigned to workstations. As officers comprise the majority of manpower slots available in the Heavy and Airborne TSE TOEs, this assumption was continued for this analysis. USAIC-FH and PM CAC guidance on TCAE operator assignments was to use enlisted personnel for operator positions whenever possible. USAIC-FH would have preferred workstation operator assignments that reflect utilization of CMF 96 or 98 enlisted personnel E7 and below as primary operators whenever possible, then warrant officer (AOC 35), then officer (AOC 35).

3.1.1.2 Constraints

The manpower analysis was constrained by the following:

a. The ASAS Block I operator manpower requirements were constrained to TOE authorizations. No changes to the number of personnel authorized by organization were allowed, i.e., operators must come from within the MOS, grades and numbers of personnel authorized within the organization performing the functions.

b. For this analysis, USAIC-FH directed the use of CMF 98 and 98C MOS if possible for all CCS / TCAC operators.

c. The analysis of the Block I software impacts on manpower was constrained. The amount of data available on various software packages planned or existent caused this constraint. This was due to the stage of development of the software. Software users manuals and other documentation are still being developed. TSE Version 2.06G software used in this analysis is the baseline software which will be used for Initial Operational Test and Evaluation (IOTE). The upgraded TSE Version 2.07 software incorporating fixes and enhancements from IOTE will be fielded with Block I. The TCAE version 2.1 software is the baseline for IOTE. A later version (not yet numbered) will incorporate the IOTE enhancements for Block I fielding.

d. AR 570-2 prescribes rounding the number of manpower to the nearest whole number for values above .5 man-years.

3.1.2 Block I Operator MOS/Grade Determination

The operator selections were constrained by the MOSs/grades authorized in the current TOE for the units receiving the equipment. Specific MOSs/grade determinations were based on the functions to be performed and the software capabilities of TSE Version 2.06 and TCAE Version 2.1 software.

3.1.2.1 Operators

Organizational functions and operator functions vary by enclave and section within enclaves. The on-line capabilities of the software also vary by function. Therefore, operator MOS and grades vary by function, enclave and unit. USAIC-FH's manning rules require one operator per workstation (TSE WCG, TCAE W/S and CCS) per 12 hour shift, two 12 hour shifts per day. Therefore each workstation requires a minimum of two operators. The TCAC requires two operators per shift, four operators per day, and as the TCAC is always fielded as a pair, the manpower requirement is eight operators per 24 hours. Also, there are off-line support positions needed to perform the functions not covered by software such as section command and control as well as off-line support to the WCG operators, e.g., off-line analysis of data. Backup personnel and off-line personnel are not included in the manpower requirements.

The analysis reveals that manpower requirements are in line with the available manpower in the Airborne Corps, Heavy Corps, Heavy Division, and Light Division configurations. In the Light Division TSE however, it was necessary to use nearly all section personnel regardless of grade/rank as operators. These overall comments are given to draw attention to the need to re-evaluate the TOE authorizations in terms of required support of ASAS.

Operators, off-line personnel, and supervisor MOSC are shown by TOE section on pages 3-6 through 3-45 as follows:

a. Airborne Corps (TOE 34305L)
    (1) Corps TSE (TOE 34307L)
    (2) Corps TCAE (TOE 34307L)
b. Heavy Corps (TOE 34405L)
    (1) Corps TSE (TOE 34407L)
    (2) Corps TCAE (TOE 34408L)

c. Light Division

(1) Division TSE (TOE 77004L)

(2) Division TCAE (34296L)

d. Heavy Division

(1) Division TSE (TOE 87004L)

(2) Division TCAE (TOE 34286L)

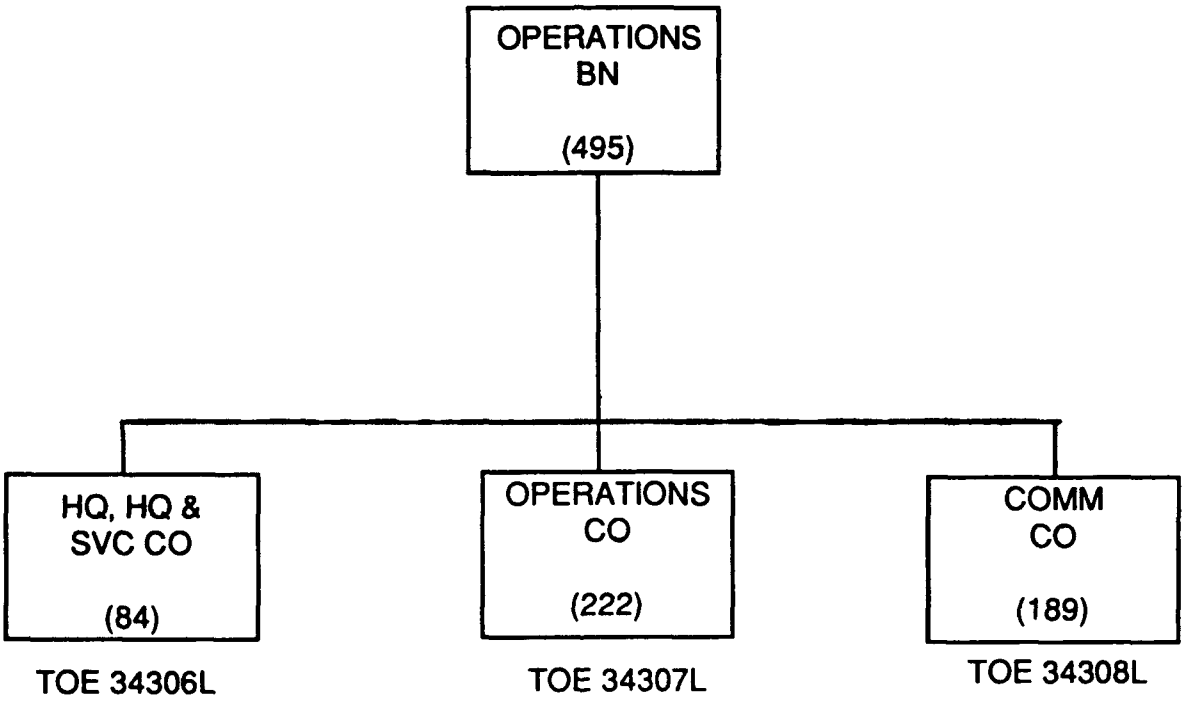


Figure 3.1.2.1
Operations Battalion, MI Brigade (ABN)

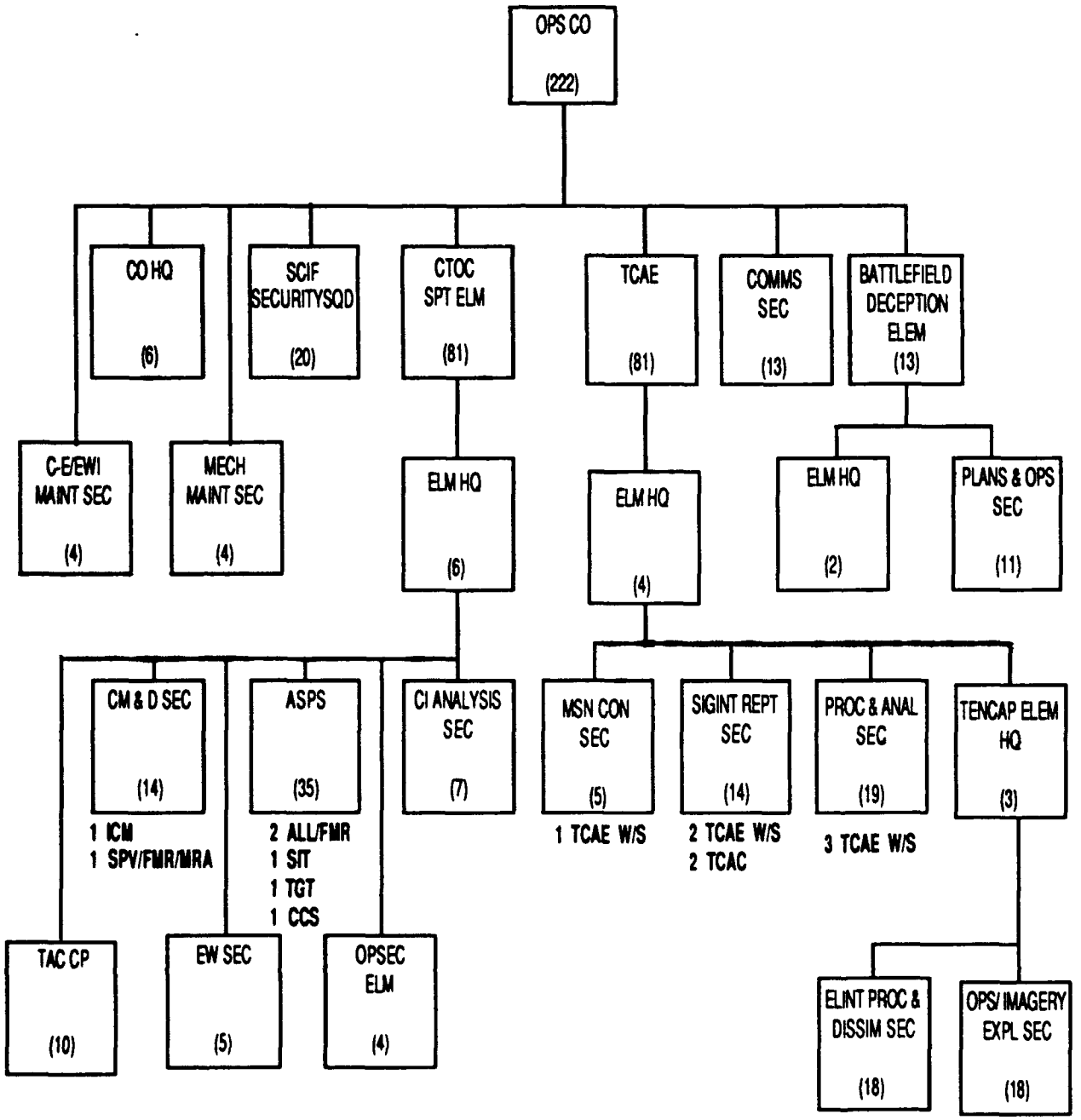


Figure 3.1.2.2

Ops Company, Ops Bn, MI Brigade (ABN) CTOC Support Element

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS	PRIMARY OPERATORS		PRIMARY OPERATORS
OFF LINE TECHNICAL SUPERVISION	35D (LTC) • / •• MISSION SUPV 98Z50		35D (CPT) •• / MISSION SUPV 96B50
OFF LINE ANALYTICAL SUPPORT			
OFF LINE ADMIN SUPPORT	71L10(E4)		71L10(E4)

OIC = • SHIFT LEADER = ••

Figure 3.1.2.3

CTSE HQ, Corps Ops Bn, MI Brigade (ABN)

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS 1 SPV/FMR/MRA 1 ICM	PRIMARY OPERATORS 35C (CPT) 96B20		PRIMARY OPERATORS 352C(W2) 96D30
OFF LINE TECHNICAL SUPERVISION	35D (MAJ) •/•• 35G (CPT) 96B50 97B30		35D (MAJ) •• 35D (CPT) 351B(W2)
OFF LINE ANALYTICAL SUPPORT	98C20		97B20 98C10(E4)
OFF LINE ADMIN SUPPORT			

OIC = • SHIFT LEADER = ••

Figure 3.1.2.4

CTSE (ABN) Collection Management and Dissemination Section

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS	PRIMARY OPERATORS		PRIMARY OPERATORS
ALL/FMR	350B(W2)		350B(W2)
ALL/FMR	96B40		96B30
SIT	350B(W2)		350B(W2)
TGT	96B20		96B20
CCS	98C20		98C20
OFF LINE TECHNICAL SUPERVISION	35D (MAJ) •/•• 35C (CPT) 35D (CPT) 350B(W2) 352C(W2) 350B(W2)		35D (CPT) •• 35D (CPT) 350B(W2) 350B(W2) 352C(W2) 98C40
OFF LINE ANALYTICAL SUPPORT	96D20 98C10(E4) 96B10(E4) 96D10 96B10 96B10 96B10		96D20 98C10(E4) 96B10(E4) 96B10(E4) 98C10 96B10
OFF LINE ADMIN SUPPORT			

OIC = • SHIFT LEADER = ••

Figure 3.1.2.5

CTSE (ABN) All Source Production Section

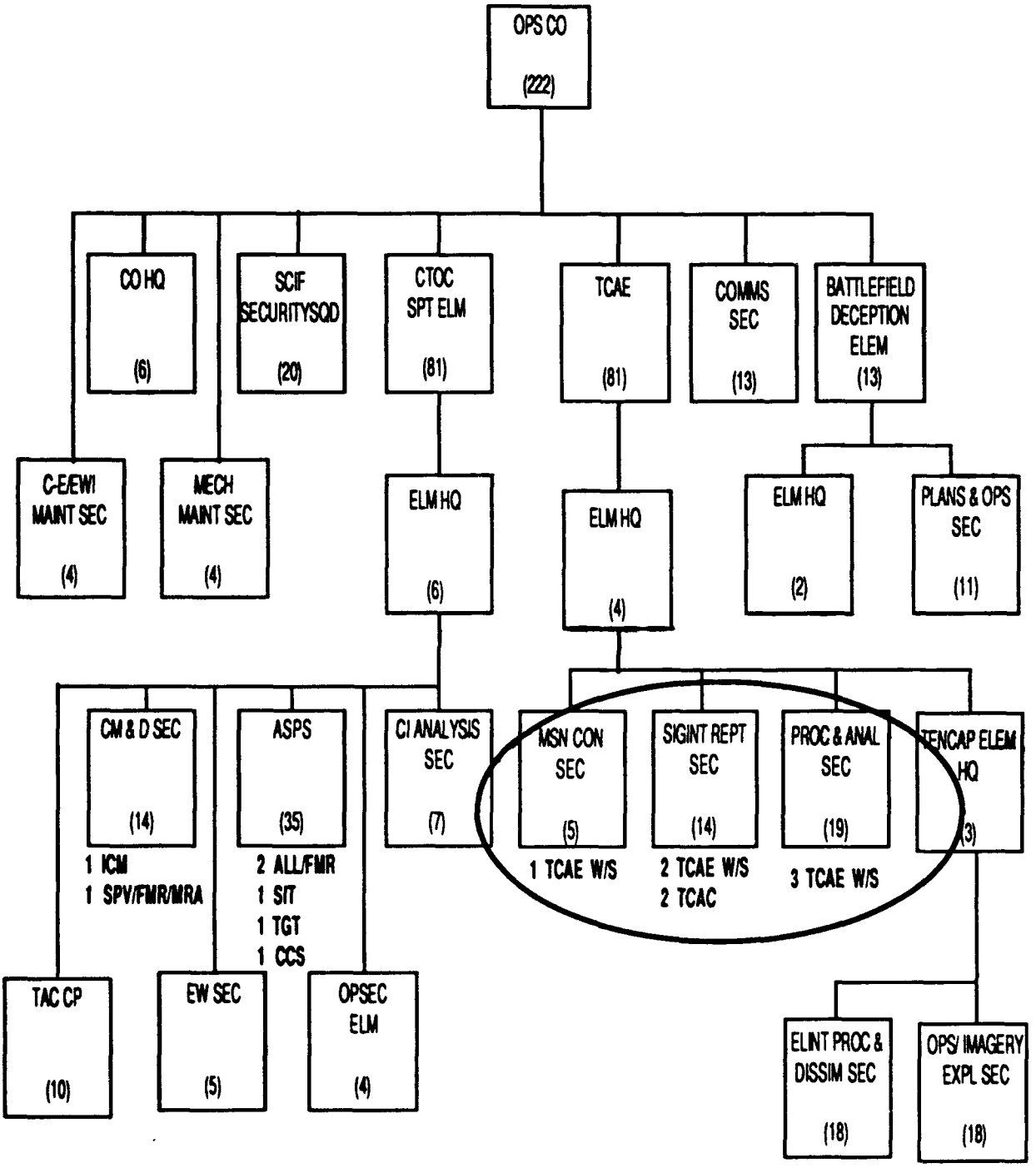


Figure 3.1.2.6

CTCAE (ABN), Ops Company, Ops Battalion, MI Bde

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS	PRIMARY OPERATORS		PRIMARY OPERATORS
OFF LINE TECHNICAL SUPERVISION	35G (MAJ) MISSION SUPV / •		98Z50
OFF LINE ANALYTICAL SUPPORT			
OFF LINE ADMIN SUPPORT	71L10(E4)		71L10(E4)

OIC = • SHIFT LEADER = ••

Figure 3.1.2.7

CTCAE (ABN), TCAE Element HQ

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS 1 TCAE W/S	PRIMARY OPERATORS 352G • / ••		PRIMARY OPERATORS 98C20
OFF LINE TECHNICAL SUPERVISION			352H MISSION SUPV / ••
OFF LINE ANALYTICAL SUPPORT	98H20		98C10(E4)
OFF LINE ADMIN SUPPORT			

OIC = • SHIFT LEADER = ••

Figure 3.1.2.8

CTCAE (ABN), Mission Control Section

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS	**PRIMARY OPERATORS**		**PRIMARY OPERATORS**
1 TCAE W/S	352C(W2) •/••		98C3L ••
2 TCAE W/S	98C3L		98C20
1 TCAC	98C20		98C20
	98C10(E4)		98C10(E4)
2 TCAC	98C20		98C10(E4)
	98C10(E4)		98C10
OFF LINE TECHNICAL SUPERVISION			
OFF LINE ANALYTICAL SUPPORT	98C10		98C10
OFF LINE ADMIN SUPPORT			

OIC = • **SHIFT LEADER = ••**

Figure 3.1.2.9

CTCAE (ABN) SIGINT Reporting Section

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS 1 TCAE W/S 2 TCAE W/S 3 TCAE W/S	PRIMARY OPERATORS 352C(W2) •/•• 98C30 98C20		PRIMARY OPERATORS 352C(W2) •• 98C20 98C20
OFF LINE TECHNICAL SUPERVISION	98C40 98G3L		98G3L
OFF LINE ANALYTICAL SUPPORT	98C10(E4) 98C10 98G1L(E4) 98G2L 98G1L(E4)		98C20 98C10(E4) 98G2L 98G1L(E4) 98C10
OFF LINE ADMIN SUPPORT			

OIC = • SHIFT LEADER = ••

Figure 3.1.2.10

CTCAE (ABN) Processing and Analysis Section

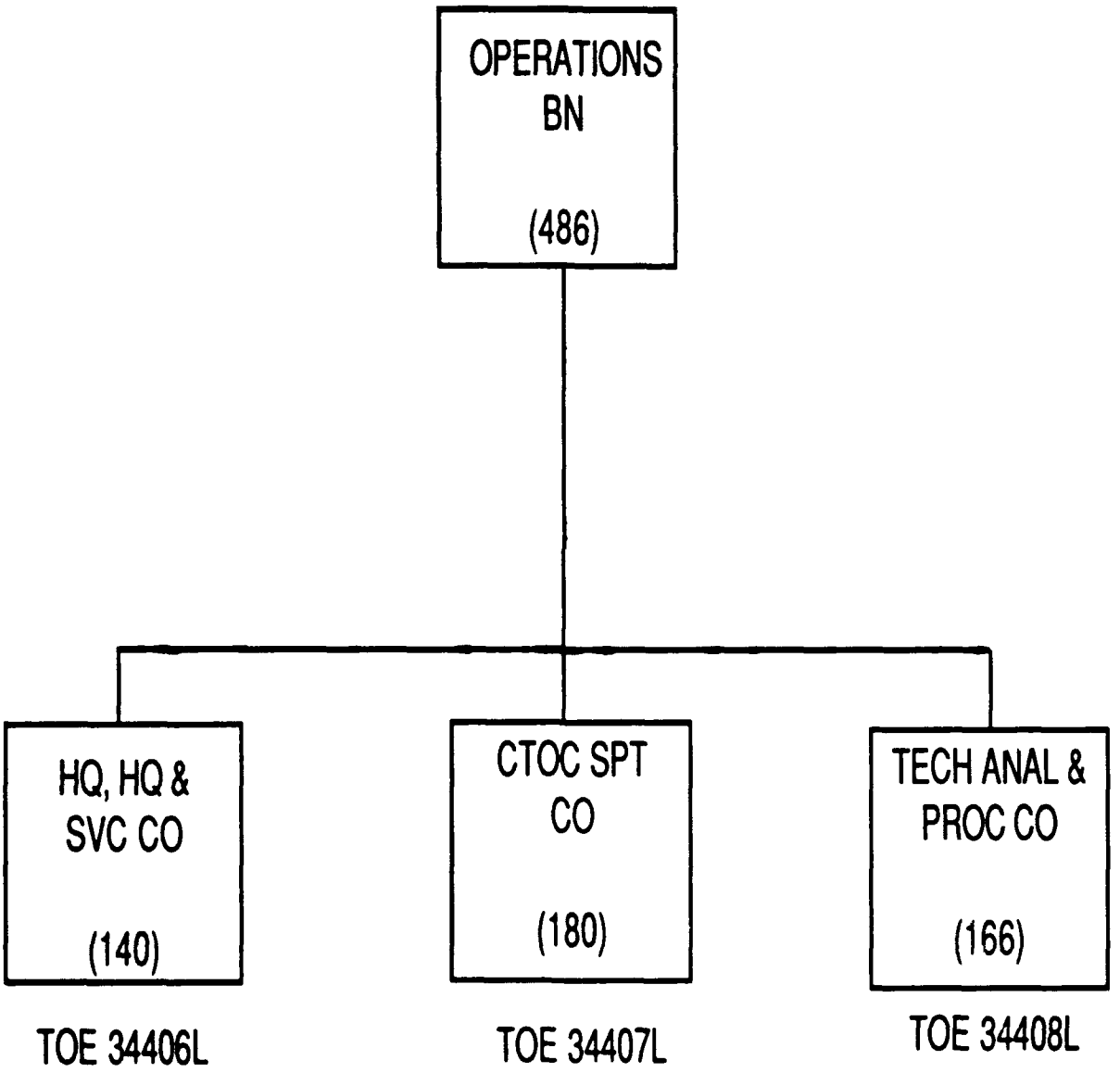


Figure 3.1.2.11
Corps MI Battalion (Operations)

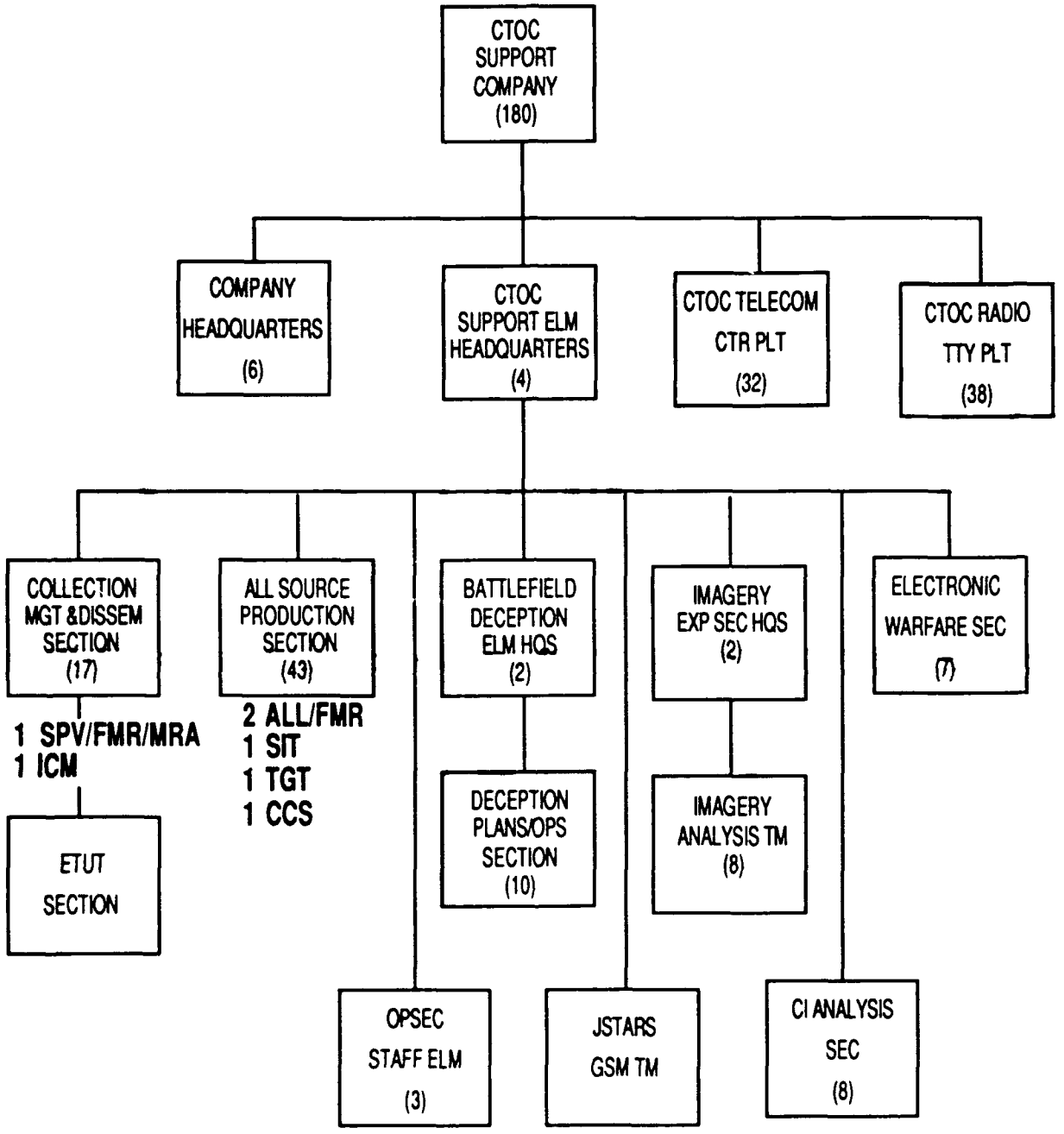


Figure 3.1.2.12

Corps TOC Support Company, MI Bn (Opns)

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS	PRIMARY OPERATORS		PRIMARY OPERATORS
OFF LINE TECHNICAL SUPERVISION	35D (LTC)• / •• & MISSION SUPV 98Z50		35G (MAJ) MISSION SUPV
OFF LINE ANALYTICAL SUPPORT	96B10		
OFF LINE ADMIN SUPPORT			

OIC = • SHIFT LEADER = ••

Figure 3.1.2.13
CTOC Support Element HQ

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS SPV/FMR/MRA ICM	PRIMARY OPERATORS 35G (CPT) 96D30		PRIMARY OPERATORS 98C40 96D20
OFF LINE TECHNICAL SUPERVISION	35D (MAJ) •/•• 35C (CPT) 35G (CPT) 96B50 98J40		35D (CPT) •• 35C (CPT) 35G (CPT) 96B30
OFF LINE ANALYTICAL SUPPORT			98C2L
OFF LINE ADMIN SUPPORT	71L20 25Q10		71L10(E4)

OIC = • SHIFT LEADER = ••

Figure 3.1.2.14

CTOC Support Co., Collection Management and Dissemination Section

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS	**PRIMARY OPERATORS**		**PRIMARY OPERATORS**
ALL/FMR	350B(W2)		350B(W2)
ALL/FMR	96B20		96B30
SIT	350B(W2)		350B(W2)
TGT	96B20		96B20
CCS	98C2L		98C10(E4)
OFF LINE TECHNICAL SUPERVISION	35D (MAJ) •/•• 35B (CPT) 35E (CPT) 35G (CPT) 352C(W4) 352J(W4) 350B(W2) 98C3L		35G (CPT) •• 35D (CPT) 35D (CPT) 352C(W4) 352J(W4) 350B(W2) 350B(W2) 350B(W2) 98J30
OFF LINE ANALYTICAL SUPPORT	98J20 96B10(E4) 96B10(E4) 96B10(E4) 98J10(E4) 96B10 96B10 96B10		96B10(E4) 96B10(E4) 98C10(E4) 98J10(E4) 96B10 96B10
OFF LINE ADMIN SUPPORT	71L10(E4)		71L10(E4)

OIC = • **SHIFT LEADER = ••**

Figure 3.1.2.15

CTOC Support Co, All Source Production Section

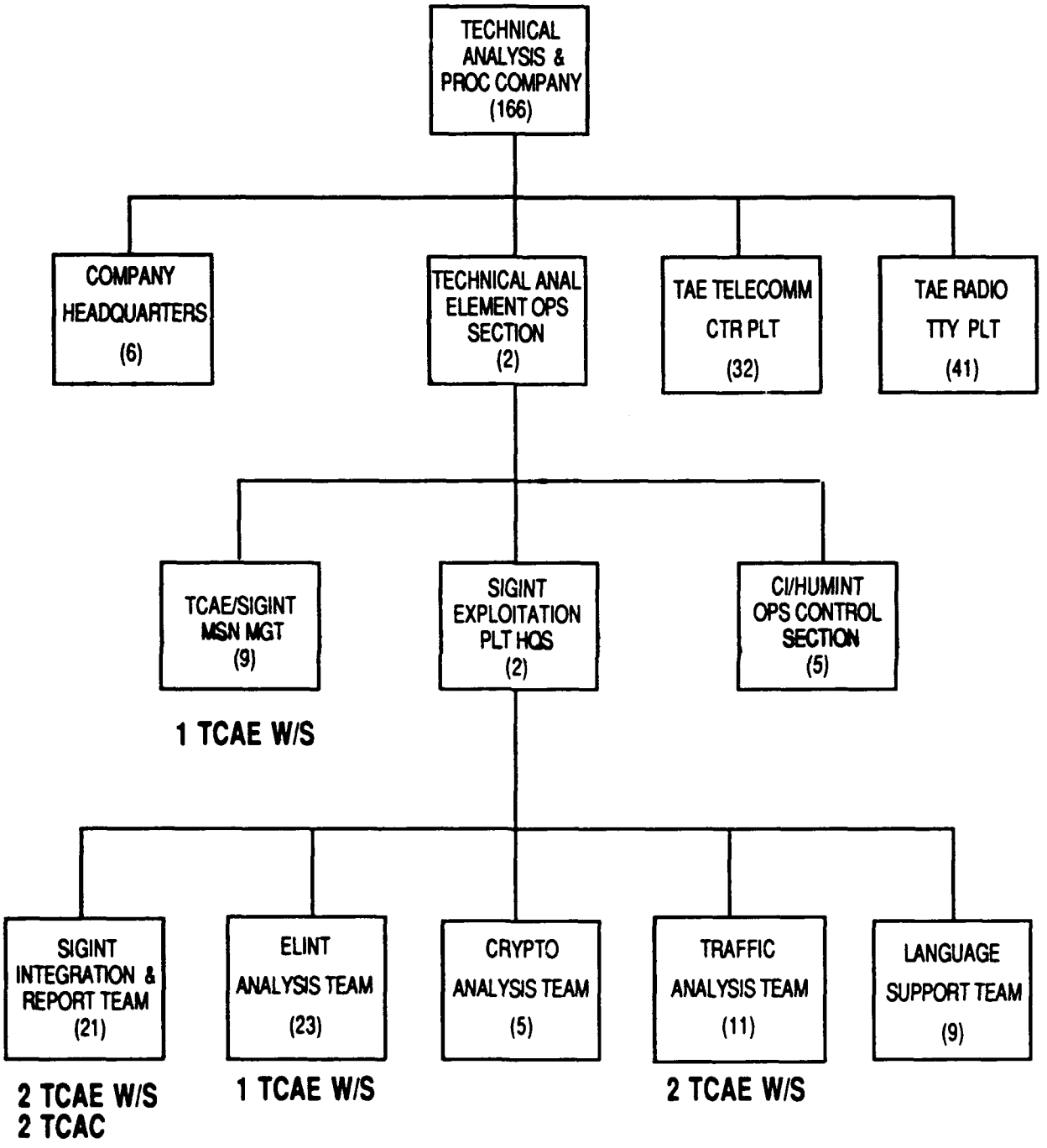


Figure 3.1.2.16

Technical Analysis & Processing Co, MI Bn (Operations) (Corps)

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS	PRIMARY OPERATORS		PRIMARY OPERATORS
OFF LINE TECHNICAL SUPERVISION	35D (CPT) • / •• & MISSION SUPV 98Z50		
OFF LINE ANALYTICAL SUPPORT			
OFF LINE ADMIN SUPPORT			

OIC = • SHIFT LEADER = ••

Figure 3.1.2.17
Corps Tech Analysis & Processing Co,
Tech Analysis Elem Ops Sect

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS 1 TCAE W/S	PRIMARY OPERATORS 352C(W4) ••		PRIMARY OPERATORS 352G(W4)
OFF LINE TECHNICAL SUPERVISION	98C40		35D (CPT) •/•• & MISSION SUPV
OFF LINE ANALYTICAL SUPPORT	98C2L 98C10(E4)		98J20 98C10(E4)
OFF LINE ADMIN SUPPORT	71L10(E4)		

OIC = • SHIFT LEADER = ••

Figure 3.1.2.18
Corps Tech Analysis & Processing Co,
TCAE/SIGINT Mission Mgt Sect

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS 1 TCAE W/S 2 TCAE W/S 1 TCAC 2TCAC	PRIMARY OPERATORS 98C3L 98J20 98C2L 98C1L(E4) 98C1L(E4) 98J10(E4)		PRIMARY OPERATORS 98C3L 98C2L 98C2L 98C1L(E4) 98C1L(E4) 98C10
OFF LINE TECHNICAL SUPERVISION	352C(W4) •/••		98C4L ••
OFF LINE ANALYTICAL SUPPORT	96B20 98J10(E4) 98J10		96B10(E4) 98J10(E4)
OFF LINE ADMIN SUPPORT	71L10(E4)		71L10(E4)

OIC = • SHIFT LEADER = ••

Figure 3.1.2.19
Corps Tech Analysis & Processing Co,
SIGINT Integration & Reporting Team

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS 1 TCAE W/S 2 TCAE W/S	PRIMARY OPERATORS 98C2L 98C10(E4)		PRIMARY OPERATORS 98C2L 98C10(E4)
OFF LINE TECHNICAL SUPERVISION	352C(W4) •/••		98C3L ••
OFF LINE ANALYTICAL SUPPORT	98C2L 98C10(E4)		98C10(E4) 98C10
OFF LINE ADMIN SUPPORT	71L10		

OIC = • SHIFT LEADER = ••

Figure 3.1.2.20

Corps Tech Analysis & Processing Co, Traffic Analysis Team

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS 1 TCAE W/S	PRIMARY OPERATORS 98J20		PRIMARY OPERATORS 98J20
OFF LINE TECHNICAL SUPERVISION	352J(W4) •/•• 98J40		352J(W4) •• 98J30
OFF LINE ANALYTICAL SUPPORT	96D20 98C20 96D10(E4) 98C10(E4) 98J10(E4) 98J10(E4) 98J10(E4) 98J10 98J10		96B20 96B10(E4) 96D10(E4) 98C10(E4) 98J10(E4) 98J10(E4) 96D10 98J10
OFF LINE ADMIN SUPPORT			

OIC = • SHIFT LEADER = ••

Figure 3.1.2.21

Corps Tech Analysis & Processing Co, ELINT Analysis Team

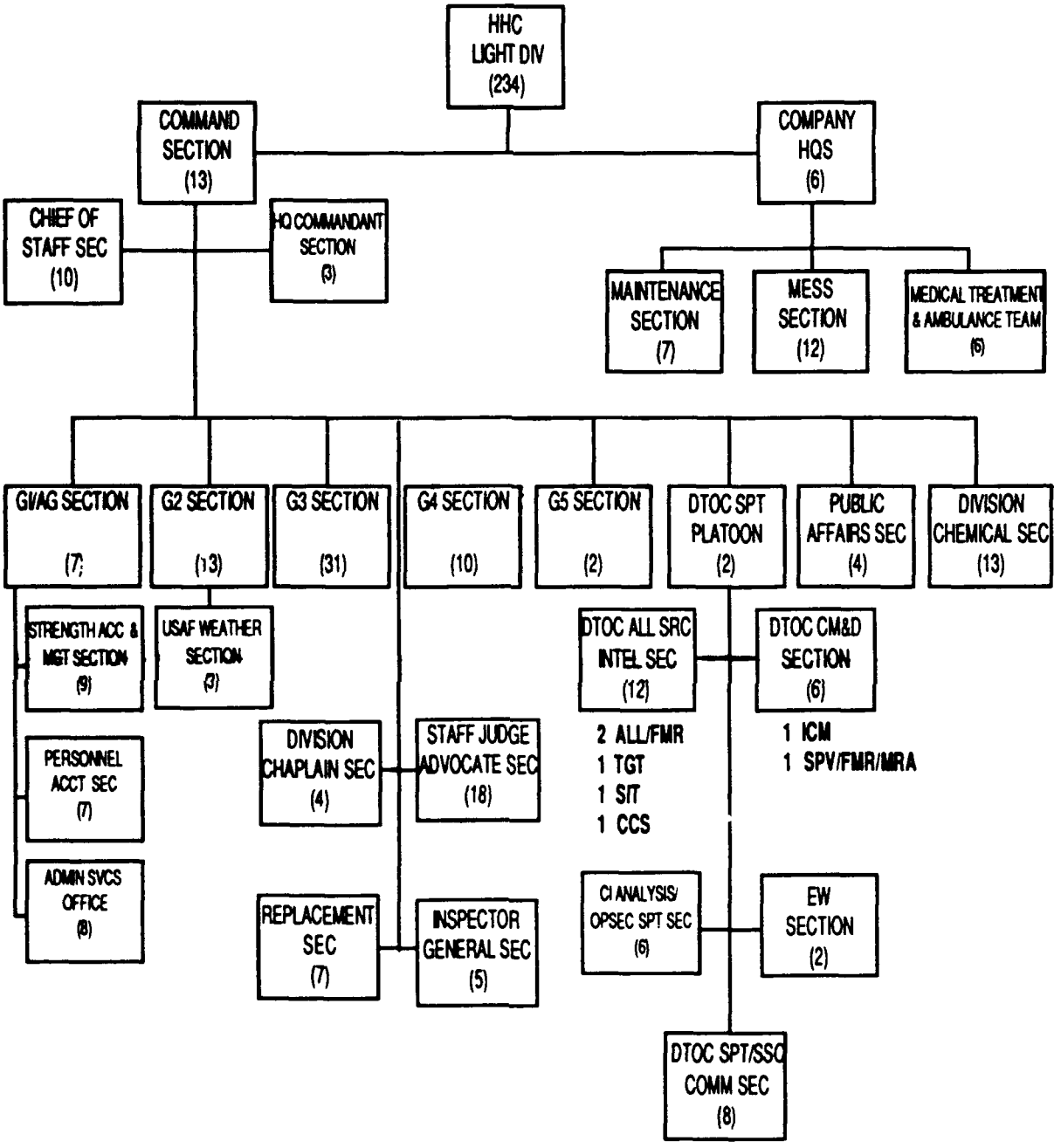


Figure 3.1.2.22

HQ & HQ Company, Light Division

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS	PRIMARY OPERATORS		PRIMARY OPERATORS
OFF LINE TECHNICAL SUPERVISION	35A (CPT) • / •• MISSION SUPV		98J40
OFF LINE ANALYTICAL SUPPORT			
OFF LINE ADMIN SUPPORT			

OIC = • SHIFT LEADER = ••

Figure 3.1.2.23

Light Division TSE, DTOC Support Platoon HQ

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS 1 ICM 1 SPV/FMR/MRA	PRIMARY OPERATORS 96D40 35C(CPT) • / ••		PRIMARY OPERATORS 96B20 352C(W4) ••
OFF LINE TECHNICAL SUPERVISION	96R40		
OFF LINE ANALYTICAL SUPPORT			96B10(E4)
OFF LINE ADMIN SUPPORT			

OIC = • SHIFT LEADER = ••

Figure 3.1.2.24
Light Division TSE, DTOC Collection Management
and Dissemination Section

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS 1 ALL/FMR 2 ALL/FMR 1 SIT 1 TGT 1 CCS	PRIMARY OPERATORS 35G (CPT) • / •• 98C30 350B(W4) 96B30 98C30		PRIMARY OPERATORS 96B20 96B10(E4) 352C(W4) 96B30 98C20
OFF LINE TECHNICAL SUPERVISION			35D(CPT) MISSION SUPV ••
OFF LINE ANALYTICAL SUPPORT	96B10		
OFF LINE ADMIN SUPPORT			

OIC = • SHIFT LEADER = ••

Figure 3.1.2.25

Light Division TSE, DTOC All Source Intelligence Section

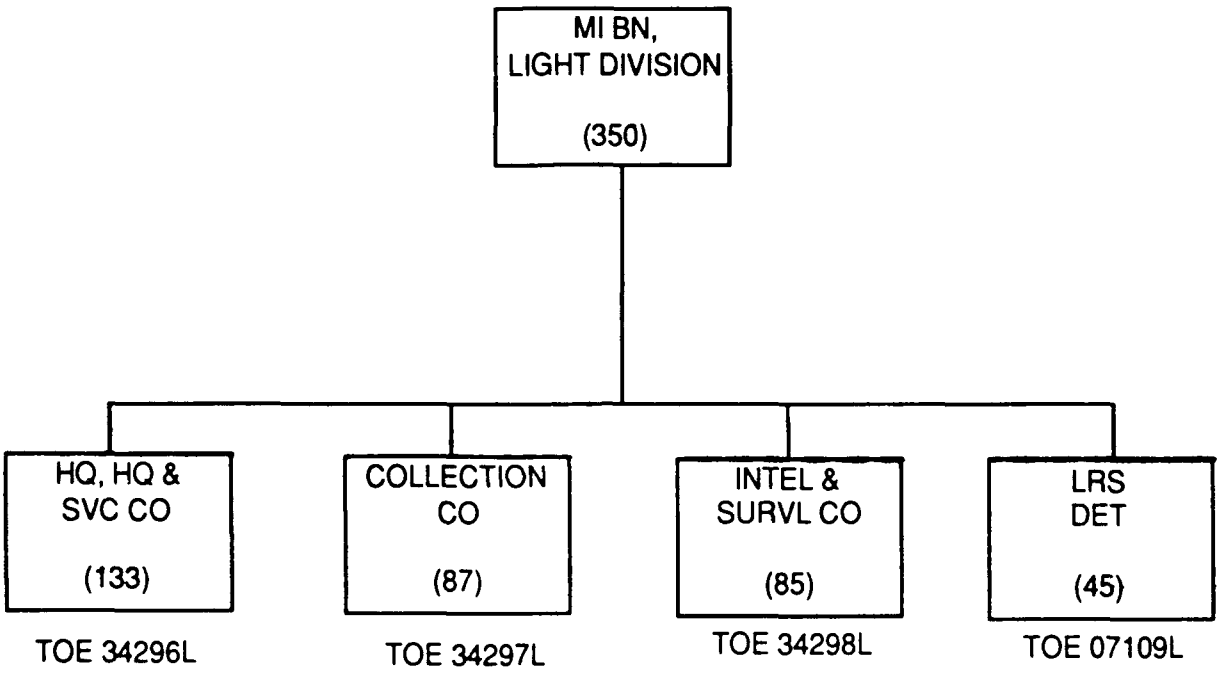


Figure 3.1.2.26
MI Battalion, Light Division

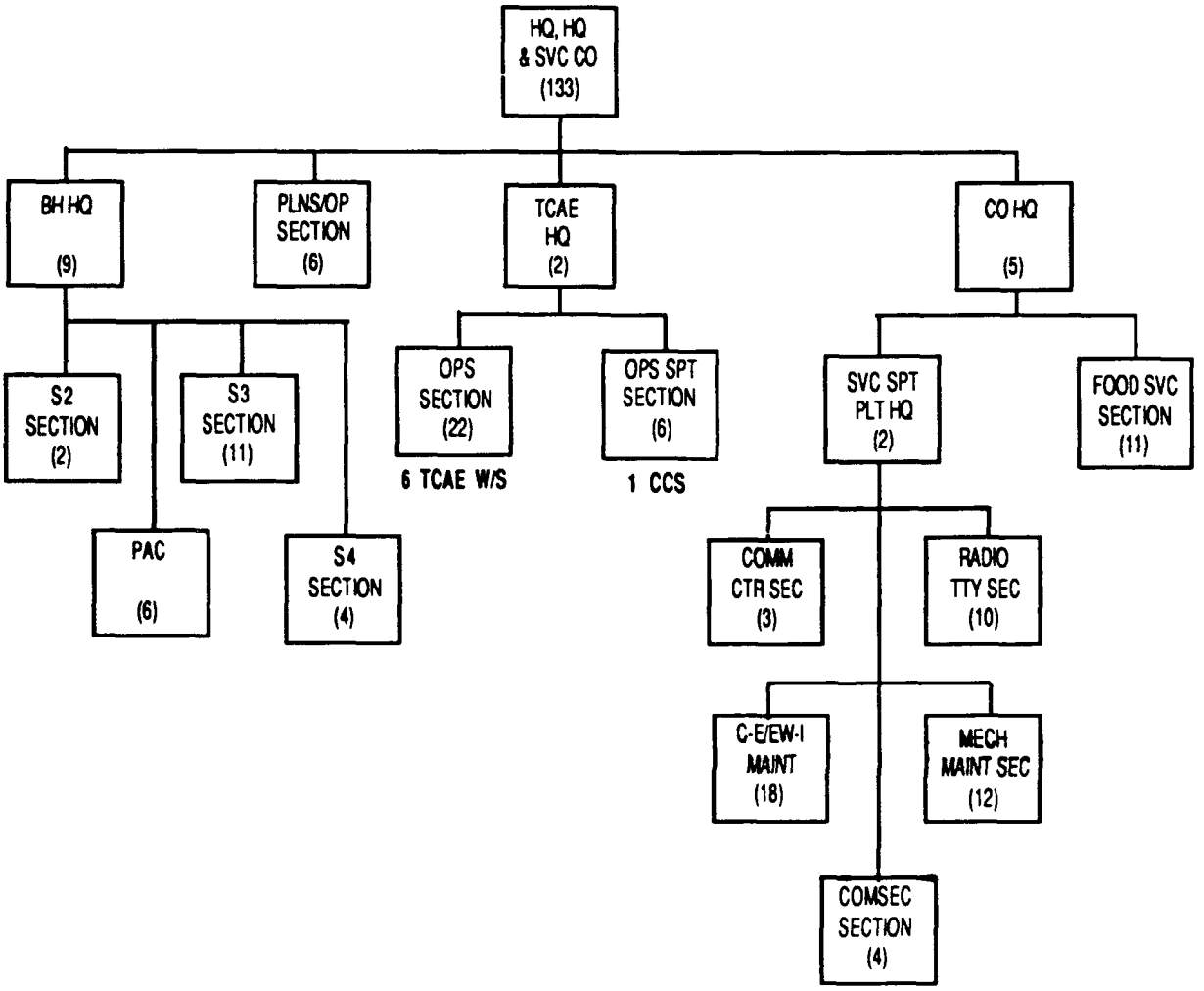


Figure 3.1.2.27

HQ, HQ & Service Co, MI Battalion, Light Division

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS	PRIMARY OPERATORS		PRIMARY OPERATORS
OFF LINE TECHNICAL SUPERVISION	35G(CPT) • / •• MISSION SUPV 98Z50		
OFF LINE ANALYTICAL SUPPORT			
OFF LINE ADMIN SUPPORT			

OIC = • SHIFT LEADER = ••

Figure 3.1.2.28

Light Division TCAE, TCAE HQ

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS	**PRIMARY OPERATORS**		**PRIMARY OPERATORS**
1 TCAE W/S	352J(W2) • / ••		352C(W2) ••
2 TCAE W/S	98J30		98J20
3 TCAE W/S	96B10(E4)		98C10(E4)
4 TCAE W/S	98C3L		96B20
5 TCAE W/S	98C2L		98C10(E4)
6 TCAE W/S	98C2L		98J10(E4)
OFF LINE TECHNICAL SUPERVISION	352G(W2)		98G4L
OFF LINE ANALYTICAL SUPPORT	98G2L 98C10 98C10		98G2L 98G1L(E4) 98C10(E4) 98C10
OFF LINE ADMIN SUPPORT	71L10(E4)		

OIC = • **SHIFT LEADER = ••**

Figure 3.1.2.29

Light Division TCAE, Operations Section

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS 1 CCS	PRIMARY OPERATORS 98C20		PRIMARY OPERATORS 98C10(E4)
OFF LINE TECHNICAL SUPERVISION	98C30 ••		352C(W2) •/ •• MISSION SUPV
OFF LINE ANALYTICAL SUPPORT	98C10		98C10
OFF LINE ADMIN SUPPORT			

OIC = • SHIFT LEADER = ••

Figure 3.1.2.30

Light Division TCAE, Operations Support Section

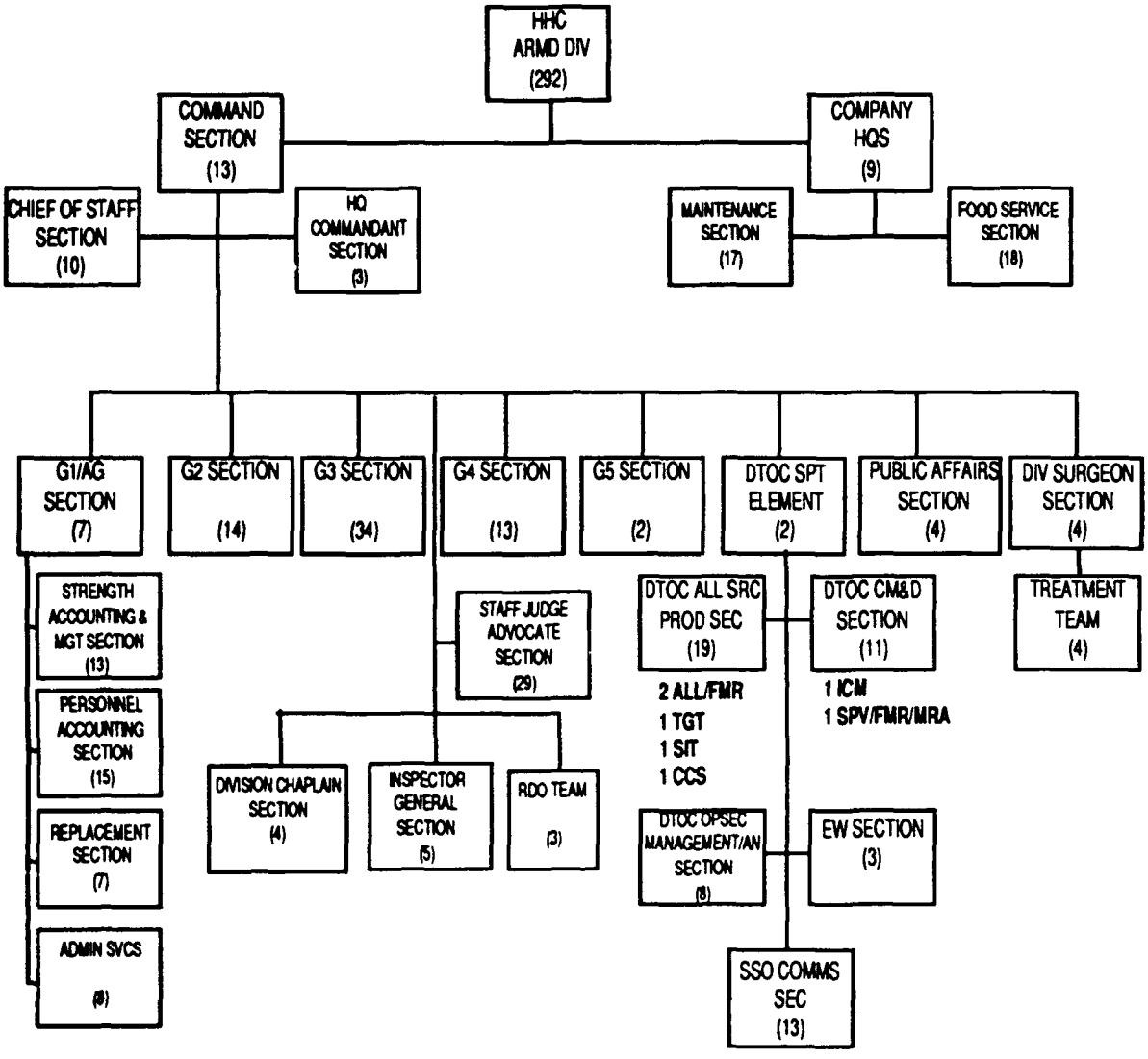


Figure 3.1.2.31

HQ & HQ Company, Heavy Division

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS	PRIMARY OPERATORS		PRIMARY OPERATORS
OFF LINE TECHNICAL SUPERVISION	35D (MAJ) • / •• MISSION SUPV 96B40		
OFF LINE ANALYTICAL SUPPORT			
OFF LINE ADMIN SUPPORT			

OIC = • SHIFT LEADER = ••

Figure 3.1.2.32

Heavy Division TSE, DTOC Support Element

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS 1 SVP/FMR/MRA 1 ICM	**PRIMARY OPERATORS** 352C(W4) 96D40		**PRIMARY OPERATORS** 98J40 96B20
OFF LINE TECHNICAL SUPERVISION	35G (CPT) • / •• 96R40		35C (CPT) •• (MISSION SUPV)
OFF LINE ANALYTICAL SUPPORT	96B10(E4)		96B10
OFF LINE ADMIN SUPPORT	71L10(E4)		71L10(E4)

OIC = • **SHIFT LEADER = ••**

Figure 3.1.2.33
Heavy Division TSE, DTOC Collection
Management & Dissemination Section

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS 1 ALL/FMR 1 ALL/FMR SIT TGT CCS	**PRIMARY OPERATORS** 352C(W4) 96B30 350B(W4) 96B40 98C20		**PRIMARY OPERATORS** 352J(W2) 96B20 350B(W4) 96B10(E4) 98C10
OFF LINE TECHNICAL SUPERVISION	35G (CPT) • / •• 35A (LT)		35D (CPT) •• 35A (LT) 98J40
OFF LINE ANALYTICAL SUPPORT	96B10(E4) 96B10		98C10(E4) 96B10
OFF LINE ADMIN SUPPORT			

OIC = • **SHIFT LEADER = ••**

Figure 3.1.2.34

Heavy Division TSE, DTOC All Source Production Section

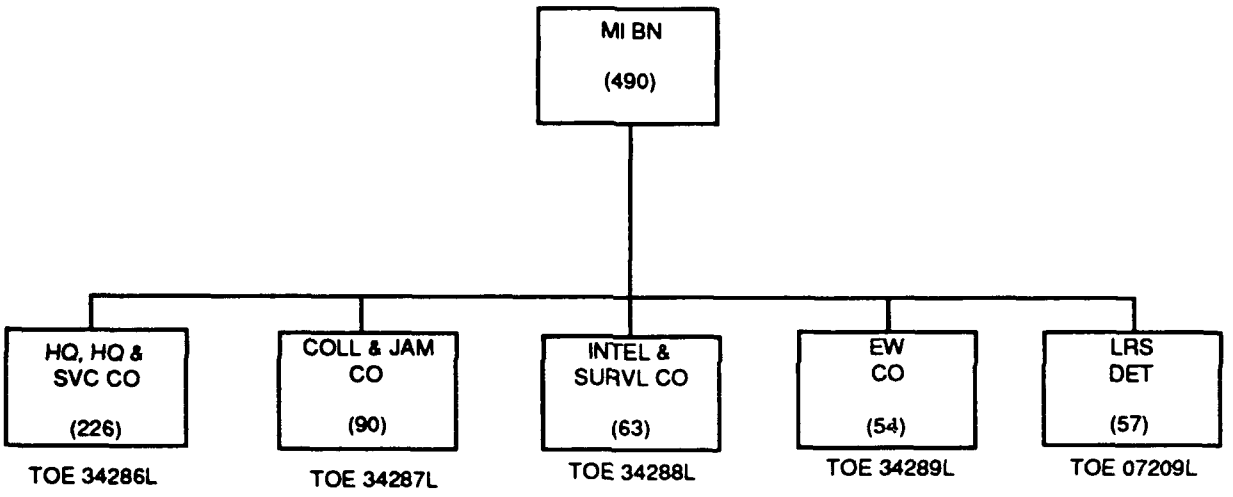


Figure 3.1.2.35
MI Battalion, Heavy Division

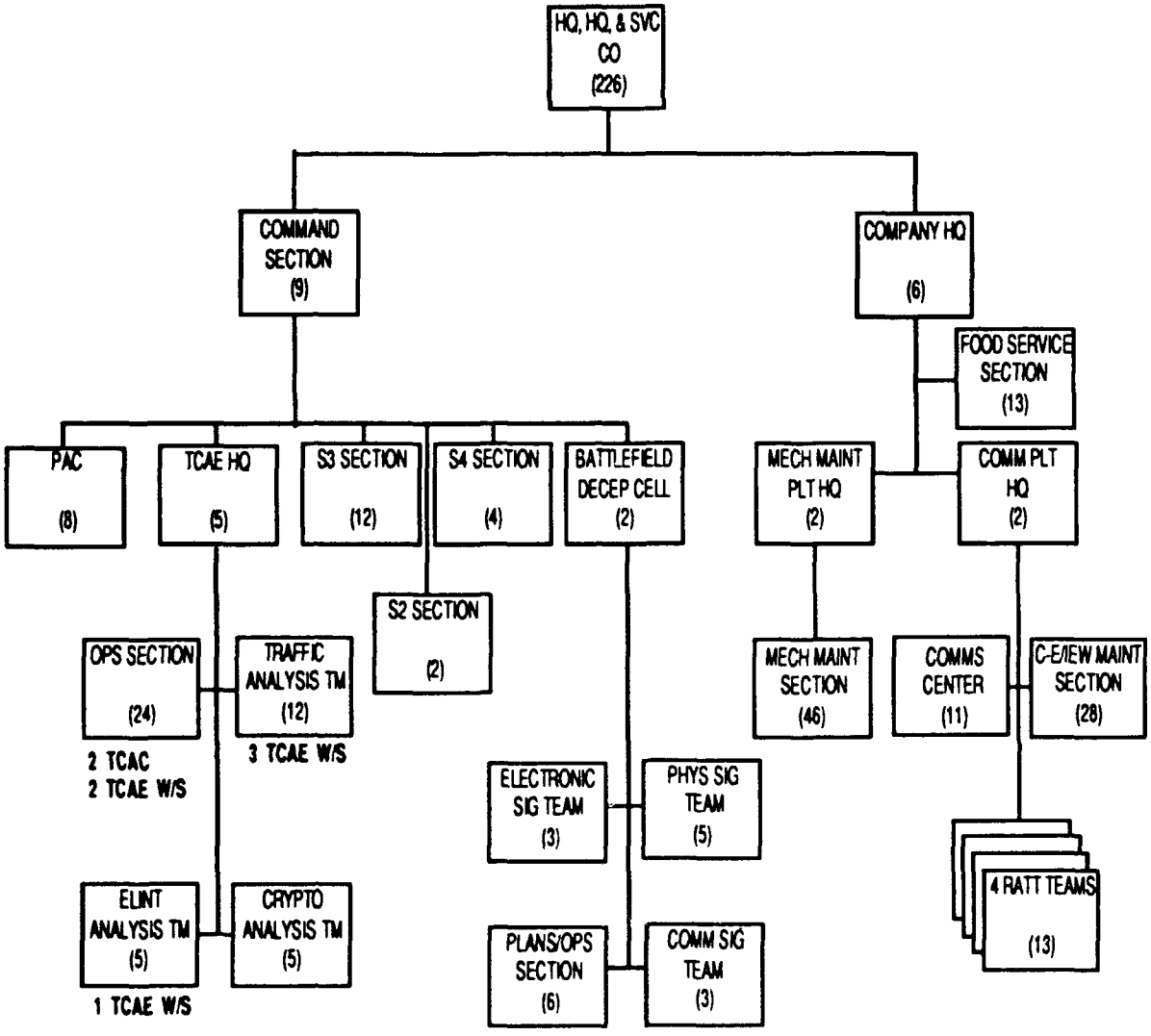


Figure 3.1.2.36

HQ, HQ & Service Company, MI Battalion (Heavy)

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS	PRIMARY OPERATORS		PRIMARY OPERATORS
OFF LINE TECHNICAL SUPERVISION	35G (MAJ) • / •• MISSION SUPV 98Z50		
OFF LINE ANALYTICAL SUPPORT			
OFF LINE ADMIN SUPPORT	71L10(E4) 71L10(E4)		71L10(E4)

OIC = • SHIFT LEADER = ••

Figure 3.1.2.37

Heavy Division TCAE, TCAE Headquarters

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS	PRIMARY OPERATORS		PRIMARY OPERATORS
1 TCAE W/S	98C40		96B40
2 TCAE W/S	98C30		98J20
1 TCAC	98C20		98C10(E4)
	98C10		98C10
2 TCAC	98C20		98C10(E4)
	98J10(E4)		98C10
OFF LINE TECHNICAL SUPERVISION	352C(W2) • / ••		352G(W2) •• MISSION SUPV
OFF LINE ANALYTICAL SUPPORT	98G2L 96B20 98J10(E4) 98G1L(E4) 98J10		98G2L 98H20 98J10(E4) 96B10(E4) 96B10
OFF LINE ADMIN SUPPORT			

OIC = • SHIFT LEADER = ••

Figure 3.1.2.38

Heavy Division TCAE, Operations Section

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS 1 TCAE W/S 2 TCAE W/S 3 TCAE W/S	PRIMARY OPERATORS 352C(W2) • / •• 98C3L 98C20		PRIMARY OPERATORS 98C3L •• 98C20 98C20
OFF LINE TECHNICAL SUPERVISION			
OFF LINE ANALYTICAL SUPPORT	98C10(E4) 98C10(E4) 98C10		98C10(E4) 98C10 98C10
OFF LINE ADMIN SUPPORT			

OIC = • SHIFT LEADER = ••

Figure 3.1.2.39

Heavy Division TCAE, Traffic Analysis Team

DUTY	SHIFT 1		SHIFT 2
ON LINE OPERATORS 1 TCAE W/S	PRIMARY OPERATORS 352J(W2) • / ••		PRIMARY OPERATORS 98J30 ••
OFF LINE TECHNICAL SUPERVISION			
OFF LINE ANALYTICAL SUPPORT	98J20 98J10(E4)		98J10(E4)
OFF LINE ADMIN SUPPORT			

OIC = • SHIFT LEADER = ••

Figure 3.1.2.40

Heavy Division TCAE, ELINT Analysis Team

3.1.3 Operator Manpower Summary

3.1.3.1 Operator Manpower Requirements, Unit Level

The total workstation, CCS and TCAC operator manpower requirements by type unit are shown below.

	AIRBORNE CORPS	HEAVY CORPS	HEAVY DIVISION	LIGHT DIVISION
TSE				
WCG OPERATOR				
OFFICER	1	1	0	2
WARRANT	5	4	5	3
ENLISTED	6	7	7	7
CCS	2	2	2	2
TSE TOTAL	14	14	14	14
TCAE				
W/S OPERATOR				
OFFICER	0	0	0	0
WARRANT	4	2	2	2
ENLISTED	8	10	10	10
CCS	0	0	0	2
TCAC	8	8	8	0
TCAE TOTAL	20	20	20	14

Figure 3.1.3.1
ASAS Operator Manpower Requirements, Unit Level

3.1.3.2 ASAS Operator Manpower Requirements, Force Level

The ASAS total operator manpower requirements for both TSE and TCAE workstations plus CCS and TCAC operators for the Block I fielding are depicted below.

TSE	
WCG OPERATOR	
OFFICER	9
WARRANT OFFICER	47
ENLISTED	76
CCS	22
TSE TOTAL	154
TCAE	
TCAE W/S OPERATOR	
OFFICER	0
WARRANT OFFICER	24
ENLISTED	108
CCS	6
TCAC	64
TCAE TOTAL	202
GRAND TOTAL	356

Figure 3.1.3.2
ASAS Operator Manpower Requirements, Force Level

3.2 MAINTAINER ANALYSIS

The purpose of this analysis was to determine the number of maintainers required at each level, i.e., unit (organizational), direct support, and general support by Airborne Corps, Heavy Corps, Heavy Division, and Light Division.

3.2.1 Maintainer Manpower Requirements Analysis Process

Considerations in determining manpower included:

a. The equipment, ASAS configuration, and TOE.

b. The workload and tasks for each component/assembly.

c. MOS options to do the tasks at each echelon of repair.

d. The number of modules to be deployed in an enclave and in an organization.

e. The annual maintenance man-hours available.

f. The maintenance concept for the Block I configuration.

The basic analysis steps included:

a. Computing Manpower requirements using three factors:

(1) The workload by module and by MOS.

(2) The number of modules deployed in various enclaves and type units.

(3) The number of available annual maintenance manhours. The following available manhours per year were used:

(a) Unit Level = 2700 hours (Except Division HHC = 2500 hours)

(b) Direct Support = 2700 hours (GFE only)

(c) General Support = 3100 hours (GFE only)

b. The primary data sources for the maintainer manpower requirements analysis of the MOS and grades include the LSAR, AR 611-201, AR 570-2, and Army MARC Maintenance Data Base (AMMDB), September 1991. The AMMDB provided the available data on GFE items including maintenance manhours, MOS, level (Unit/DS/GS), item nomenclature, and where the MARC was derived. The source for maintenance manhours for ASAS unique items was the ASAS LSAR data base.

3.2.2 MOS Selection

The maintainer MOS selection process was based on a detailed maintenance task analysis. Criteria used in the development of MOS included:

a. When the item is GFE and has MARC data, the MOS identified in the MARC data was used. An exception is an MOS not in the TOE that performs the same maintenance duties as MOS in the TOE. In such cases, the workload was transferred to the TOE MOS.

b. If the item is not GFE, the workload was assigned to MOS 33T unless it was explicitly applicable to another MOS.

3.2.2.1 TSE WCG

MOS 33T was the MOS selected for organizational and direct support maintenance of the WCG. Details for each maintenance level by MOS are shown in Appendix A.

3.2.2.2 DPS

MOS 33T was the MOS selected for organizational and direct support maintenance of the DPS. DPS equipment components/assemblies and maintenance workload by MOS are shown in Appendix B of this report.

3.2.2.3 CCS

MOS 33T was the MOS selected for organizational and direct support maintenance of the CCS. CCS equipment components/assemblies and maintenance workload by MOS are shown in the Appendix C of this report.

3.2.2.4 TCAE W/S

TCAE W/S components/assemblies and maintenance workload by MOS are shown in the Appendix D of this report. The TCAE Workstation is maintained by operator personnel at the unit level. Direct, general support and depot level maintenance will be provided by Life Cycle Contractor Support (LCCS); therefore no organizational maintenance is reflected for the TCAE W/S.

3.2.2.5 TCAC

TCAC equipment components/assemblies and maintenance workload by MOS are shown in the Appendix E of this report. As the TCAC is maintained via LCCS for all levels of maintenance, the only AMMH reflected is for the GFE equipment, e.g. air conditioners, trucks, etc.

3.2.2.6 Enclave Supplemental Equipment (SUP)

Enclave Supplemental Equipment with maintenance requirements by item and the total maintenance workload by MOS are shown in Appendix G. The total maintenance requirement by SUP is:

(1) SUP 1 (Corps and Heavy Division TSE) total maintenance is 4090.3 manhours/year. See Appendix G(1) for details.

(2) SUP 2 (Corps and Division TCAE) total maintenance is 5481.0 manhours/year. See Appendix G(2) for details.

(3) SUP 3 (Light Division TSE) total maintenance is 4023.0 manhours/year. See Appendix G(3) for details.

(4) SUP 4 (Light Division TCAE) total maintenance is 3791.9 manhours/year. See Appendix G(4) for details.

3.3 TOTAL MAINTENANCE MANPOWER REQUIREMENTS

Using the available AMMH previously discussed in paragraph 3.2.1.a. above, each Block I configuration maintenance manpower increase was calculated. The Unit Maintenance Data Summary worksheet (Appendix H) recaps the maintenance manhours by MOS for each configuration. The Maintenance Data worksheets for each configuration (Appendices I through L) convert these calculations from manhours to manyears (carried to 2 decimal places) and the equivalent manpower spaces by grade and MOS. As an example, Appendix G(1) and Appendix H show MOS 63B with 1605.6 AMMH for a Corps or Division TSE. Appendix I-1 breaks the AMMH into a manyear equivalent of .64 (1605.6 divided by 2500 hours for Division HHC). Using the rounding formula prescribed in AR 570-2, that equates to one manyear increase to the gaining command. The grade of that manpower increase is determined by going to the model TOE for that unit and counting the number of MOS 63B personnel already authorized in that section. Then by looking in AR 611-201 at the Standards of Grade Increase table for MOS 63B, the grade of the next manpower increase is determined. In this example, an E-4 is the next grade authorization increase, as depicted in Appendix I-1.

Maintenance manpower requirements by MOS are depicted for an Airborne Corps, a Heavy Corps, a Heavy Division, and a Light Division for unit, direct support and general support in Figures 3.3A and B. Note that the 33T requirements do not actually come into existence until FY94 when the DS-level maintenance work is transferred from Interim Contractor Support to the unit 33T.

ABN CORPS MI BN		
33T	(E5)	1*
52C	(E4)	1
52D	(E5)	1
63B	(E5)	1
TOTAL:		4

HVY CORPS MI BN		
33T	(E3)	1*
52C	(E4)	1
52D	(E4)	1
63B	(E3)	1
TOTAL:		4

* With Direct Support FY94

Figure 3.3A
Corps Maintenance Manpower Increases, Unit Level

In the case of the Light Division TCAE, the inclusion of the CCS in place of the two TCACs immediately justifies the additional 33T due to the unit-level 33T maintenance manhours associated with the CCS. But adding the CCS eliminates the expensive TCAC Contractor support, one MOS 63B, one 52C and one 52D.

LIGHT DIV HHC	
33T	0*
52C	0
52D	0
63B (E3)	1

HVY DIV HHC	
33T	0*
52C	0
52D	0
63B (E4)	1

LIGHT DIV MI BN	
33T (E3)	1*
52C	0
52D	0
63B (E5)	1

HVY DIV MI BN	
33T (E4)	1*/**
52C	0
52D	0
63B (E4)	1

TOTAL: 3

TOTAL: 3

* 33T'S in CEWI BN Support HHC
** With Direct Support FY9:

Figure 3.3B
Division Maintenance Manpower Increases, Unit Level

The 36 total maintainers by MOS required for the Block I fielded configuration are shown in Figure 3.3C.

		AIRBORNE CORPS	HEAVY CORPS	HEAVY DIVISION	LIGHT DIVISION
33T	E1-E4		2	5	3
	E5-E6	1			
	E7-E9				
	SUBTOTAL	1	2	5	3
52C	E1-E4	1	2		
	E5-E6				
	E7-E9				
	SUBTOTAL	1	2		
52D	E1-E4		2		
	E5-E6	1			
	E7-E9				
	SUBTOTAL	1	2		
63B	E1-E4		2	10	3
	E5-E6	1			3
	E7-E9				
	SUBTOTAL	1	2	10	6
TOTAL		4	8	15	9

TOTAL MAINTAINER MANPOWER BILL

36

Figure 3.3C

Maintenance Manpower Increases, Force Level

3.4 SUPERVISOR ANALYSIS

Off-line supervisors are identified for information purposes only since they are not included in manpower and personnel numbers but do require ASAS unique training. Supervisors were selected based on the requirement for supervision at section or higher organizational levels, e.g.. Mission Supervisor, Section or Shift Leader, or OIC. Figure 3.4 shows supervisory manpower training requirements at unit and force level. As previously discussed, USAIC-FH criteria was used for selecting supervisor personnel.

TSE	ABN CORPS	HEAVY CORPS	HEAVY DIV	LT DIV	UNIT LEVEL TOTALS	FORCE LEVEL TOTALS
OFFICER						
35A - O3				1	1	3
35C - O3			1		1	5
35D - O3	1			1	2	4
35D - O4			1		1	5
35D - O5	1	1			2	3
35G - O4		1			1	2
SUBTOTALS	2	2	2	2	8	22
TCAE						
OFFICER						
35D - O3		2			2	4
35G - O3				1	1	3
35G - O4	1		1		2	6
WARRANT OFFICER						
352C - W2				1	1	3
352G - W2			1		1	5
352H - W2	1				1	1
SUBTOTALS	2	2	2	2	8	22
TOTALS	4	4	4	4	16	44

Figure 3.4
Supervisory Manpower, Unit and Force Level

3.5 TOTAL MANPOWER SUMMARY

The total manpower requirement to field the ASAS Block I Configuration of 1 Airborne Corps, 2 Heavy Corps, 5 Heavy Divisions and 3 Light Divisions (11 fielded systems) is 392 personnel as shown in Figure 3.5.

MANPOWER REQUIREMENTS
FORCE LEVEL SUMMARY

	OPERATOR	MAINTAINER	TOTAL
OFFICER	9	0	9
WARRANT OFFICER	71	0	71
ENLISTED	276	36	315
TOTAL	356	36	392

Figure 3.5
Total ASAS Block I Manpower Requirements, Force Level

4.0 PERSONNEL REQUIREMENTS ANALYSIS

The two major objectives of the Personnel Requirements Analysis are to determine personnel pipeline requirements for the MOSs in the proposed system and to determine the number of personnel which must be trained per year to support manpower requirements.

4.1 PERSONNEL REQUIREMENTS ANALYSIS PROCESS

The Personnel Requirements Analysis determines the number of personnel needed in the inventory to support system specific manpower requirements.

4.1.1 Transient, Holdee and Student (THS) Personnel Requirements Analysis

The THS Personnel Analysis is used to determine the number of personnel required in the inventory by MOS and grade to support system specific manpower requirements. It includes determination of the percentage of personnel above the manpower requirement needed to cover THS requirements.

The analysis of THS requirements begins with the system specific manpower requirements by MOS and grade identified in the Manpower Analysis. That requirement is increased to cover historical THS requirements. THS requirements are calculated using the ratio of the average number of personnel in the THS accounts versus manpower authorizations for an MOS and grade. THS ratios to estimate future requirements were developed from the Defense Manpower Documentation Center (DMDC) data base for FY87. These ratios were used to maintain parallelism between the IOTE and the Block I Configuration analysis. The THS personnel requirements formula is:

$$\frac{\text{Manpower by MOS and grade}}{\text{(1 - THS ratio by MOS and grade)}}$$

Using a manpower requirement of one 96B20 for example, the calculation would be:

$$\frac{1}{(1 - .0325)} = \frac{1}{0.9675} = 1.0336$$

Based on the example, one 96B20 system specific manpower requirement would generate a THS personnel requirement of 1.03 personnel. The same process was used to calculate all the THS personnel requirements shown for the ASAS Block I Configuration operators and maintainers.

4.1.2 Required Training Graduates Analysis

The THS personnel requirements reflect the number of personnel needed in the inventory on a steady state basis. That inventory is constantly changing due to personnel leaving the MOS and/or Army and promotions to the next higher grade. Those losses must be replaced by trainees, warrant officers and officers graduating from Initial Entry Training (IET), Warrant Officer Basic Courses, and Officer Basic Courses. The Training Graduates Analysis determines the number of graduates required each year to replace losses assuming the historical attrition and promotion rates will prevail in the future. Whenever ASAS unique training is required (operator, supervisor, and ASAS maintainer), it was assumed that only ASAS replacement personnel would require training.

The replacement methodology was used for this report. The formula used was:

THS Requirement * (Promotion + Attrition) = Required Graduates

The THS Requirement represents the number of personnel needed to fill the manpower position. The promotion and attrition rates reflect the losses that will occur. See Appendix G for the THS, Promotion, and Attrition Factors by MOS and Grade. This methodology will only replace losses. Using the E5 96B20 operator example from above, the calculation would be:

1.0336 * (.16232 + .09476) = .2657 required graduates

Maintainer training graduate requirements were calculated using the same methodology. For example, an additional 52D Power Generator Equipment Repairer is required to maintain ASAS equipment in a unit. The additional manpower requirement and the number of 52Ds already in the TOE produce a requirement for a 52D20 (E5) based on the Standards of Grade Authorization (SGA). The required training graduates are calculated on 52D20 losses(promotion and attrition) only.

The methodology for calculating maintainer training graduate requirements using one 52D20 is:

52D20 THS Personnel Requirement * (52D20 Promotion + Attrition Rates) = Required Training Graduates.

Using data from Appendix M, the calculations for one 52D20 are:

1.0291 * (.1424 + .0119) = .1588 Required Graduates

4.2 BLOCK I CONFIGURATION PERSONNEL REQUIREMENTS

4.2.1 Operator Personnel Requirements

4.2.1.1 ASAS Operator Personnel Requirements, Unit Level

The ASAS Operator Personnel Requirements for unit level fielding of the TSE and TCAE Enclaves for the Block I System are shown in Figure 4.2.1.1. This chart reflects workstation, CCS and TCAC operators.

	AIRBORNE CORPS	HEAVY CORPS	HEAVY DIVISION	LIGHT DIVISION
TSE				
WCG OPERATOR				
OFFICER	1.14	1.21	0.00	2.42
WARRANT OFFICER	5.29	4.22	5.49	3.24
ENLISTED	6.26	7.31	7.38	7.35
SUBTOTAL	12.69	12.74	12.87	13.01
CCS	2.11	2.10	2.10	2.10
TCAE				
TCAE W/S OPERATOR				
OFFICER	0.00	0.00	0.00	0.00
WARRANT OFFICER	4.34	2.16	2.22	2.22
ENLISTED	8.40	10.48	10.52	10.43
SUBTOTAL	12.74	12.64	12.74	12.65
CCS	0.00	0.00	0.00	2.10
TCAC	8.46	8.43	8.63	0.00
TOTAL	36.00	35.91	36.34	29.86

Figure 4.2.1.1
Operator Personnel Requirements, Unit Level

4.2.1.2 ASAS Operator Personnel Requirements, Force Level

The ASAS Operator Personnel Requirements for fielding of the ASAS Block I System is 370.5 personnel, as depicted in Figure 4.2.1.2 below.

	MANPOWER	PERSONNEL
35C	4	4.7
35G	5	6.0
TOTAL OFFICERS	9	10.7
350B	25	26.9
352C	30	32.2
352G	3	3.3
352J	13	14.8
TOTAL W/O	71	77.2
96B	64	66.5
96D	13	14.3
98C	162	171.5
98J	37	30.3
TOTAL ENLISTED	276	282.6
GRAND TOTAL	356	370.5

Figure 4.2.1.2
Operator Personnel Requirements, Force Level

4.2.2 ASAS Supervisor Personnel Requirements, Force Level

Figure 4.2.2 shows Supervisor Personnel Requirements for fielding of the ASAS Block I System.

	MANPOWER	PERSONNEL
OFFICER	35	41.1
WARRANT OFFICER	9	9.9
TOTAL	44	51.0

Figure 4.2.2
Supervisor Personnel Requirements, Force Level

4.2.3 ASAS Maintainer Personnel Requirements, Force Level

The Maintainer Personnel Requirements by MOS for fielding of the ASAS Block I System is shown in Figure 4.2.3.

MOS	MANPOWER	PERSONNEL
33T	11	11.5
52C	3	3.1
52D	3	3.0
63B	19	19.6
TOTAL	36	37.2

Figure 4.2.3
Maintainer Personnel Requirements, Force Level

4.2.4 ASAS Total Personnel Requirements, Force Level.

The total Personnel Requirements by category for the Block I fielding is shown in Figure 4.2.4 below.

	OPERATOR	MAINTAINER	SUPERVISOR *	TOTAL
OFFICER	10.7	0	41.1	51.8
WARRANT OFFICER	77.2	0	9.9	87.1
ENLISTED	282.6	37.2	0	319.8
TOTAL	370.5	37.2	51.0	458.7

* Supervisor manpower/personnel is not a requirement against the ASAS program and is shown for training purposes only.

Figure 4.2.4
Total Personnel Requirements, Force Level Summary

4.3 BLOCK I CONFIGURATION GRADUATE REQUIREMENTS

4.3.1 Operator Graduate Requirements

The Operator graduate requirement by MOS is shown in Figure 4.3.1 below.

	MANPOWER	PERSONNEL	GRADUATES
35C	4	4.7	1.0
35G	5	6.0	1.3
TOTAL OFFICERS	9	10.7	2.3
350B	25	26.9	5.4
352C	30	32.2	8.5
352G	3	3.3	0.6
352J	13	14.8	5.5
TOTAL W/O	71	77.2	20.0
96B	64	66.5	20.8
96D	13	14.3	2.8
98C	162	171.5	66.1
98J	37	30.3	8.5
TOTAL ENLISTED	276	282.6	98.2
GRAND TOTAL	356	370.5	120.5

Figure 4.3.1
Operator Graduate Requirements, Force Level

4.3.2 Supervisor Graduate Requirement

The Supervisor graduate requirement for officer and warrant officer is shown below.

	MANPOWER	PERSONNEL	GRADUATES
OFFICER	35	41.1	9.0
WARRANT OFFICER	9	9.9	2.0
TOTAL	44	51.0	11.0

Figure 4.3.2
Supervisor Graduate Requirements, Force Level

4.3.3 Maintainer Graduate Requirements

The Maintainer graduate requirement is depicted in Figure 4.3.3 below.

MOS	MANPOWER	PERSONNEL	GRADUATES
33T	11	11.5	6.9
52C	3	3.1	1.3
52D	3	3.0	0.9
63B	19	19.6	9.5
TOTAL	36	37.2	18.6

Figure 4.3.3
Maintainer Graduate Requirements, Force Level

4.3.4 Annual Graduate Requirements

Figure 4.3.4 below recaps the total annual graduate requirement for ASAS Block I fielding.

	OPERATOR	MAINTAINER	SUPERVISOR	TOTAL
OFFICER	2.3	0	9.0	11.3
WARRANT OFFICER	20.0	0	2.0	22.0
ENLISTED	98.2	18.6	0.0	116.8
TOTAL	120.5	18.6	11.0	150.5

Figure 4.3.4

Total Annual Graduate Requirements, Force Level Summary

5.0 GENERAL TRAINING RESOURCE REQUIREMENTS ANALYSIS (GTRRA)

5.1 GTRRA PROCESS

The GTRRA is normally conducted in two steps: a course requirements analysis and a training cost and resources determination. For this abbreviated analysis, the ASAS course requirements were based on the USAIC-FH ASAS Institutional Training Resource Requirements Analysis (ITRRA) Report prepared by Hay Systems Inc.(HSI) for U.S. Army Training and Doctrine Command (TRADOC) in August, 1991. Assumptions and constraints used are below.

5.1.1 Assumptions

(1) An ASAS PDI has been approved. This will allow tracking of ASAS-trained soldiers for near-term utilization.

(2) Only replacement personnel need to receive ASAS training. Otherwise the entire MOS would be trained to ensure an ASAS trained replacement was available.

(3) ASAS specific training will be in addition to current POI training.

(4) Training resources and costs are estimated for the "steady-state" or average value year. The "steady-state year" is defined as the first year in which the service training system is producing only replacement training and ASAS is fielded. Training is focused on filling manpower positions vacated through attrition and promotion.

(5) The courses in this study are based on the USAIC-FH ASAS ITRRA Report. The ITRRA report used the ASAS New Equipment Training (NET) POI developed by ManTech as a beginning point, then developed a Quasi-POI which brought the multiple Functional

Identities (FIs) into the training concept. ManTech's NET POI grouped four common blocks (common hardware, common software, collective training and a system level PE) of 160 hours of training, plus one FI track. With multiple Functional Identity capability in the Block I software, HSI constructed Quasi-POIs to teach multiple FI's. The courses and course information are below.

(a) The ITRRA-based TSE WCG Operator course is 365 hours (9 weeks) long, has an Optimal Class Size (OCS) of 12, contains 1255 Instructor Contact Hours (ICH), requires 12 WCG or commercial equivalents, and requires 336 hours of instruction on the WCG. The course includes 61 hours of ICM, 49 hours of Database Management (All Source), 95 hours of SIT, 41 hours of Target and 50 hours of PE and Exam. The target audience is all TSE WCG operators in CMF 96 and 98, plus all officer and warrant officer operators.

(b) The ITRRA-based CCS Operator course is 230 hours long, has an OCS of 7, contains 645 ICH, requires two CCS and one clamshell trainer for instruction, and requires 204 hours of instruction on the CCS. This equates to a 6 week class for CMF 98 personnel. The course includes 28 hours hardware training, 144 hours initialization operations and 58 hours of PE and Exam.

(c) The USAIC-FH POI-based TCAE Analyst course is 200 hours (5 weeks) long, has an OCS of 12, and contains 80 hours communications (TCAC and CCS), 100 hours COMINT/ELINT (CEI) training, and a 20 hour CPX. The target audience is all TCAE operators (TCAE W/S, TCAC and CCS) in CMF 96 and 98 plus warrant officer operators.

(d) The ITRRA-based ASAS Supervisor course is a combination of the Mission Supervisor Course NET POI and Common Software and supervisory functions from the System Management block of the ASAS Operator POI. The course is 209 hours (5 weeks)

long, has an OCS of 12, contains 412 ICH, requires 12 WCG or Commercial WCG for instruction, and includes 17 hours common hardware/software, 64 hours Enclave Operations, and 61 hours of PE and Exam. The target audience for this class includes all TSE and TCAE supervisors and TSE System Supervisors (CMF 96 and 98, plus officers and warrant officers that will perform Mission Supervisor or TSE SPV/FMR operator tasks.

(e) ASAS Maintainer course Quasi-POI was unchanged from the ASAS Maintenance NET POI with the exception of reducing the OCS to three. This was based on the low number of graduates required. The Quasi-POI as developed is 240 hours (6 weeks) long, contains 240 OCH, requires three WCG and two CCS for instruction. The Quasi-POI requires 28 hours of instruction on the WCG and 25 hours on the CCS. Target audience is MOS 33T, grades E3-E5.

5.1.2 Constraints

(1) Only required operators, supervisors, and MOS 33T maintainers will receive ASAS training.

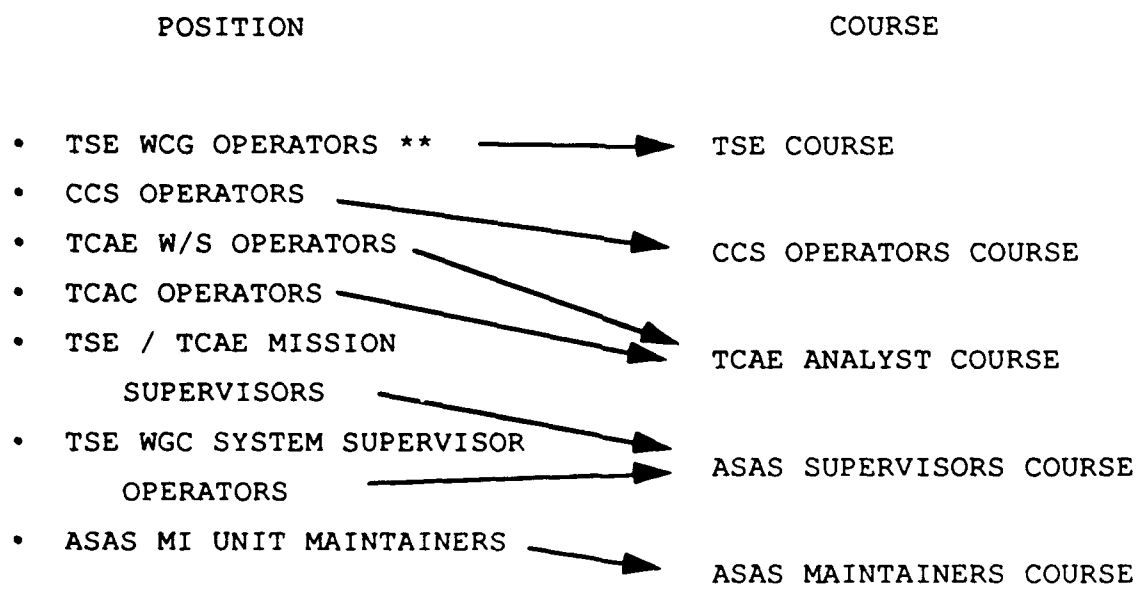
(2) Only those resources and costs associated with courses of instructions conducted at military formal schools and training centers are estimated in the GTRRA.

(3) Training resource requirements for unit collective training and classified Programs of Instruction (POIs) are not included in the analysis.

(4) The analysis addresses peacetime POI estimates; mobilization hours are not included in the GTRRA.

5.1.3 ASAS Training Strategy

The ASAS Training Strategy, based on the assumptions and constraints listed above, is depicted in Figure 5.1.3 below. TSE WCG operators will attend the nine week TSE Operators course. CMF 98 personnel designated to be CCS operators will attend the 6 week CCS Operators Course. TCAE W/S operators and TCAC operators will attend the 5 week TCAE Analyst course. All Mission Supervisors and TSE System Supervisors will attend the 5 week ASAS Supervisor course. The ASAS 33T unit-level maintainers will attend the ASAS Maintainers course.



** Less System Supervisors

Figure 5.1.3
ASAS HARDMAN Training Strategy

5.1.4 Training Cost and Resources Determination Process

Training cost and resources were developed using the Department of the Army approved Man Integrated Systems Technology (MIST) methodology that has been incorporated into the ASAS HARDMAN MPT model. The ASAS MPT computer model takes cost and resource data for an existing or BCS course and calculates cost and resource requirements for new courses based on the Quasi-POI's developed as part of the ITRRA analysis, required number of graduates and other information. Outputs include course hours, cost per graduate, annual training cost and instructor requirements. The analysis does not address the cost of training devices, facilities and their maintenance.

The BCS basic course data includes cost data from the TRADOC ATRM-159 Report augmented by course data applicable to the course. The additional data comes from the TRADOC 812R Report and TRADOC Management Engineering Agency (TRAMEA) Data Base. The ATRM-159 Report reflects courses and course loads from FY85 with costs by appropriation (OMA, MPA, etc.) that have been inflated to reflect FY87 dollars. The POI data inputs are used to update the FY85 course to the current equivalent course, e.g., FY85 96B10 course to the FY87 96B10 course. The ASAS MPT model uses both sets of data to generate cost and resource data for the BCS course.

The ASAS courses for Block I operators, supervisors, and ASAS maintainers were based on the IOTE NET courses and the ITRRA Technical Report. Other data included the required number of graduates from the Personnel Analysis. The ASAS MPT model adds the ASAS course to the BCS course and costs the combined courses as one course. The difference between the BCS course cost and resource requirements and those of the combined course (BCS and ASAS course) is the cost and resource requirements of the new system training course.

5.2 OPERATOR TRAINING

The operator GTRRA addressed only those resource requirements for Block I configuration TSE WCG operators, CCS operators, TCAE W/S operators and TCAC operators.

5.2.1 Operator Training Cost and Resources Requirements

Training costs and resources determination were done using the following training costing strategy. The Block I required operator graduates were run through the 96B10 IET course and either the TSE WCG Operator course, the CCS Operator course, or the TCAE Analyst course.. The required warrant officer operator graduates were run through the MI Warrant Officer Basic course and either the TSE WCG Operator course or the TCAE Analyst course. Finally, the required officer operator graduates were programmed through the MI Officer Basic course and TSE WCG Operator course. All required CCS operators were run through the 96B10 IET course and the CCS Operator course. Although CCS and TCAC operators are primarily CMF 98 personnel, the 96B10 IET course was used as the BCS course to reflect training costs at Ft. Huachuca AZ where the ASAS training will be conducted. All required TCAC operators were programmed through the TCAE Analyst course.

5.2.1.1 TSE WCG Operators

The training costs for the TSE WCG operators by officer, warrant officer, enlisted are shown in Figure 5.2.1.1. This figure also shows the number of graduates, course cost, annual cost and new instructors required in manyears.

COURSE	REQUIRED GRADs	COST PER GRAD ($K)	ANNUAL COST ($K)	TOTAL INSTRs
TSE WCG OPERATOR				
• OFFICER	0.8	$ 21.3	$17.1	0.1
• WARRANT	9.8	$ 13.8	$ 135.2	1.4
• ENLISTED	20.4	$ 11.8	$241.4	2.5
• TOTAL	31.0		$393.7	4.0

Figure 5.2.1.1

TSE WCG Operators Estimated Training Costs

5.2.1.2 CCS Operators

The training costs for the CCS operators are shown in Figure 5.2.1.2. This figure also shows the number of graduates, course cost, annual cost and new instructors required.

COURSE	REQUIRED GRADs	COST PER GRAD ($K)	ANNUAL COST ($K)	TOTAL INSTRs
CCS OPERATOR (ENLISTED)	10.8	$ 8.9	$ 96.0	1.2

Figure 5.2.1.2

CCS Operators Estimated Training Costs

5.2.1.3 TCAE Analysts (including TCAC operators)

The training costs for the TCAE W/S operators are shown in Figure 5.2.1.3. This figure also shows the number of graduates, course cost, annual cost and new instructors required.

COURSE	REQUIRED GRADs	COST PER GRAD ($K)	ANNUAL COST ($K)	TOTAL INSTRs
TCAE ANALYST				
• WARRANT	7.5	$ 7.8	$ 58.7	0.7
• ENLISTED	66.4	$ 6.8	$ 450.3	4.7
• TOTAL	73.9		$ 509.0	5.4

Figure 5.2.1.3
TCAE Analysts Estimated Training Costs

5.3 SUPERVISOR TRAINING

The training costing strategy for supervisors was similar. Required supervisors from both the TSE and TCAE enclaves, to include TSE System Supervisors, were programmed through the Advanced NCO course, Advanced MI Warrant Officer course or Advanced MI Officer course as appropriate and through the ASAS Supervisor course. The training costs for the Supervisor operators are shown in Figure 5.3. This figure also shows the number of graduates, course cost, annual cost and new instructor manyears required.

COURSE	REQUIRED GRADs	COST PER GRAD ($K)	ANNUAL COST ($K)	TOTAL INSTRs
ASAS SUPERVISOR				
• OFFICER	10.6	$ 9.1	$ 96.4	0.4
• WARRANT	4.6	$ 7.9	$ 36.5	0.2
• ENLISTED	0.9	$ 6.9	$ 6.2	0.0
• TOTAL	16.1		$ 139.1	0.6

Figure 5.3

ASAS Supervisors Estimated Training Costs

5.4 MAINTAINER TRAINING

5.4.1 Maintainer Training Cost and Resource Requirements

The process for analyzing maintainer costs and resources were the same as that used above. For all maintainer MOS, only the required Block I graduates were run through each particular course.

5.4.2 ASAS Maintainer Training Cost Summary

a. The required graduates, cost per graduate, course cost, annual training costs, and number of new instructors for MOS 33T, 52C, 52D, and 63B are summarized in Figure 5.4.2 below.

MOS	REQUIRED GRADS	COST PER GRAD ($K)	ANNUAL COST ($K)	TOTAL INSTRs
33T (EW/Intercept)	6.9	$ 7.1	$ 48.8	0.6
52C (Util. Equip.)	1.3	$ 20.0	$ 26.0	0.18
52D (Generator)	0.9	$ 11.8	$ 10.7	0.05
63B (Lt. Vehicle)	9.5	$ 10.5	$ 99.8	0.37
	18.6	$ 53.4	$ 185.3	1.20

Figure 5.4.2
Maintainer Estimated Training Costs

5.5 GENERAL TRAINING RESOURCE REQUIREMENTS SUMMARY

The annual training cost to field the ASAS Block I configuration to 1 Airborne Corps, 2 Heavy Corps, 5 Heavy Divisions and 3 Light Divisions is 138.7 graduates per year at an estimated annual cost of $1,187,000 and 11.8 new instructor manyears.

COURSE	REQUIRED GRADS	ANNUAL COST ($K)	NEW INSTRUCTORS
TSE WCG OPERATOR COURSE	31.0	$ 394	4.0
CCS OPERATOR COURSE	10.8	$ 96	1.2
TCAE ANALYST COURSE	73.9	$ 509	5.4
ASAS SUPERVISOR COURSE	16.1	$ 139	0.6
ASAS MAINTAINER COURSE	6.9	$ 49	0.6
TOTAL	138.7	$ 1,187	11.8

Figure 5.5
General Training Resource Requirements Summary

6.0 IMPACT ANALYSIS

The major objectives of the impact analysis are to establish resource availability, determine critical resources and assess the force level impact. This analysis is based on the manpower, personnel, and training analysis results. Tradeoffs were subsequently conducted to evaluate alternatives that might reduce the baseline impacts.

6.1 IMPACT ANALYSIS PROCESS

Resource availability was based on TOEs, POIs, Materiel Readiness Support Activity (MRSA) Maintenance Man-Hour Master Data File, Defense Manpower Data Center, Army MOS operating strengths and authorizations using PERSCOM Force Management Books (Volumes I and II) and the Enlisted Personnel Manpower Requirements (EPMR) and proponent school estimates of available training resources. The impact analysis compares current manpower, personnel and training resources with those required for the ASAS Block I configuration fielding. The determination of critical requirements is based on projected supply versus projected demand for resources.

6.2 FORCE LEVEL MANPOWER IMPACT

The ASAS manpower impact on Army authorized strength was based on 1992 projected target strengths reflected in the US Total Army Personnel Command (PERSCOM) Force Management Book, Volume I and II, dated January 1991. This is the most recent set of data available from PERSCOM that projects officer, warrant officer and enlisted target and operating strengths into FY92. The ASAS Manpower Percentage Requirement is determined by dividing the ASAS Manpower Requirement by the Authorized Strength of that MOS. Since operator manpower requirements are already in current authorizations (TOE), there is no change to current authorized strength. Operator manpower came from within existing TOE authorizations for the TSE and TCAE workstation operators,

CCS/TCAC operators, and supervisors. However, maintainer manpower requires an increase of 36 spaces with no reductions or offsets identified at this time.

6.2.1 ASAS Operator Manpower Impact

6.2.1.1 Commissioned Officers

The most critical officer branch was in the 35 AOC. The ASAS impact on officer manpower is insignificant as shown in Figure 6.2.1.1 below.

	ARMY AUTHORIZED STRENGTH *	ASAS REQUIREMENT	PERCENTAGE REQUIREMENT
OFFICERS (AOC 35)			
LIEUTENANT	574	0	0.0
CAPTAIN	2,190	8	0.3
MAJOR	1,145	1	0.0
TOTALS	3,909	9	0.2

* FY90 DATA

Figure 6.2.1.1
Operator Manpower Impacts, Officers, Force Level

6.2.1.2 Warrant Officers

Warrant officer manpower requirements do significantly effect the current status as shown in Figure 6.2.1.2 below. ASAS requires 20.5% of the Army inventory of Warrant Officer CMF 35. The greatest impact is on CMF 350B, Order of Battle Technician, with a 29.1% ASAS requirement.

WARRANT OFFICERS		ARMY AUTHORIZED STRENGTH	ASAS REQUIREMENT	PERCENTAGE REQUIREMENT
350B	W1-W2	48	12	25.0
350B	W3-W4	38	13	34.2
	SUBTOTAL	86	25	29.1
352C	W1-W2	81	12	14.8
352C	W3-W4	63	18	28.6
	SUBTOTAL	144	30	20.8
352G	W1-W2	37	1	2.7
352G	W3-W4	26	2	7.7
	SUBTOTAL	63	3	4.8
352J	W1-W2	30	13	43.3
352J	W3-W4	24	0	0.0
	SUBTOTAL	54	13	24.1
TOTALS		347	71	20.5

Figure 6.2.1.2

Operator Manpower Impacts, Warrant Officers, Force Level

6.2.1.3 Enlisted Personnel

The ASAS impact on projected enlisted operator manpower (TSE WCG, TCAE W/S, CCS and TCAC) is minimal, as shown in Figure 6.2.1.3 below. The total ASAS enlisted requirement of 276 operators represents just 4% of the projected FY92 manpower.

ENLISTED		ARMY AUTHORIZED STRENGTH	ASAS REQUIREMENT	PERCENTAGE REQUIREMENT
96B	E1-E4	612	16	2.6
	E5-E6	1,575	37	2.3
	E7-E9	621	11	1.8
	SUBTOTAL	2,808	64	2.3
96D	E1-E4	196	0	0.0
	E5-E6	348	5	1.4
	E7-E9	146	8	5.5
	SUBTOTAL	690	13	1.9
98C	E1-E4	1,071	58	5.4
	E5-E6	1,139	97	8.5
	E7-E9	230	7	3.0
	SUBTOTAL	2,440	162	6.6
98J	E1-E4	482	10	2.1
	E5-E6	367	22	6.0
	E7-E9	91	5	5.5
	SUBTOTAL	940	37	3.9
TOTAL		6,878	276	4.0

Figure 6.2.1.3

Operator Manpower Impacts, Enlisted, Force Level

6.2.2 ASAS Maintainer Manpower Impact

ASAS Block I maintainer manpower requirements do have an impact on the overall Army authorized strength in that the 39 ASAS maintainer manpower requirements represent a manpower increase to ASAS Block I TOEs. MOS 33T is the most critical with a 2.2% requirement of authorized strength. However, the small total number of maintainers needed to support ASAS Block I has a minimal impact on overall Army strength, as shown in Figure 6.2.2 below.

ENLISTED		ARMY AUTHORIZED STRENGTH	ASAS REQUIREMENT	PERCENTAGE INCREASE
33T	E1-E4	251	10	4.0
	E5-E6	168	1	0.6
	E7-E9	79	0	0.0
	SUBTOTAL	498	11	2.2
52C	E1-E4	1,064	3	0.3
	E5-E6	681	0	0.0
	E7-E9	0	0	0.0
	SUBTOTAL	1,745	3	0.2
52D	E1-E4	3,840	2	0.1
	E5-E6	1,724	1	0.1
	E7-E9	0	0	0.0
	SUBTOTAL	5,564	3	0.1
63B	E1-E4	7,741	15	0.2
	E5-E6	4,861	4	0.1
	E7-E9	2,000	0	0.0
	SUBTOTAL	14,602	19	0.2
TOTAL		22,409	36	0.2

Figure 6.2.2

Maintainer Manpower Impacts, Force Level

6.3 FORCE LEVEL PERSONNEL IMPACT

The ASAS personnel impact on Army operating strength is evaluated below. The Force Level MOS Availability Ratios (AR) were based on the 1992 projected target and operating strengths as reflected in the PERSCOM Force Management Book, Volume I and II, dated January 1991. The AR is determined by dividing the projected operating strength of an MOS by the projected authorized strength of that MOS. The ASAS Percent of Total Operating Strength reflects the ASAS personnel requirements divided by the projected Operating Strength. Maintainer personnel require an MOS percentage increase to the Army operating strength.

6.3.1 ASAS Operator Personnel Impact

6.3.1.1 Commissioned Officers

The personnel status of the Military Intelligence Branch (35 AOC) is excellent with a 119% availability rate. The ASAS impact on officer personnel is insignificant as shown in Figure 6.3.1.1 below.

	ARMY OPERATING STRENGTH *	% AR **	ASAS RQMT	ASAS % OF OPER STR
OFFICERS (AOC 35)				
LIEUTENANT	1,478	257.1	0.0	0.0
CAPTAIN	2,328	106.3	9.6	0.4
MAJOR	848	74.1	1.1	0.1
TOTALS	4,654	119.1	10.7	0.2

* FY90 DATA

** AR = OPER STR/AUTH STR

Figure 6.3.1.1
Operator Personnel Impacts, Officers, Force Level

6.3.1.2 Warrant Officers

Warrant officer personnel requirements for MOS 350B, 352C, 352G, and 352J do significantly effect the current status as shown in Figure 6.3.1.2 below. ASAS requires 31.5% of the projected Army inventory of the Emanations Analysis Technician, MOS 352J. Overall, ASAS is projected to require 20.7% of all CMF 35 warrant officers.

WARRANT OFFICERS		ARMY OPERATING STRENGTH	% AR	ASAS RQMT	ASAS % OF OPER STR
350B	W1-W2	58	120.8	12.6	21.7
350B	W3-W4	42	110.5	14.3	34.0
	SUBTOTAL	100	116.3	26.9	26.9
352C	W1-W2	99	122.2	12.9	13.0
352C	W3-W4	49	77.8	19.3	39.4
	SUBTOTAL	148	102.8	32.2	21.8
352G	W1-W2	55	148.6	1.1	2.0
352G	W3-W4	23	88.5	2.2	9.6
	SUBTOTAL	78	123.8	3.3	4.2
352J	W1-W2	30	100.0	14.8	49.3
352J	W3-W4	17	70.8	0.0	0.0
	SUBTOTAL	47	87.0	14.8	31.5
TOTALS		373	107.5	77.2	20.7

Figure 6.3.1.2
Operator Personnel Impacts, Warrant Officers, Force Level

6.3.1.3 Enlisted Personnel

The ASAS impact on enlisted operator personnel (TSE WCG, TCAE W/S, CCS and TCAC) is minimal. The most critical enlisted operator MOS is 98C with an FY 92 availability ratio of 99.4% for E-5/E-6 and a personnel requirement for 102 ASAS operators. Figure 6.3.1.3 below shows the overall personnel impact. The enlisted M1 MOS

availability ratio has improved considerably over the past year to a projected 105.7% FY92 availability.

ENLISTED		ARMY OPERATING STRENGTH	% AR	ASAS RQMT	ASAS % OF OPER STR
96B	E1-E4	786	128.4	16.4	2.1
	E5-E6	1,557	98.9	38.4	2.5
	E7-E9	609	98.1	11.7	1.9
	SUBTOTAL	2,952	105.1	66.5	2.3
96D	E1-E4	210	107.1	0	0.0
	E5-E6	345	99.1	5.3	1.5
	E7-E9	144	98.6	9.0	6.3
	SUBTOTAL	699	101.3	14.3	2.0
98C	E1-E4	1,233	115.1	62.1	5.0
	E5-E6	1,132	99.4	102.0	9.0
	E7-E9	228	99.1	7.4	3.2
	SUBTOTAL	2,593	106.3	171.5	6.6
98J	E1-E4	496	102.9	8.2	1.7
	E5-E6	387	105.4	16.8	4.3
	E7-E9	90	98.9	5.3	5.9
	SUBTOTAL	973	103.5	30.3	3.1
TOTAL		7,217	105.7	282.6	3.9

Figure 6.3.1.3

Operator Personnel Impacts, Enlisted, Force Level

6.3.2 ASAS Maintainer Personnel Impact

Availability Ratios for the maintainers are impacted since ASAS maintainer personnel requirements are not in the current Army authorizations. However, the relatively small quantity of personnel required to support ASAS does not represent a serious impact on any of the maintainer MOSs in Figure 6.3.2 below. To determine impact, the ASAS maintainer MOS requirement is added to the projected FY92 operating strength. This figure is then divided by the MOS projected operating strength to determine the ASAS percent of the total operating strength. As the figure below shows, the projected ASAS maintainer impact on MOS 33T is only 2.1 percent in FY92.

ENLISTED		ARMY OPERATING STRENGTH	% AR	ASAS RQMT	ASAS % INCREASE
33T	E1-E4	296	117.9	10.5	3.5
	E5-E6	166	98.8	1.0	0.6
	E7-E9	78	98.7	0.0	0.0
	SUBTOTAL	540	108.4	11.5	2.1
52C	E1-E4	1,017	95.6	3.1	0.3
	E5-E6	748	109.8	0.0	0.0
	E7-E9	0	0.0	0.0	0.0
	SUBTOTAL	1,765	101.1	3.1	0.2
52D	E1-E4	3,594	93.6	2.0	0.1
	E5-E6	1,931	112.0	1.0	0.1
	E7-E9	0	0.0	0.0	0.0
	SUBTOTAL	5,525	99.3	3.0	0.1
63B	E1-E4	7,655	98.9	15.5	0.2
	E5-E6	5,268	108.4	4.1	0.1
	E7-E9	2,041	102.1	0	0.0
	SUBTOTAL	14,964	102.5	19.65	0.1
TOTAL		22,794	101.7	37.2	0.2

Figure 6.3.2

Maintainer Personnel Impacts, Force Level

6.4 CRITICAL RESOURCE REQUIREMENTS

6.4.1 Manpower

The manpower for operators came from within the existing TOE authorizations. Maintainer manpower requires an increase of 36 spaces with no reduction or offsets identified at this time.

6.4.2 Personnel

No new MOS requirements were identified. A PDI has been approved to assist in tracking ASAS-trained personnel and thereby reduce training requirements. The ability of the MOS to operate and maintain the system has not been verified. The most critical MOS are 98C and 33T.

6.4.3 Training

The critical training impact is an increase in operator, supervisor, and maintainer training due to ASAS unique replacement training. Figure 6.4.3.A shows the five proposed courses and course lengths that need to be added to the USAIC-FH curriculum for ASAS Block I fielding.

COURSE	COURSE LENGTH
TSE WCG OPERATOR COURSE	9 Weeks
CCS OPERATOR COURSE	6 Weeks
TCAE ANALYST COURSE	5 Weeks
ASAS SUPERVISOR COURSE	5 Weeks
ASAS MAINTAINER COURSE	6 Weeks

Figure 6.4.3A
Training/Course Impacts

Total annual training cost is estimated at $1,187,000 for 138.7 new graduates per year. Additionally, there is a requirement for 11.8 additional instructor manyears (see Figure 6.4.3B below).

COURSE	REQUIRED GRADS	ANNUAL COST ($K)	NEW INSTRUCTORS
TSE WCG OPERATOR COURSE	31.0	$ 394	4.0
CCS OPERATOR COURSE	10.8	$ 96	1.2
TCAE ANALYST COURSE	73.9	$ 509	5.4
ASAS SUPERVISOR COURSE	16.1	$ 139	0.6
ASAS MAINTAINER COURSE	6.9	$ 49	0.6
TOTAL	138.7	$ 1,187	11.8

Figure 6.4.3B
Training/Resource Impacts

6.5 ENCLAVE MANPOWER IMPACTS

The addition of ASAS equipment to the TSE and TCAE enclaves impacts the respective TOE manpower. The figures below show the percentage impact of the Block I configuration on each type of unit. Additional figures in Appendix Q show the manpower and personnel impacts by actual TOE strength for each of the Block I unit configurations.

6.5.1 Airborne Corps Manpower Impacts

Figure 6.5.1A shows the percentage of the Airborne Corps TSE manpower dedicated to operating ASAS equipment. Warrant officers comprise the highest utilization, with five of the 12 available Warrant Officers (42%) in the TSE performing ASAS duties.

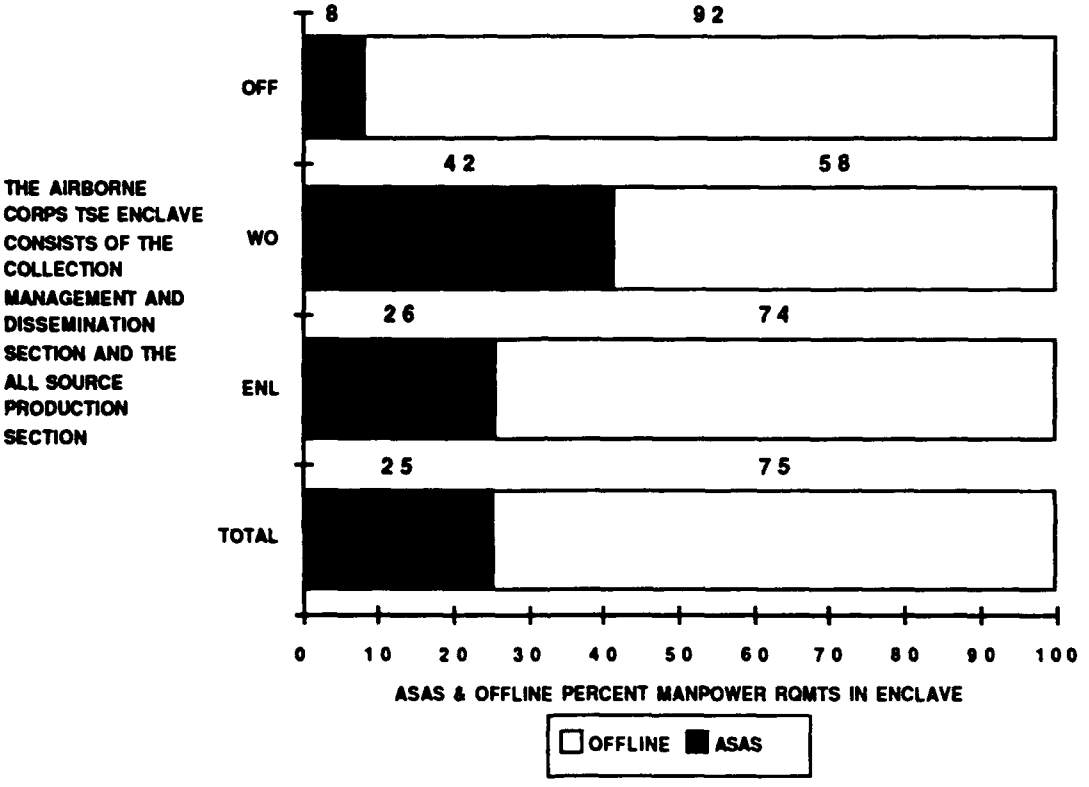


Figure 6.5.1A
Airborne Corps Manpower Impacts (TSE)

Figure 6.5.1B shows the percentage of the Airborne Corps TCAE manpower dedicated to operating ASAS equipment. Warrant officers comprise the highest utilization, with four of the five available Warrant Officers (80%) in the TCAE performing ASAS duties.

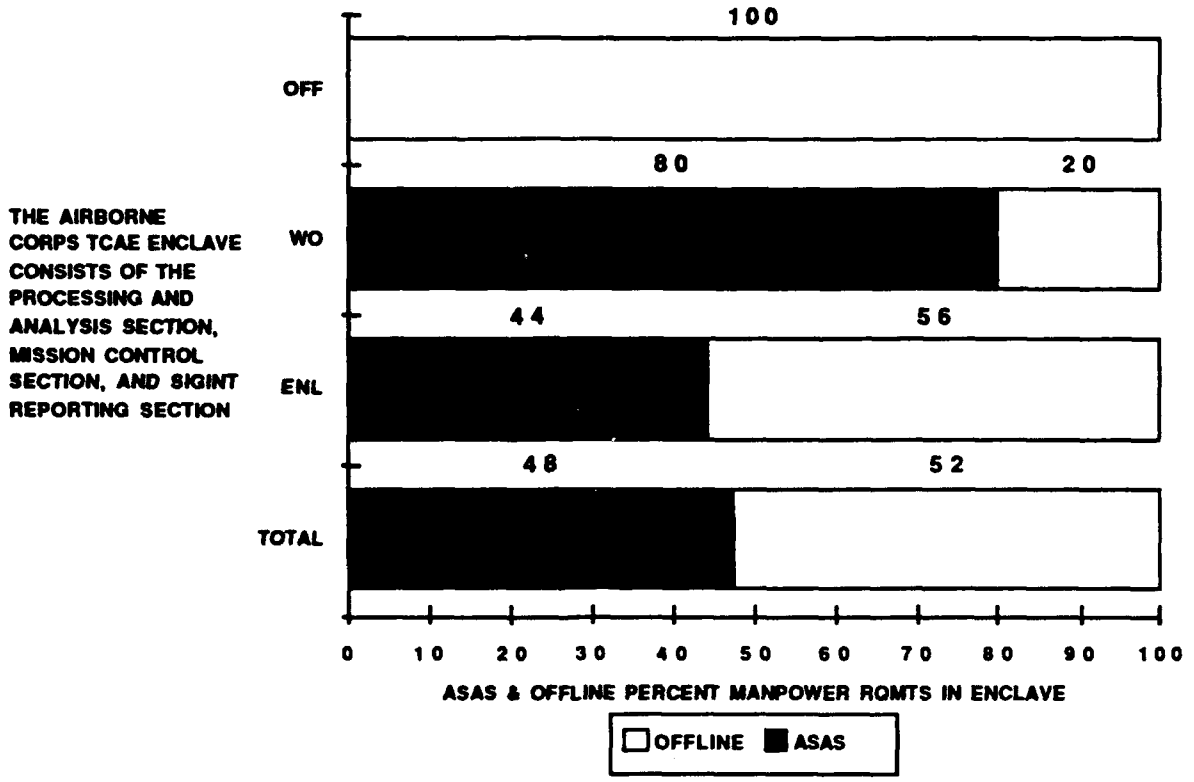


Figure 6.5.1B
Airborne Corps Manpower Impacts (TCAE)

6.5.2 Heavy Corps Manpower Impacts

Figure 6.5.2A shows the percentage of the Heavy Corps TSE manpower dedicated to operating ASAS equipment. Warrant officers comprise the highest utilization, with four of the 12 available Warrant Officers (33%) in the TSE performing ASAS duties.

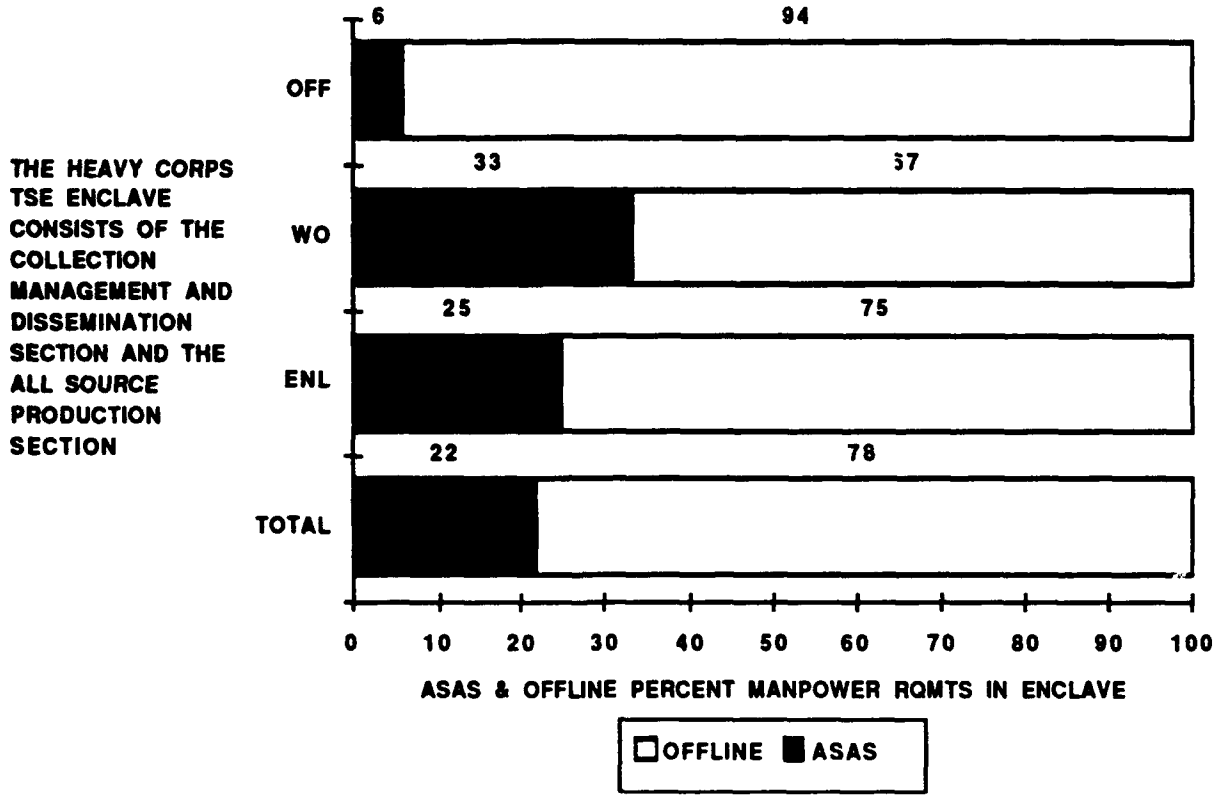


Figure 6.5.2A
Heavy Corps Manpower Impacts (TSE)

Figure 6.5.2B shows the percentage of the Heavy Corps TCAE manpower dedicated to operating ASAS equipment. Warrant officers comprise the highest utilization, with two of the six available Warrant Officers (33%) in the TCAE performing ASAS duties.

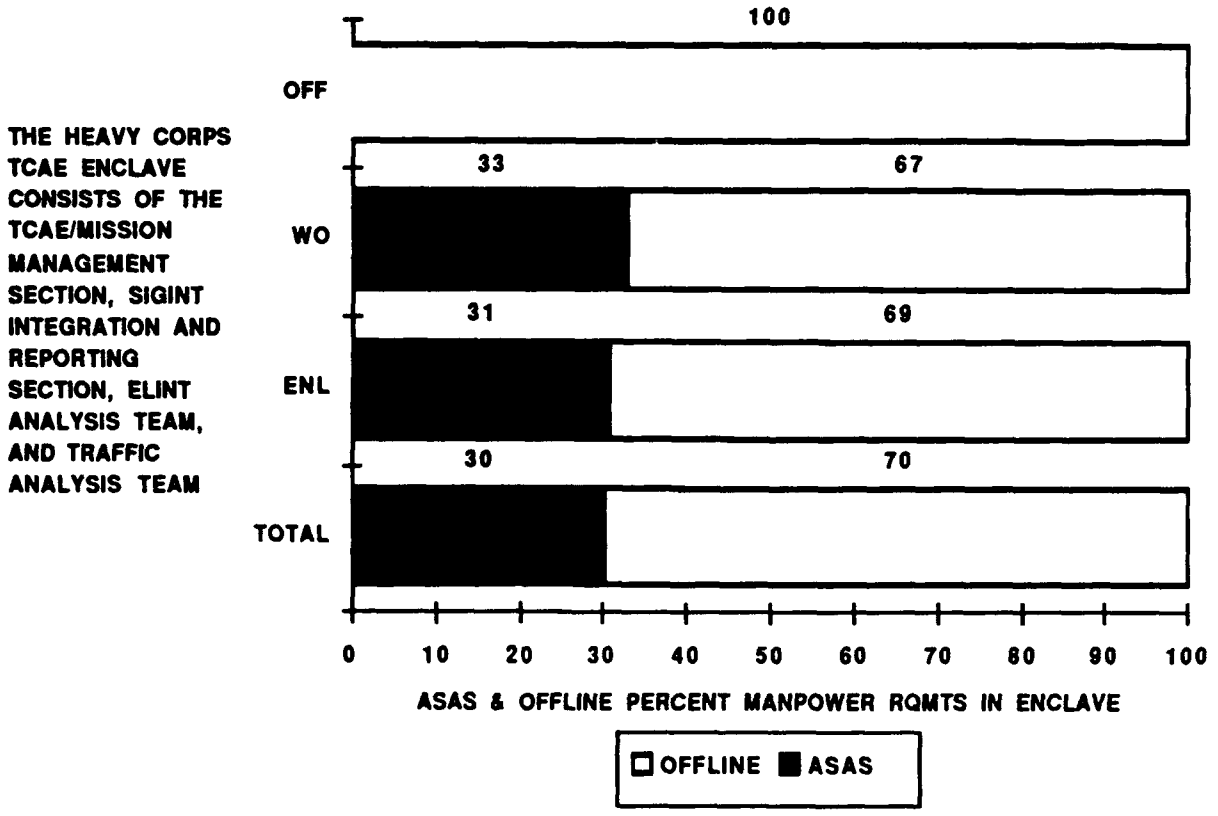


Figure 6.5.2B
Heavy Corps Manpower Impacts (TCAE)

6.5.3 Light Division Manpower Impacts

Figure 6.5.3A shows the percentage of the Light Division TSE manpower dedicated to operating ASAS equipment. The combined strength of the All Source Intelligence Section and the Collection Management and Dissemination Section is 20, and ASAS utilizes 14 of those spaces (70%). Warrant officers comprise the highest percent utilization, with all three available Warrant Officers (100%) in the TSE performing ASAS duties. Nine of the 13 enlisted spaces are designated for ASAS (69%).

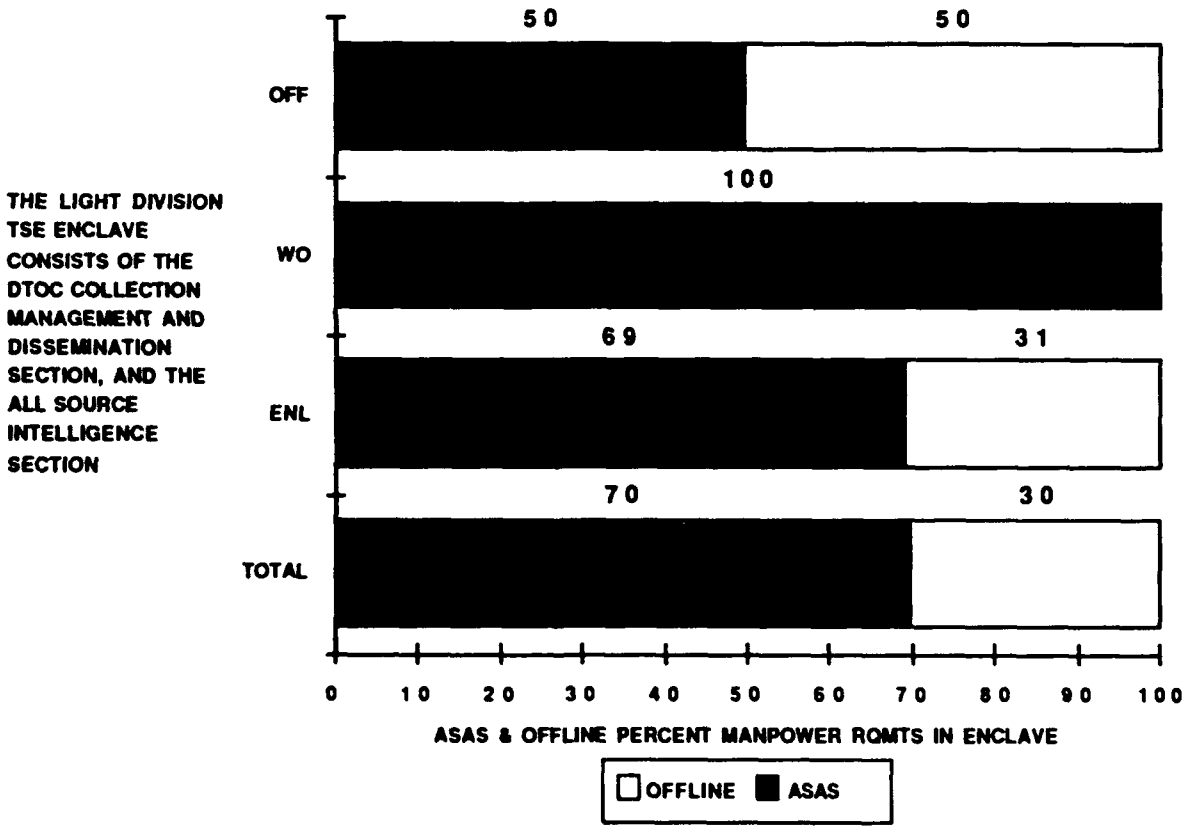


Figure 6.5.3A
Light Division Manpower Impacts (TSE)

Figure 6.5.3B below shows the percentage of the Light Division TCAE manpower dedicated to operating ASAS equipment. The combined strength of the TCAE Operations Section and the Operations Support Section is 30, and ASAS utilizes 14 of those spaces (47%). Warrant officers comprise the highest percent utilization, with two of the four available (50%) in the TCAE performing ASAS duties. Twelve of the 25 enlisted spaces are designated for ASAS (48%).

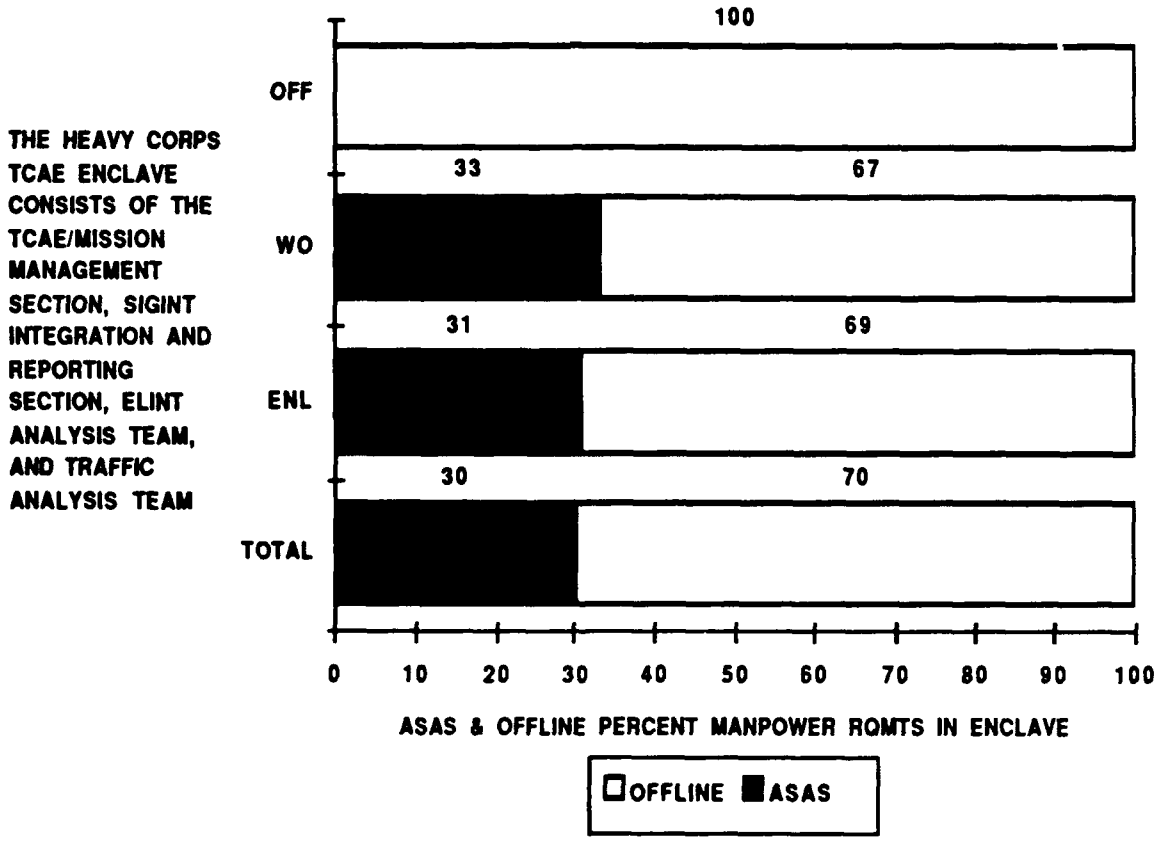


Figure 6.5.3B
Light Division Manpower Impacts (TCAE)

6.5.4 Heavy Division Manpower Impacts

Figure 6.5.4A shows the percentage of the Heavy Division TSE manpower dedicated to operating ASAS equipment. Warrant officers comprise the highest utilization, with all five available Warrant Officers (100%) in the TSE performing ASAS duties.

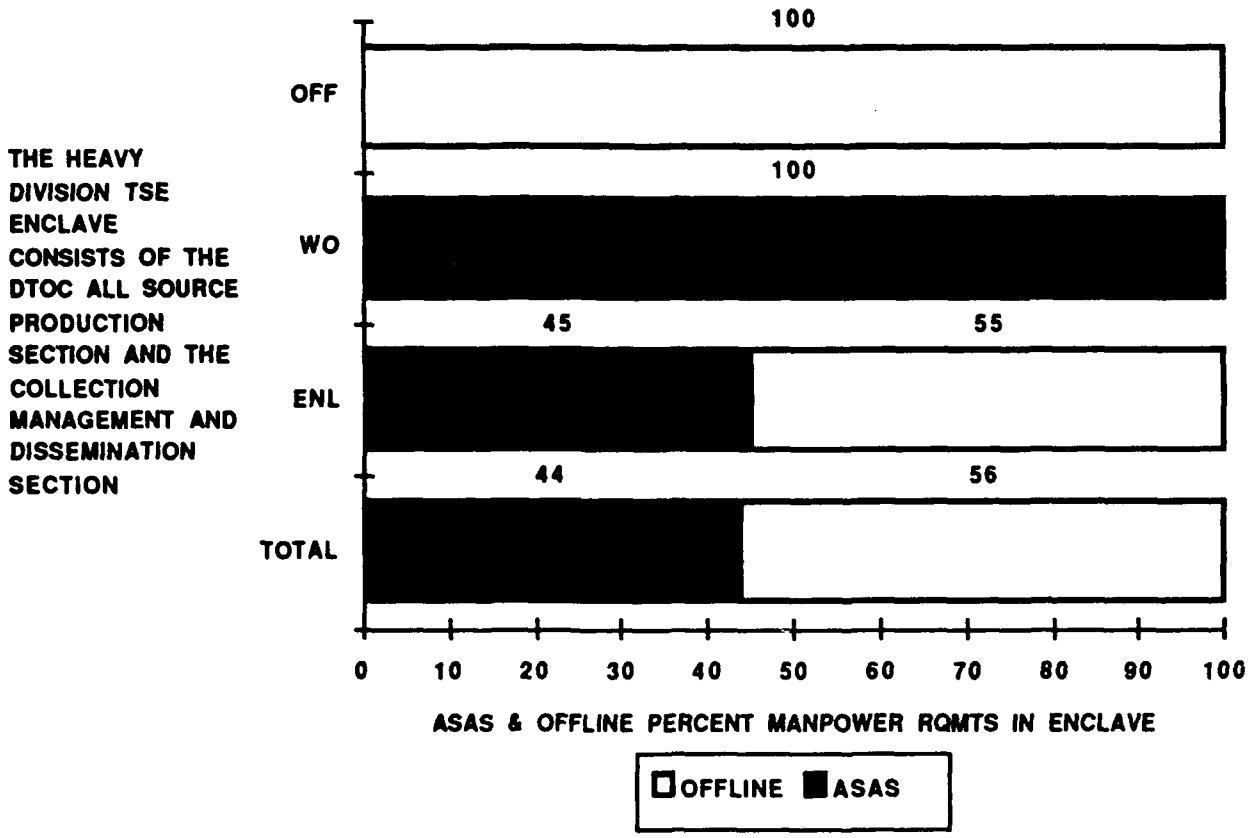


Figure 6.5.4A
Heavy Division Manpower Impacts (TSE)

Figure 6.5.4B below shows the percentage of the Heavy Division TCAE manpower dedicated to operating ASAS equipment. Warrant officers comprise the highest utilization, with two of the four available Warrant Officers (50%) in the TCAE performing ASAS duties.

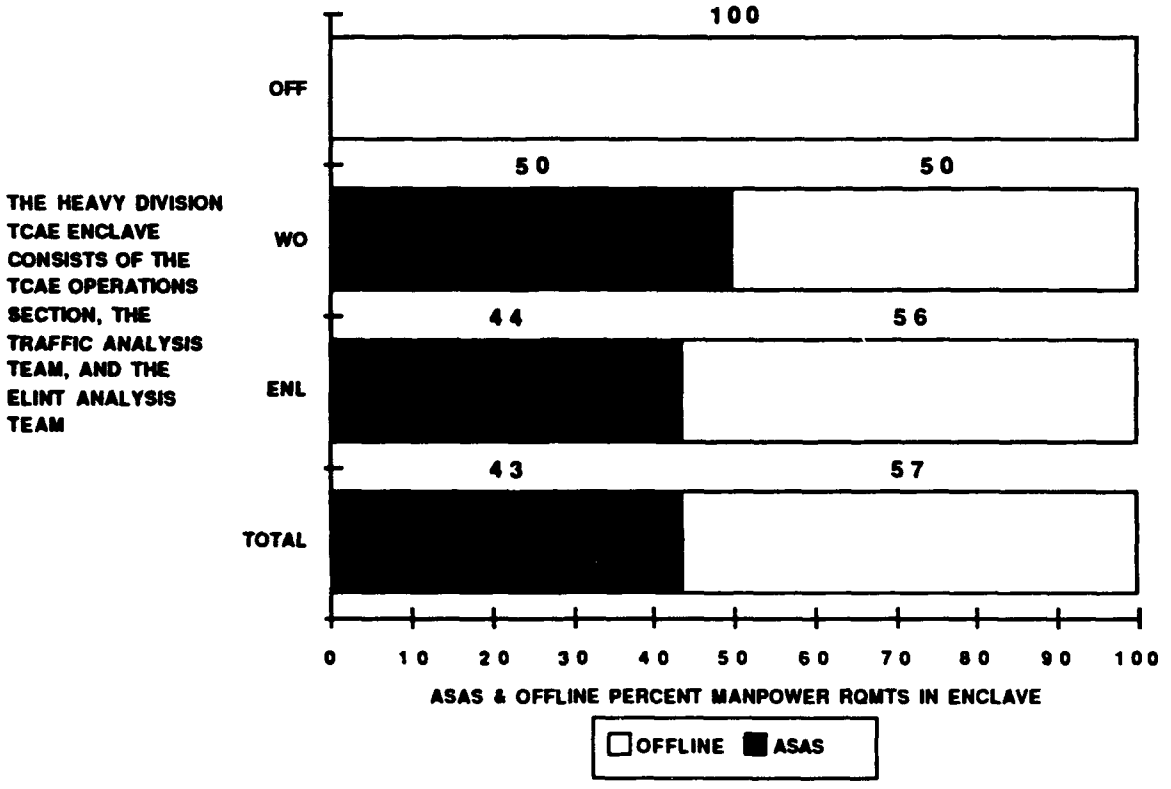


Figure 6.5.4B
Heavy Division Manpower Impacts (TCAE)

6.6 IMPACTS SUMMARY

6.6.1 Manpower Impacts Summary

Operators for the ASAS Block I configuration are within the current TOE authorizations, but current MOS and grades are not optimal for ASAS operators. TOE structures should be reviewed once ASAS is fielded. The 36 additional maintenance positions must be resourced. The Light Division TOE is the most severely impacted by introduction of ASAS Block I.

6.6.2 Personnel Impacts Summary

ASAS Block I causes minimal personnel impact on officers in the TOEs evaluated. Warrant Officer utilization is high, but the analysis tools available via ASAS will enhance the technician's role in the TSE and TCAE enclaves. The FY92 projected MOS availability ratio in the officer and warrant officer Career Management Field 35 exceeded 100% except for MOS 352J Emanations Analyst Technician at 87.0%. The CMF 35 personnel picture is projected to improve through FY93. The ASAS personnel percentage requirement for officers is 0.2% of total strength and 20.7% of warrant officer strength. Impact on the enlisted force is minimal with a 3.9% requirement of projected operating strength. FY 90 statistics show CMF 96 at 107% strength and CMF 98 at 104% strength. Maintainer MOSs are at or near 95%.

6.6.3 Training Impacts Summary

ASAS Block I is a resource impact on USAIC-FH to provide five new courses, train 138.7 required graduates annually at a yearly estimated cost of $1,187,000, and provide 11.8 instructor manyears.