A REQUIREMENTS ANALYSIS FOR AN INTEGRATED MAINTENANCE INFORMATION SYSTEM APPLICATION INTO THEATER AIR CONTROL SYSTEM MAINTENANCE

THESIS

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AFIT/GLM/LAR/94S-3

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THESIS

Presented to the Faculty of the Graduate School of Logistics
and Acquisition Management
of the Air Force Institute of Technology
Air Education and Training Command
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Acquisition Logistics Management

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September 1994

Preface

The advances in computer and communications technology make it possible to make economical and powerful information systems to support maintenance information needs. The Integrated Maintenance Information System (IMIS) promises to bring this technology to maintenance managers. Today, IMIS is only being used for aircraft maintenance. Ground-based Theater Air Control Systems (TACS) provide a prime target for the IMIS program. The purpose of this thesis was to identify the IMIS requirements to support ground TACS.

Completion of this thesis was a major part of our AFIT education. We would like to thank our thesis advisors, Major Michael Shoukat of AFIT and Barbara Masquelier of Armstrong Laboratory, for their understanding and support. They helped stretch our minds in unexpected and worthwhile ways.

We would also like to thank the men and women of the 728th Air Control Squadron for their hospitality, patience, and professionalism. We would particularly like to thank Senior Master Sergeant Bill Schuster and Captain Tom Waldrand for setting up our research visits and taking time during field deployments and unit moves to support our research.

When considering thesis topics, we wanted to do research that would stretch our abilities and also contribute to the day-to-day Air Force. We both came from command and control units in our last assignments. The IMIS program can help make tomorrow's TACS units better maintained and more efficient. In the end, that's why we came to AFIT-- to make the Air Force better.

Morris "Skip" Blumenthal

Stephen Starks

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Abstract

This research determined Integrated Maintenance Information System (IMIS) functional requirements to meet ground-based Theater Air Control Systems maintenance information requirements. IMIS is a program sponsored by Armstrong Laboratory at Wright-Patterson Air Force Base, Ohio to automate maintenance information. To date, Armstrong Laboratory has only targeted aircraft maintenance for this automated program. The Theater Air Control System contains powerful military radars connected to a mobile communications and computer network. Theater Air Control System maintenance information requirements were identified through a study of the 728th Air Control Squadron at Eglin Air Force Base, Florida, and the existing aircraft requirements matrix for the Integrated Maintenance Information System was modified to meet Theater Air Control System requirements. The small amount of changes required to modify the aircraft matrix in order to satisfy ground TACS requirements indicate that ground TACS is a prime candidate for IMIS technology.

A REQUIREMENTS ANALYSIS FOR AN INTEGRATED MAINTENANCE INFORMATION SYSTEM APPLICATION INTO THEATER AIR CONTROL SYSTEM MAINTENANCE

I. Introduction

Weapons systems in today's Air Force are becoming increasingly complex, more expensive and difficult to maintain. Current trends in downsizing the military have further prompted the Air Force to perform maintenance more efficiently. Recent developments in information processing technology and computer design have made it possible to automate many maintenance information processes that were traditionally manual operations. These processes include accessing maintenance technical information, collecting and updating maintenance historical data, obtaining and using technical manuals (TM's), querying and interacting with the supply system, and interfacing with the weapons systems built-in-test equipment. One initiative to apply this technology to aircraft maintenance is an Air Force program called the Integrated Maintenance Information System (IMIS).

IMIS is an advanced development program in progress at Armstrong Laboratory. Figure 1 illustrates how IMIS combines electronic technical orders, interactive diagnostics, maintenance data collection, flight data, supply, and other information in a computer network. This network can also link to other Air Force computer systems used for maintenance data collection (MDC). IMIS technology is being applied to most new aircraft systems such as the B-2 bomber, the F-22 fighter, the E-8 (JSTARS) surveillance plane, and the C-17 cargo plane. Parts of IMIS technology are being incorporated into select legacy systems such as the F-15 and F-16 fighters. To date, all IMIS research has

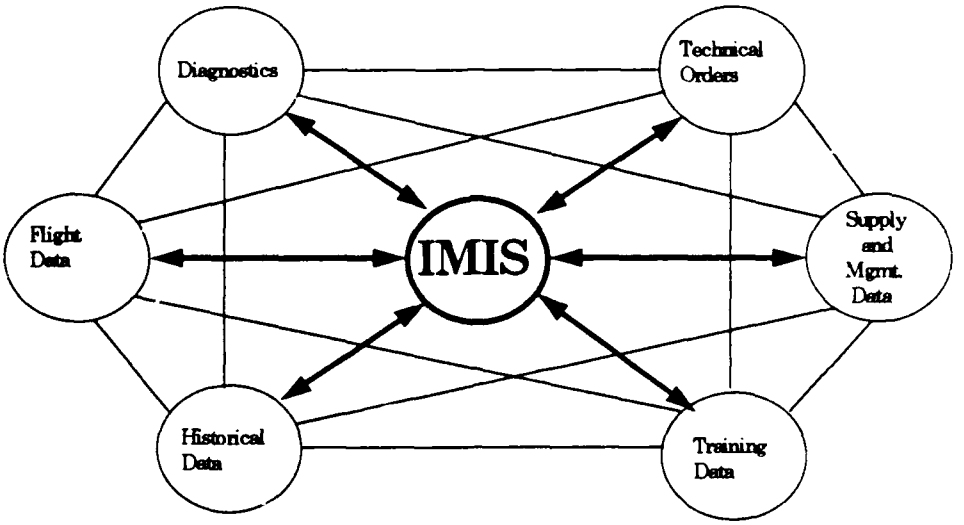

Figure 1. The IMIS Concept

been focused on aircraft systems. After a briefing on IMIS in early 1993, Lt. General John Jaquish, Principal Deputy, Assistant Secretary of the Air Force (Acquisition), suggested efforts to apply IMIS technology more broadly across weapon systems (Jaquish, 1993:18 Feb.). The ground Theater Air Control System (TACS) is a prime target for broadening the application of IMIS. TACS is based on computerized radar and communications vans that can be airlifted or road transported quickly into a theater of operations. These vans control powerful radar and communication networks that can coordinate, control, and direct theater air operations. While vastly different from combat aircraft, the maintenance information requirements and concepts for TACS are very similar.

Problem Statement

IMIS is an accepted technology being applied Air Force-wide to aircraft weapon systems (Masquelier, 1994). To date, no research has been conducted to evaluate how IMIS can be applied to other than airborne systems. Will IMIS functional requirements meet ground TACS maintenance information requirements? This research will explore ground TACS information requirements with a goal to develop IMIS requirements for TACS, and compare and contrast them with the current IMIS requirements for aircraft.

Research Objectives

The objective of this research is to determine IMIS functional requirements to meet TACS maintenance information requirements both in-garrison and when deployed to the field. The specific objectives are:

1) Examine IMIS at its current state of development

2) Determine the maintenance information requirements of ground TACS

3) Determine what unique requirements of TACS must be satisfied by IMIS.

To meet the research objectives, we pose the following investigative questions:

1) What are the current capabilities and benefits of IMIS?

2) What are the maintenance information requirements of ground TACS maintenance personnel?

3) Can IMIS support ground TACS both in-garrison and when deployed in the field?

Scope and Limitations

This thesis determined Integrated Maintenance Information System (IMIS) functional requirements to meet ground-based Theater Air Control Systems maintenance information requirements. This study is not intended to present new IMIS technology, but

to suggest a new application area. The 728th Tactical Air Control Squadron is representative of a typical ground TACS unit; however, these units may be deployed in many different configurations. While the conclusions presented should be applicable to any ground TACS unit, this research will only study the 728 ACS.

Thesis Overview

The remainder of this study will attempt to answer the questions posed in this chapter. A literature review in Chapter II will examine the background of Air Force maintenance concepts and the background and operating environment of ground TACS. Chapter II will also examine the development of IMIS and investigate how the IMIS Systems/Segment Specification was written for military aircraft. Chapter III will explain the research methods used to gather information on ground TACS maintenance activities, consolidate them in a Systems/Segment Specification for IMIS, and validate these findings through user input. Chapter IV will analyze the data gathered and answer the investigative questions. Chapter V will present conclusions on the feasibility of using IMIS to support ground TACS maintenance and provide recommendations for future actions and research.

II. Literature Review

Introduction

The purpose of this chapter is to provide a framework for our research. To evaluate the feasibility of applying IMIS technology to ground Theater Control Systems, it is important to understand Air Force maintenance activities and reporting requirements. We must also investigate the background and current operating procedures of ground TACS. Next, we examine the development of IMIS and its components. Finally, we review the current status of IMIS and the movement to an Air Force-wide implementation of IMIS.

Air Force Maintenance Concepts

The objective of maintenance is to "keep Air Force equipment in serviceable condition, safely operable, and properly configured to meet mission needs" (Department of the Air Force, 1983:5). Meeting this objective will ensure that mission-ready equipment will be at the right place at the right time in the proper condition to ensure mission success. Proper maintenance prolongs equipment life which in the long term reduces defense costs (Department of the Air Force, 1983:5). In order to meet the above objectives, maintenance must:

a. optimize capabilities to support operational requirements in peacetime by effective scheduling in order to meet maintenance and flying schedules
b. organize, train, and equip to support wartime operational missions
c. ensure an effective transition from peacetime to wartime
d. pursue timely resolution of limiting factors (LIMFACS) through communications, documentation and reporting, dialogue with support commands, and inputs to situation reports
e. stay proficient in wartime skills

f. identify changing needs in terms of personnel, equipment, and technology
g. advocate the development of automated information systems and procedures that enhance productivity. The goal is to eliminate nonproductive administrative tasks and improve efficiency (Department of the Air Force, 1983:5).

Air Force maintenance is performed by squadrons or detachments within operating commands and by Air Logistics Centers (ALCs) operated by the Air Force Material Command (AFMC). Within the operating commands, maintenance is performed at organizational or intermediate levels. Responsibilities and tasks are divided among these units and ALCs to "balance peacetime economy, readiness, and responsiveness with wartime effectiveness, flexibility, survivability, and ease of sustainment" (Department of the Air Force, 1983:5). Maintenance tasks are divided into two categories: on-equipment and off-equipment. Both tasks are performed by each level of maintenance providers. On-equipment maintenance tasks performed by the operating unit level include servicing, loading, launching and recovering, remove and replace repair, and inspections. On-equipment tasks performed by an ALC include tasks which require highly specialized equipment and skills or highly industrialized facilities. Off-equipment tasks performed at the operating unit include tasks which cannot be performed on the aircraft or equipment item but do not require highly specialized equipment, such as repairing a system component by removing and replacing subassemblies. Off-equipment tasks performed at ALC include engine rebuilding. War-time considerations may require that operating commands perform certain tasks which are in peacetime accomplished by the depots. The two categories of maintenance are further divided into preventive maintenance and corrective maintenance.

Transition From Three to Two-Level Maintenance. In June 1992, Secretary of the Air Force Dick Chaney and Chief of Staff of the Air Force General Merrill McPeak directed a transition of major USAF systems from the traditional three levels of maintenance to two levels of maintenance. In the past, maintenance had been performed at

organizational or flight-line, intermediate, and depot levels. Existing systems will have intermediate level tasks reallocated to either organizational or depot levels. New systems are being designed for two levels of maintenance. This two level concept reduces the mobility footprint and the overall maintenance costs by cutting manpower and equipment requirements. Manpower authorizations at the intermediate level for avionics were cut by 80 percent and authorizations for engines were cut by 60 percent (Grafton, 1994). Further cuts will reduce the maintenance manpower requirements by approximately 5000 personnel by FY99 (Grafton, 1994). Intermediate level support equipment procurement will also be curtailed by $201 million dollars in FY94-96 (Grafton, 1994). These cuts are expected to produce a cumulative savings of $384.9 million dollars by FY99 (Gafton, 1994). While the initial focal point of this restructure is aimed at avionics and engines, other systems will transition in future years. In the two level maintenance concept, depot maintenance is divided between two sources of repair. The primary source of repair is an Air Logistics Center and supports approximately 70 percent of the peacetime repair load. The second source of repair, such as a civilian company or other military depot, provides the primary source with contingency support and possible deployment capabilities for war time theater operations. The critical issues involved with two level maintenance include ensuring responsive repair throughput times and orienting data systems toward detailed tracking of reparable assets. New systems will be designed with high reliability, accurate built-in-test (BIT), and easy remove and replace components (Grafton, 1994).

The Air Force is instituting a new fee for service accounting system. Wing Commanders are currently charged for all work sent to depots whether the item actually needs repair or not. This means expensive false equipment removals could break the organization's annual budget.

Two-level maintenance and fee for service accounting have the potential to make military maintenance more efficient and effective. Improved maintenance information systems can help make these programs successful.

Aircraft Maintenance Organization. The Air Force has changed its wing organization structure since the end of the Cold War. Air Force wings are now organized under the objective wing structure with an operations group, a logistics group, and a support group. The new Air Force instruction which establishes aircraft maintenance is AFI 21-101, Managing Air Force Equipment Maintenance. Air Combat Command has adapted this instruction into ACCI 21-166, Objective Wing Aircraft Maintenance. This instruction divides aircraft maintenance between the operations group and the logistics group. Within the operations group are several flying squadrons. Under each flying squadron are flying operations and flying squadron maintenance units. Led by the maintenance operations officer, the squadron maintenance unit is composed of a sortie generation flight with crew chiefs, technical specialists, and weapons technicians; and a sortie support flight with support and inspection personnel. The logistics group has a maintenance squadron which contains equipment maintenance specialists and intermediate-level maintenance functions not performed at depots. The maintenance operations center now comes under the wing command post (Air Combat Command, 1994:22).

A typical aircraft maintenance scenario in Air Combat Command has the pilot debriefing maintenance specialists after a flight. Identified aircraft problems are loaded into the Core Automated Maintenance System (CAMS) and sent directly to the squadron maintenance unit shops and to the maintenance operations center (MOC). If the squadron maintenance unit can not repair the aircraft problem, the MOC will assign a specialty shop from the logistics group maintenance squadron to repair it. If an aircraft crew chief discovers a problem while inspecting the aircraft, he or she will relay it to the expediter. The expediter will contact the MOC, which will then assign the maintenance job to the

squadron maintenance unit or the logistics group maintenance squadron, depending on available resources (Moore, 1994).

Ground TACS Maintenance. Ground TACS units are typically squadrons. Under each squadron are operations and maintenance. The maintenance organization is lead by the chief of maintenance. The chief of maintenance is in charge of work centers such as ground radio, wideband radio, computer maintenance, power and air conditioning. He is also in charge of maintenance control for the squadron.

The maintenance concept for ground TACS is two level, organizational and depot. Organizational level maintenance will take place on and off-equipment at the tactical site or in garrison. Organizational level maintenance will consist of:

> "removal and replacement of assemblies, subassemblies, modules, single circuit card assemblies (CCA); cable replacement; minor adjustment and alignment; routine cleaning/corrosion prevention; and lubrication and inspection. It may include repair of assemblies and subassemblies; cable replacement and repair; removal and replacement of CCAs on the workbench and replacement of switches and chassis-mounted components; and minor adjustments and alignments" (Air Combat Command, 1993:6).

Built-in-test equipment will be used to the maximum extent possible to minimize the amount of maintenance required (Air Combat Command, 1993:6). "Depot level maintenance will be used to repair or restore failed equipment, assemblies, subassemblies, modules, and CCAs beyond the repair capability of the organizational level "(Air Combat Command, 1993:6).

In addition to normal maintenance tasks, TACS maintenance technicians must tear-down and re-build the system each time the unit moves. The system is composed of many different pieces of equipment which must be linked together with cables or microwaves. This is analogous to an airplane which must have all its internal electronic systems connected before each flight. Often trouble shooting a connection problem may involve

two connections that may be several hundred yards or even miles apart. See Appendix B for a series of typical maintenance scenarios gathered from the 728th ACS.

Ground Theater Air Control System

The mission of ground Theater Air Control Systems (TACS) is to provide an air control capability sufficient to handle all friendly air traffic and to provide an overall view of the enemy situation. It permits the Air Force component commander to rapidly deploy worldwide and provides

> "the organization and equipment necessary to plan, direct, and control tactical air operations and perform specified airspace management tasks. The system will function independently to provide responsive, real-time control of all available air assets to provide air defense, and airspace management". (Air Combat Command, 1993:1)

TACS units are a part of every major command in the USAF in CONUS and overseas. They are a part of the active duty forces and the National Guard. Figure 2 illustrates the TACS structure consisting of a Tactical Air Control Center (TACC), one or more Control and Reporting Centers (CRCs), and two or more Forward Air Control Posts (FACPs) (728 ACS, 2). In combat, the TACC is located many miles behind the Forward Edge of Battle (FEBA) while the CRCs are located several miles behind the FEBA. The FACP may be located along the FEBA. This thesis will only examine the CRC.

The CRC has five major areas of responsibility:

1. Air surveillance. Gathering, processing, and presenting a complete air picture from information acquired by its own radar and supplemental information told-in from external interfaces with other CRCs, AWACS, other service's C2 systems, and Allied C2 systems.

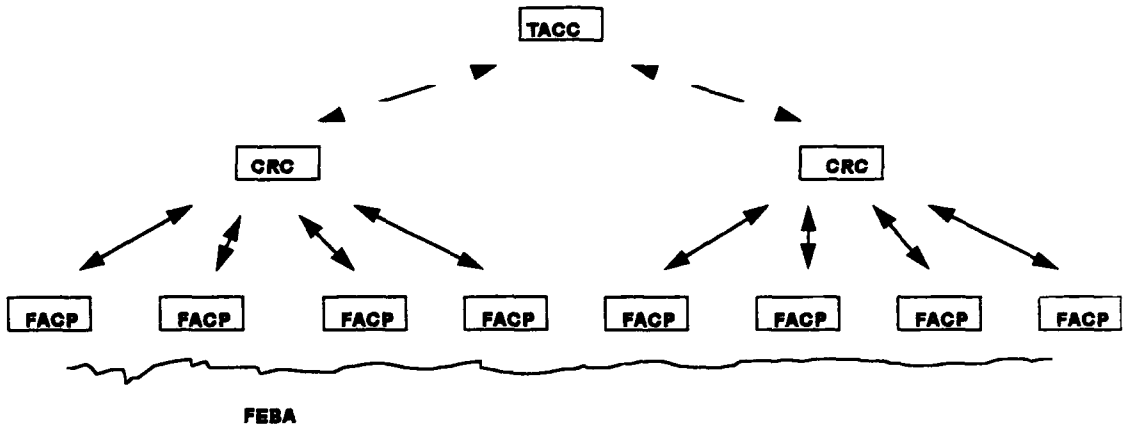

Figure 2. TACS Deployment Structure (728 ACS, 2)

2. Air Identification. Identifying all objects flying through the assigned airspace by applying active measures and local and international rules.
3. Weapons Control. Selecting and directing employment of Surface to Air missiles (SAMs) or interceptor aircraft against hostile objects, close air support, interdiction, or other missions as necessary.
4. Airspace Management. Regulating the use of assigned airspace and providing navigational assistance.
5. Battle Management. Providing guidance and direction for the effective operation of the tactical air defense system. (728 ACS, 3)

Information on objects moving through the assigned airspace or "tracks" can be acquired through the unit's organic radar, the AN/TPS-75 long range mobile search radar, or told-in in from other sources. Told-in information is transmitted from other sources such as AWACS or other CRC/FACP units via Tactical Digital Information Links (TADIL). These data links include a point-to-point system for stationary systems called TADIL B. There is a non-point-to-point system for non-stationary systems such as AWACS or naval ships called TADIL A or Link 1 by NATO forces. NATO forces use Link 1 for stationary systems similar to TADIL B. Finally, there is a new Joint Tactical Information Distribution System (JTIDS) for linking with AWACS and other services (728 ACS, 3).

The major equipment required by a typical CRC includes the AN/TPS-75 Radar, three to four AN/TYQ-23 Modular Control Equipment (MCE) operations modules (OMs), AN/TRC-170 Troposcatter Radio, AN/TSQ-III Combination Nodal Control and Element, AN/TTC-42 and AN/TTC-39 Automatic Telephone Central Offices, AN/TSC-100 Tactical Satellite Terminals, AN/TSQ-165 Modular Tactical Control Center, AN/TSQ-146 Tech Control Van, SB-3865 Tactical Switchboard, an Adaptable Surface Interface Terminal (ASIT) to connect with AWACS (ACC, 1993: 7). Also required are four to six power generation and fuel trucks. This equipment is supported by six maintenance work centers, a maintenance or job control center, and a supply center. The unit contains its own security and medical functions. The unit must maintain equipment to house and feed its personnel. Finally, there must be enough prime-mover equipment (trucks) available to move the above equipment and the personnel to deployed locations. A typical unit may have over 25 pieces of prime equipment, 25 pieces of support equipment, over 100 trucks, and well over 200 people. Figure 3 shows a typical TACS site layout.

Currently, when TACS units deploy, they take 200 to 500 pounds of TOs to the field (Wilmore, 1993). These TOs take up valuable weight and space during a deployment and maintenance personnel must constantly update them. The TOs are currently specified in paper form and written for Air Force 5-skill level technicians (Air Combat Command, 1993:4). Technicians on new systems currently receive on the job training from a few military technicians who have been to the manufacturer's schools. TACS equipment may be operated and maintained by troops wearing Arctic, rain, and/or chemical/biological protective suits.

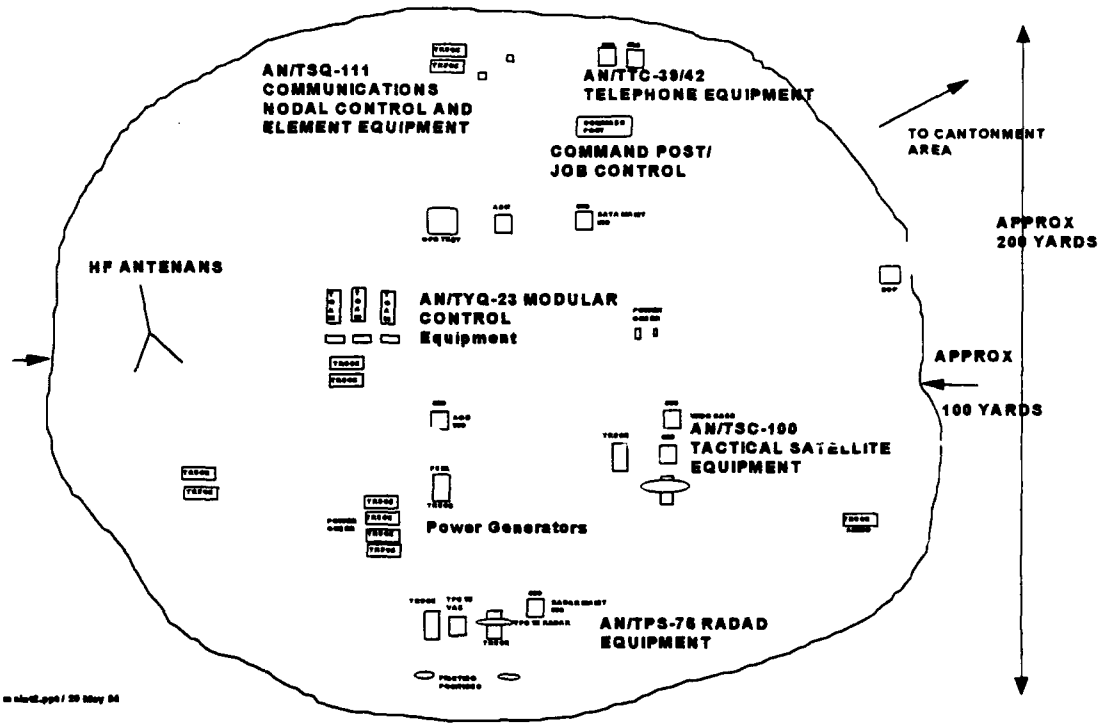

Figure 3. Typical TACS Site Layout (Deployed).

Equipment is subject to temperatures ranging from sub-zero to above one hundred and in dry to humid conditions. The systems are operated 24 hours a day, 7 days a week, and are subject to battle damage. Maintenance technicians are located on site and provide 24 hour maintenance coverage while in the field and during operating hours in garrison, with an expected response time of less than 15 minutes (Air Combat Command, 1993:5).

Ground TACS provide vital air control information for the battlefield. Composed of numerous separate pieces of equipment linked electronically, TACS is analogous to a fighter aircraft whose components are still connected, yet spread over a wide area. The basic principles behind aircraft maintenance would apply to TACS as well.

Maintenance Information Systems

Background. Air Force technical orders (TOs) were first established in the 1940's to provide for the acquiring, maintaining, storing, and dissemination of technical information, instruction, and safety procedures pertaining to Air Force systems. The typical TO is 100 to 150 pages, and averages 60 percent text and 40 percent graphics. The total paper data base is approximately 20 million pages (not counting distributed copies) with about 2.3 million pages changed per year (AFTOMS, 1989:1). The F-16 fighter aircraft alone requires 1,963 TOs to maintain and operate it (Carney and Quinto, 1993:17). Current paper TOs are bulky, heavy to transport, and awkward in adverse weather conditions. The TO system is also difficult to keep updated.

When technical data changes, technicians must receive the change orders and update the paper TOs by hand. At any one time, 10 percent of the information in TOs is outdated (Kerr, 1988:81). Outdated TOs could mean incorrect maintenance on systems. This can result in systems failures, increased expenses, and dangerous safety hazards.

TOs are written to support only one level of expertise, which often confuses novice technicians while hindering the experienced. These TOs, while having technical information, often do not have trouble-shooting techniques. Those that do are very rigidly formatted and are not adaptable to changing circumstances or problems (Link and others, 1987:33).

These and other problems have led the Air Force to seek a more efficient way to use technical information. In the late 1970s, Bob Johnson, a maintenance officer, had a vision for maintenance in the future. He knew that technicians were going to be required to maintain aircraft with the help of many different information systems. These technicians would be required to interact with information data bases such as the Core Automated Maintenance System (CAMS), the Standard Base Supply System (SBSS), the Automated Technical Order System (ATOS), and many others. He felt current information delivery

systems would soon be unacceptable for the technician to use. His vision was to give the technician access to all required information in a small, portable computer (Ancker, 1993). In 1978, Armstrong Laboratory, formally known as the Air Force Human Resources Laboratory (AFHRL), initiated an effort to create an automated technical data presentation system (ATDPS) to display TOs in maintenance workshops. Because of costs and lack of technology, AFHRL intended ATDPS to be an immobile table-top system and terminated it when the program sponsor added a mobility requirement to the system (Thomas and Clay, 1988:4). Follow-on programs in the 1980s included the Computer-based Maintenance Aids System (CMAS) I and II which were designed to present automated technical data to intermediate level maintenance shops (Thomas and Clay, 1988:6). The Portable Computer-based Maintenance Aids System (PCMAS) program was developed to deliver automated technical data to on-equipment or flight-line maintenance technicians (Thomas and Clay, 1988:6). While these programs were not entirely successful, they significantly contributed to the technical and presentation requirements for the next phase of information delivery systems.

Integrated Maintenance Information System (IMIS). In continuing its work to aid the maintenance technician, Armstrong Laboratory began conducting a new project in the early 1980s. This project took the next step in delivering information to the maintenance technician by not only presenting technical data but also by providing automated diagnostics systems, automated maintenance management systems, computer-based training systems, and automated supply system interfaces. This project was Project 2950, Integrated Maintenance Information System (IMIS) (Thomas and Clay, 1988:7). IMIS encompasses development and testing of technology capable of accessing all technical information required to support maintenance via a single, integrated information system (Link and others, 1987:1).

IMIS Objectives. The specific IMIS objectives are:

1. Integrate multiple maintenance information sources into a single easy to use system.
2. Tailor information to meet the specific needs of the task and the technician.
3. Provide on-the-job and proficiency training aids.
4. Eliminate time-consuming paperwork and task through automation.
5. Improve the quality of maintenance performance by taking advantage of the computer's ability to interact with the technician.
6. Improve the quality of maintenance performance by taking advantage of the computer's ability to interact with the technician.
7. Maximize the utilization of available manpower by providing information in standard, generic formats independent of the system, and supporting general technical capabilities at various skill levels.
8. Improve the maintenance capability for deployed operations by packaging the needed information into a highly portable, deployable system.
9. Provide the capability to support maintenance performance in future scenarios of consolidated specialties (Link and others, 1987:31).

IMIS accomplishes this goal by providing fully integrated information to the technician at the work site. IMIS integrates technical information from the aircraft itself, pilots, TOs, maintenance technicians, and historical data systems. IMIS comprises three interdependent core capabilities. These capabilities are dynamic diagnostics algorithms, Interactive Electronic Technical Manuals (IETMs), and connectivity with maintenance data systems. "IETMs are a package of information needed for the diagnosis and maintenance of a weapon system, optimally arranged and formatted for interactive screen presentation to the technician on an electronic display system" (Carderock Division, 1992). Dynamic diagnostic algorithms support interrogating built-in-test (BIT) equipment in an aircraft and determining the next diagnostic step based on the BIT data. This interaction significantly reduces false removals. Interactive Electronic Technical Manuals (IETMs) replace the paper based TOs. Connectivity with maintenance data systems provides maintenance personnel with direct access to the Core Automated Maintenance System (CAMS) and the Standard Base Supply System (SBSS). This capability eliminates paperwork and speeds up the ordering of parts. This connectivity provides the supervisor

with real-time access to maintenance reports, aircraft and work order status, and other administrative data (Burright, 1993:2).

IMIS Development. Phase I of IMIS development was conducted between 1982 and 1987. The focus of this first phase was to further develop automated technical data delivery. The specific goals of this phase were to develop electronic presentation systems with interactive presentation, display formats for electronic presentation, and to present information either at expert or novice levels of detail. The initial IETM specifications were also formulated during this phase. The presentation formats and screen layouts, and user interaction and navigation functions developed. Results of field tests at several Air Force bases and independent Navy tests showed marked improved performance. In tests of paper-based systems versus electronic systems, maintenance time was reduced by half, fault isolation was improved from 75 percent to 100 percent, and false removals were completely eliminated by the use of electronic systems (Armstrong Laboratory, 1994). Presently two systems, the B-2 and the C-17 are using Phase I electronic manuals.

Phase II of IMIS development was conducted between 1986 to 1992. This phase concentrated on integrating interactive diagnostics with technical order information as illustrated in Figure 4. Specifically, the Portable Maintenance Aid (PMA) and the interactive diagnostics software were developed. The PMA will interface with the aircraft's 1553 data bus to integrate or download stored systems failure data. The heart of the interactive diagnostics software is the Maintenance Diagnostic Aiding System (MDAS). "The basis of this tool is a system that closely models how equipment behaves under failure and offers the best diagnostic or repair activities to the technician during trouble-shooting" (Link, 1987: 12).

Work also continued on IETM specifications in presentation formats and user interaction and content data model of technical manual elements. Phase II capabilities

have been proven in several field tests. Armstrong Laboratory recently completed a financial study of IMIS at the 310th Fighter Squadron at Luke AFB.

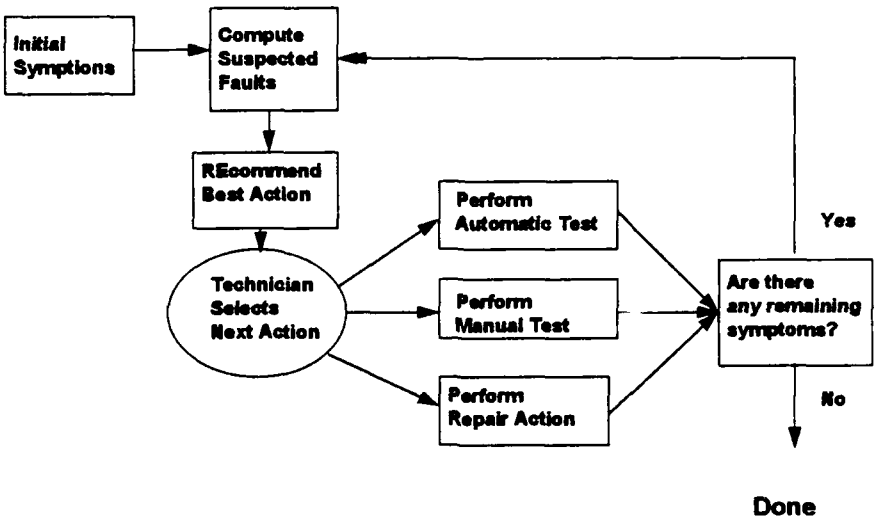

Figure 4. Interactive Diagnostics (Armstrong Laboratory, 1994)

The results showed an overall cost saving for a typical F-16 fighter wing to be approximately 913.7 million dollars. The major areas of savings include 443.1 million dollars from reduced false removals and 400.1 million dollars from elimination of manually posted TO changes (Burright,1993:2).

The Navy conducted independent tests of their system called Aviation Maintenance Integrated Diagnostics (AMID) for its F-18 fighter aircraft. This test on readiness improvement showed an overall increase in full mission capable (FMC) rates from 55.5 percent to 66.1 percent (Bare, 1993:8). Phase II applications include the F-16

fighter aircraft and the E-8 Joint Surveillance Targeting Attack Radar (JSTARS) aircraft (Armstrong Laboratory, 1994).

Phase III of IMIS development was started in 1988 and continues to date. Phase III is developing a fully integrated system. In addition to the technologies developed in the previous two phases, Phase III will include Maintenance Information Workstations (MIWs) for in-shop use, interfaces with Job Control and outside databases, and information integration software as shown in Figure 5. This integration will allow maintenance technicians to perform all aspects of maintenance requirements including postflight, pilot debriefing, maintenance scheduling, trouble-shooting, repair and parts ordering, and status reporting and history data collection (Armstrong Laboratory, 1994). Phase III is highlighted by direct user involvement in determining requirements. In collecting user requirements, ten bases in the CONUS and Europe were visited and

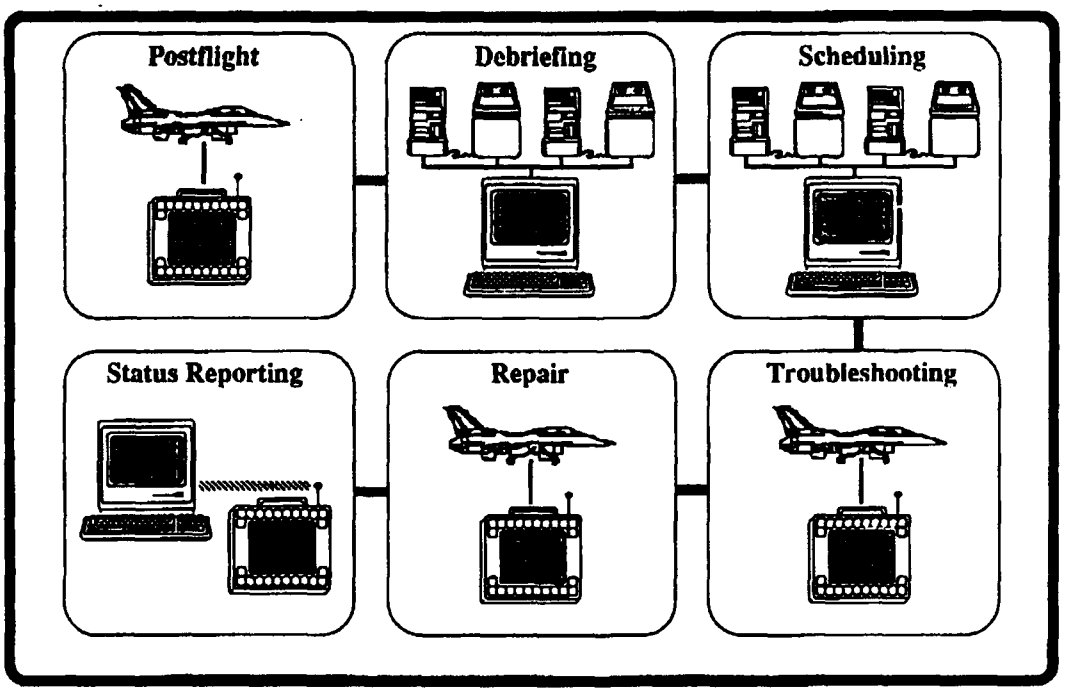

Figure 5. Fully Integrated Functions (Armstrong Laboratory, 1994)

and over 400 maintenance personnel ranging from the Deputy Commander of Maintenance to specific functional area technicians were interviewed. Using the information from this input, two models of aircraft maintenance activity and information requirements were developed. The first was an "as is" model of current aircraft maintenance processes. The second was a "to be" model of proposed maintenance processes with IMIS. These models were validated by walking technicians through scenarios that were created from the models. Three IMIS system specifications were derived from the models, the System/Segment Specification (SSS), the Software Requirements Specification (SRS), and the Interface Requirements Specification (IRS). The System/Segment Specification identifies three segments; Portable Maintenance Aid (PMA), Maintenance Information Workstation (MIW), and the Aircraft Interface Panel (AIP) (General Dynamics, 1993: 1-5). The specification also lists over 700 functional requirements allocated to the various IMIS segments. The Software Requirements Specification identifies the information modes and functions, user interface requirements and the software architecture. The Interface Requirements Specifications identifies outside data bases that IMIS must interface with such as CAMS, ATOS, and SBSS. (Armstrong Laboratory, 1994) Presently the SSS is accepted in the aircraft community as a valid representation of reality and is the basis for IMIS development.

Armstrong Laboratory is conducting a field test of this fully integrated system on F-16s of the 310th Fighter Squadron at Luke AFB from June to October 1994. The IMIS system will be composed of four MIWs with connections to CAMS and SBSS, and 16 PMAs with aircraft interfaces. Five F-16 sub-systems will be tested including the fire-control radar, hydraulic power supply, head-up display, cabin pressure, and engine indicating system. IMIS functions will include interactive diagnostics, electronic technical manuals, parts ordering, and automatic maintenance data collection for the above five systems. IMIS will also have debriefing, open and close work orders, and track

aircraft status for all systems. Phase III technology is being applied to the F-22 fighter aircraft and the V-22 aircraft (Armstrong Laboratory, 1994).

IMIS Hardware and Software. IMIS is composed of three major segments. The first is the Portable Maintenance Aid (PMA); the front end delivery device for the flight line maintenance technician. This is a small, battery powered, ruggedized portable computer with a screen readable under all lighting conditions, and a keypad usable with chemical and cold weather gloves (IMIS: 4). The PMA allows users to access all pertinent maintenance information. The next segment is the Maintenance Information Workstation (MIW). This is a table-top computer network used to integrate and access information from the CAMS, the SBSS, and the Core Engine Monitoring System (CEMS). The next segment is the Aircraft Interface Panel (AIP). This is a panel on the aircraft that allows the maintenance technician to interact with the on-board maintenance and diagnostics systems (Armstrong Laboratory, undated: 5). The AIP can act as an interface between the aircraft systems and the PMA or as a direct interface between the aircraft systems and the technician (General Dynamics, 1993: 3-3). A major component of IMIS is the integration software to logically tie all of the maintenance data elements together. It is the software that gives IMIS its flexibility. A different weapon system will already be compatible with the hardware of IMIS and only needs a new software cartridge to display the necessary information about the system (Armstrong Laboratory, undated: 5). A library of removable memory cartridge stores all the technical order information and diagnostic aids needed for a single weapon system. These memory cartridges are designed for fast and easy updating (Link and others, 1987:2). For maintenance technicians, IMIS means they only have to learn one maintenance system. The software can be changed for different systems while the hardware remains the same. The maintenance technician will be able to download the latest technical information from the depot's data base before going out to perform maintenance.

IMIS States. "The primary emphasis of the IMIS is to support flightline or O-level maintenance activities, wherever they take place" (General Dynamics,1993: 1-7). The types of missions performed by the Air force require that IMIS have different capabilities in order to be effective in different locations and configurations. This requirement is not because the requirements will change, but the limitations and demands will change, and to some extent, cannot be forecasted (General Dynamics, 1993: 1-7).

To cope with these changes, IMIS was conceived with two different configuration scenarios. The first is the Full Configuration State (FCS). FCS is "typical of the Main Operating Base (MOB) environment"(General Dynamics, 1993: 1-8). In this configuration, IMIS will have access to full interconnectivity with all supporting databases such as CAMS and SBSS through transparent interfaces. IMIS will also be in its fully equipped state, with all components such as the MIW, PMA and associated infrastructure available. The second configuration is the Deployed Support State (DSS) which is "characterized by isolation of the IMIS from external system data bases"(General Dynamics, 1993: 1-8). This location includes Dispersed Operating Locations (DOLs), Collocated Operating Bases (COBs), and austere sites in the Third World. "IMIS capability for the most austere deployments is largely limited to supporting direct On-equipment maintenance, such as servicing, integrated combat turns (ICTs), minor inspections, and remove-and-replace actions" (General Dynamics, 1993: 1-8). The PMA may be the only piece of equipment deployable, the software "updating its own and remote data bases using a variety of methods, such as phone lines, tapes, and floppy disks" (General Dynamics, 1993: 1-4).

IMIS Modes. IMIS is operated in one of six different modes of operation, each reflecting maintenance data generation and/or retrieval requirements, and system security.

The Define Status Mode will define the status of the primary weapons system and its associated support/test equipment. In this mode, IMIS will determine the condition of

the system and provide the scheduled maintenance requirements. IMIS will review previous information, set repair priority designations, develop aircraft conditions projections and generate Estimated Time In Commission (ETICs). Reporting of Status of Resources and Training System (SORTS) and information entry into required data bases will be accomplished by the IMIS. "The IMIS will check availability of parts kits that will be required during a schedules maintenance action and will generate a revised list of potential repair actions" (General Dynamics, 1993: 1-10).

In the Allocate Resources Mode, "IMIS will support the allocation of resources for both On-equipment and Off-equipment maintenance. The IMIS will provide the wing's mission schedules, current status of backshops, availability of personnel and S/TE, available parts inventory, and available maintenance facilities, and will assist with the analysis of this information to make resource assignments " (General Dynamics, 1993: 1-10).

The Perform Maintenance Mode "will support the maintenance activities required for a Partially Mission Capable (PMC), or Not Mission Capable (NMC) aircraft to achieve Fully mission Capable (FMC) status or required to convert a malfunctioning asset into a working asset. IMIS will support five major activities in this mode: a) Trouble shooting; b) Ordering parts; c) Repairing; d) Performing standard servicing; e) Technical order processing"(General Dynamics, 1993: 1-10). IMIS will adapt technical order data and present it at the level of detail required by the technician. IMIS will provide fault-based systems diagnostics for trouble-shooting malfunctions. Once identified, IMIS will provide instructions for repair, adjustments, and documentation of repair actions. IMIS will provide instructions for servicing and mission configuration requirements and update the systems status (General Dynamics, 1993: 1-11).

In the Maintenance Staff Support Mode IMIS will support management of the maintenance complex. IMIS will provide: access to schedule information; status of

assigned assets, critical resources; and personnel. "The IMIS will assist in monitoring and analyzing key maintenance data to identify trends and potential problems. The IMIS will also recommend changes in resource allocations based on changes in mission, priorities, and current status" (General Dynamics, 1993: 1-11).

In the Maintenance Training Mode, IMIS is able to provide realistic simulations to provide initial and advanced training. IMIS also maintains all training records, skill level, and task qualification of each technician, and can identify training requirements (General Dynamics, 1993: 1-11).

Security for the system is provided in the IMIS Control Mode. This provide first-time installation and initialization of the IMIS, log-on and access/authorization controls, shut-down/restart procedures, and system configuration. The control mode also provides self-test, navigation through data, data access, data input and display, and help functions (General Dynamics, 1993: 1-12).

Integrated Maintenance Data System

In early 1993, Lt. General John Jaquish, Principal Deputy, Assistant Secretary of the Air Force (Acquisition), was briefed by Mr. Cream of Armstrong Laboratory on the IMIS concept and its present state of deployment. General Jaquish, in a letter to AFMC/CV, acknowledged the positive impact of IMIS in achieving the long range improvements in reliability, maintainability and deployability that the present day Air Force requires. He was also impressed with IMIS's ability to reduce the excessive cannot duplicate (CND) rate that is plaguing many deployed systems. However, General Jaquish was concerned that there was no standard implementation approach for IMIS integration (Jaquish, 1993).

In a memorandum to AF/LG, General Jaquish stated "I believe that IMIS needs to be tied into an overall maintenance concept if it is to be successfully implemented across

weapon systems." In response to these letters, a draft Program Management Directive (PMD) for Integrated Weapon System Management (IWSM) of the Integrated Maintenance Data Systems (IMDS) was written. This PMD directed the integration of all current and emerging maintenance data systems into one program.

Up to this point, most automated maintenance data system were developed primarily for aircraft maintenance. IMDS will be the standard for all maintenance information systems not only to support aircraft maintenance but also other systems as well. The IMDS PMD was written to address the user's mission needs to support the Air Force mission. Those needs are to:

a. execute defense guidance and project power globally
b. reduce costs
c. reduce equipment downtime
d. adapt to changing infrastructure

To satisfy these needs, the IMDS is required to have an accurate, timely, reliable, and integrated worldwide information flow to ensure technicians have immediate access to needed information. This information should be able to connect to multiple data systems transparently to the user. The system must provide automated production support to ensure rapid, standardized maintenance. The system must support classified data processing. There must be a common user interface so the technician only has to learn one system, not a new one for each specific weapon system. There must be a passive data entry capability to reduce data entry error and to improve historical data collection. Finally, the system must be mobile, deployable, and global to support any contingency or war scenario. Simply put, there are really no new requirements, just the requirement to aggregate many fragmented requirements. (Colmer, undated)

To satisfy the above requirements and needs, five major system functional requirements were identified. First, the system must maintain total visibility of all assigned assets and resources. The system must support forecasting, scheduling, and

tracking of all maintenance production events. In doing this, the system must be able to effectively allocate maintenance resources such as parts, personnel, facilities, and support equipment. Second, the system must also track and define equipment status and utilization rates. The system must be able to report mission capability, configuration and location of each individual system. Third, by providing enhanced debriefing sessions, expert system diagnostics, interactive electronic technical data presentation, and on-line, real-time parts ordering, the system will improve maintenance production. The system must also be able to support all maintenance training through computer aided training sessions. Finally, the system must be able to provide metrics for the measurement of equipment and maintenance performance. It will do this through improved data collection, the ability to compute reliability and maintainability figures, to provide failure analysis and prediction. The system will improve and enhance the support given to maintenance technicians and supervisors. (Colmer, undated)

In investigating the current architecture of weapon systems, an Integrated Product Team study found that present systems were not and could not be integrated. These systems were stovepiped to weapons system unique solutions, and there was a high level of duplication of functionality among these systems as shown in Figure 6. These systems were also manpower intensive with redundant manual data entry requirements and were also very user unfriendly. Finally, these systems for the most part were not deployable and were using outdated technology.

Figure 7 illustrates the IPT developed a target architecture for the new integrated system. This system will be required to have a united view of global data with a logical, not physical, integration of stored data. The data will be stored in both distributed and centralized data repositories for maximum flexibility. All data will be accessed through a

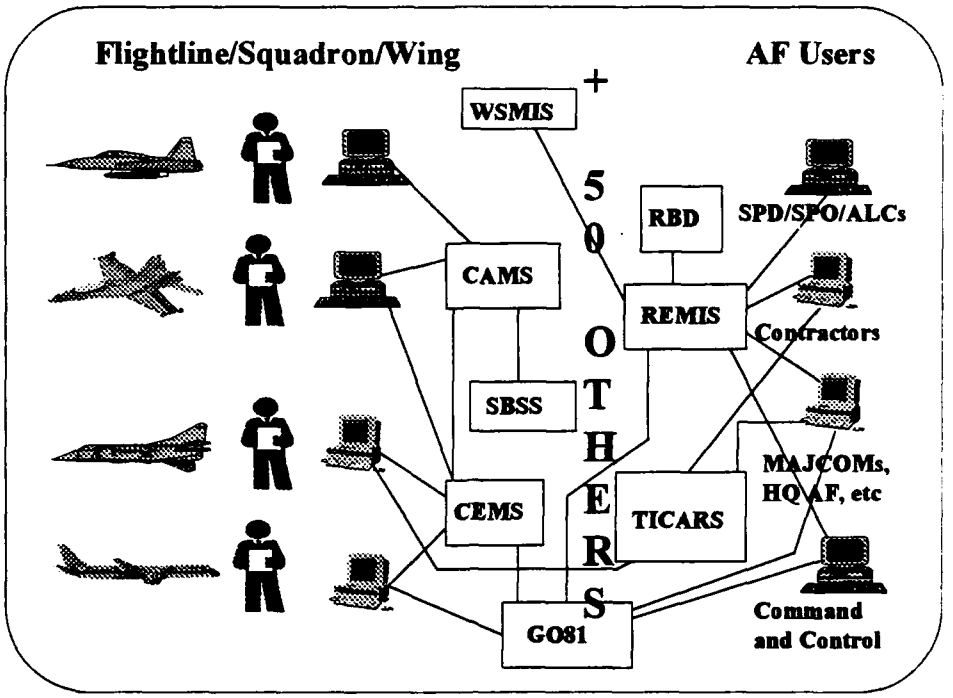

Figure 6. Current Architecture (Colmer, undated)

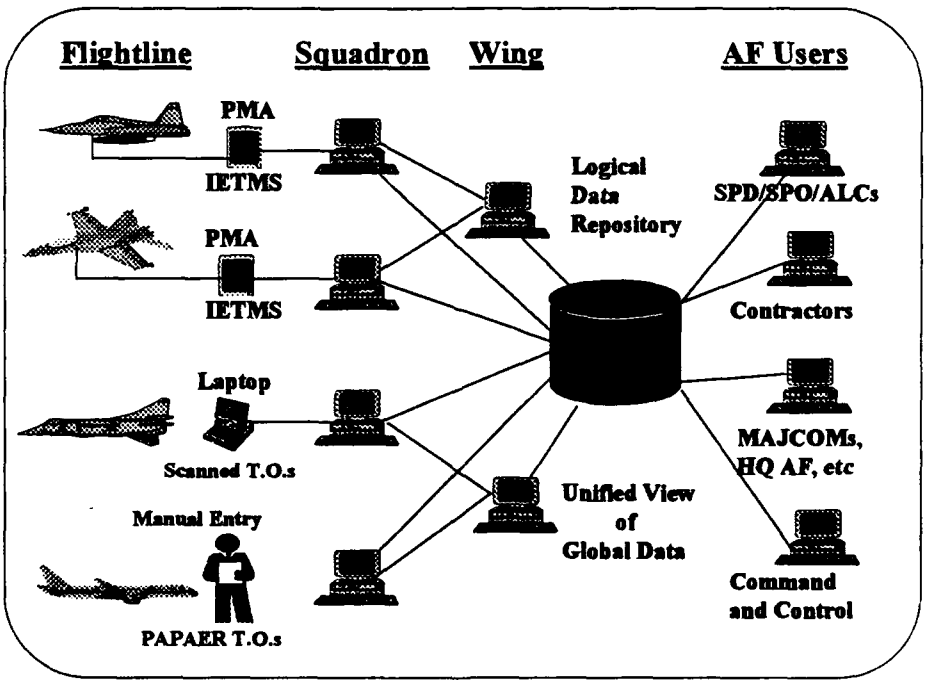

Figure 7. Target Architecture (Colmer, undated)

standard interface to data bases that are transparent to the users. The system will be compliant with the DoD Corporate Information Management (CIM) efforts and build on present programs such as JCALS. The system must also be modular and interoperable between the various weapon systems. It will be divided into core and unique components. The core components will standardized maintenance workstations, portable maintenanceaids, core software functions, and standardized data base interfaces. Each weapon system will have its own unique system interface and data software modules which will operate on the core hardware and software. Older systems will be supported by various levels of this system operating in a subset mode.

To move from the present system architecture to the target, four steps were identified to minimize the transition problems. Figure 8 shows the migration architecture to the target maintenance information system.

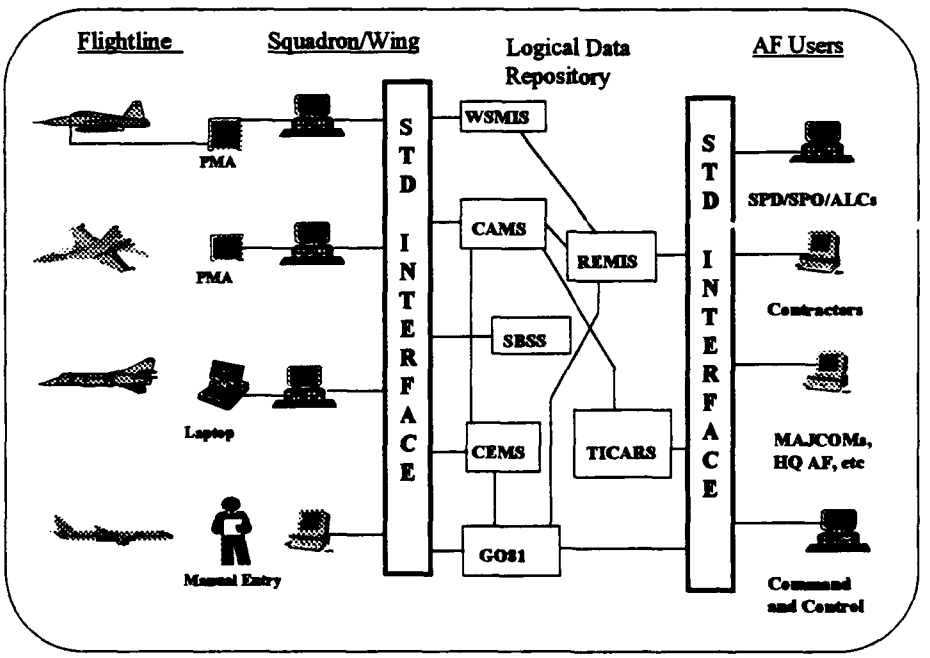

Figure 8. Migration Architecture (Colmer, undated)

First, to take full advantage of current and emerging technologies, the user must be isolated from legacy systems, and a uniform interface must be established with external data bases such as CAMS and others.

The second step is the development of standardized Maintenance Workstations (MIWs). These MIWs will have core software functions such as debriefing, scheduling, staff support aids. The MIWs will also have a single man-machine interface for single point data entry. The MIWs will be deployable. The third step is to develop a standardized Portable Maintenance Aid (PMA) with a standard PMA/MIW interface. The PMA will have standardized hardware and software components to facilitate interoperability. IMDS modules will be designed to interface with the external interfaces such as the Joint Computer-Aided Acquisition and Logistic Support (JCALS).

The MNS for IMDS is currently being written. IMDS will provide the Air Force with a single, standard maintenance information system. Based on IMIS specifications, IMDS will reduce the proliferation of weapon system unique maintenance information systems. In order to be supported by IMDS, IMIS requirements for ground TACS must be identified.

Conclusion

This chapter laid the foundation for research in applying IMIS technology to other systems. We first examined the Air Force Maintenance concept and the structure of aircraft and ground TACS maintenance organizations. Next, we introduced a candidate system to apply IMIS technology, the ground Theater Air Control System. We provided an overview of the system and its maintenance concepts. We then examined the background and development of the IMIS concept. Finally, we examined the next phase of development of Integrated Maintenance Data System (IMDS). In transitioning to this next phase of development, the first step must be to identify the maintenance information

requirements of a system. These requirements are identified in the IMIS System/Segment Specification (SSS). The next chapter relates the methodology the researchers used to identify, validate, and tailor the present IMIS SSS for aircraft maintenance to the needs of ground TACS units.

III. Methodology

Introduction

The Integrated Maintenance Information System (IMIS) was developed to automate the maintenance environment and aid the maintenance technician. To date, this concept has only been aimed at aircraft maintenance. This thesis determined Integrated Maintenance Information System (IMIS) functional requirements to meet ground-based Theater Air Control Systems maintenance information requirements. Unique requirements to support ground TACS were listed and examined. This chapter will 1) describe the research method and design, 2) review literature on our methodology, 3) describe the population and sample, and 4) explain the data collection plan.

Research Method and Design

Initially, the researchers used their own experience and research to make determinations on ground TACS maintenance requirements for IMIS use. The researchers then gathered information from ground TACS maintenance technicians and supervisors through a series of visits and a mailed questionnaire to enhance and validate the IMIS functional requirements. Ground TACS maintenance personnel at the unit level are in the best position to choose the system features and appreciate the environmental extremes faced when maintaining the system. Figure 9 shows the major activities for this research.

The first phase of this study determined the current maintenance information requirements of ground TACS. A strawman model of the ground TACS maintenance environment was accomplished through a review of current maintenance regulations and the researcher's past experience. Since ground TACS is a deployable system, the

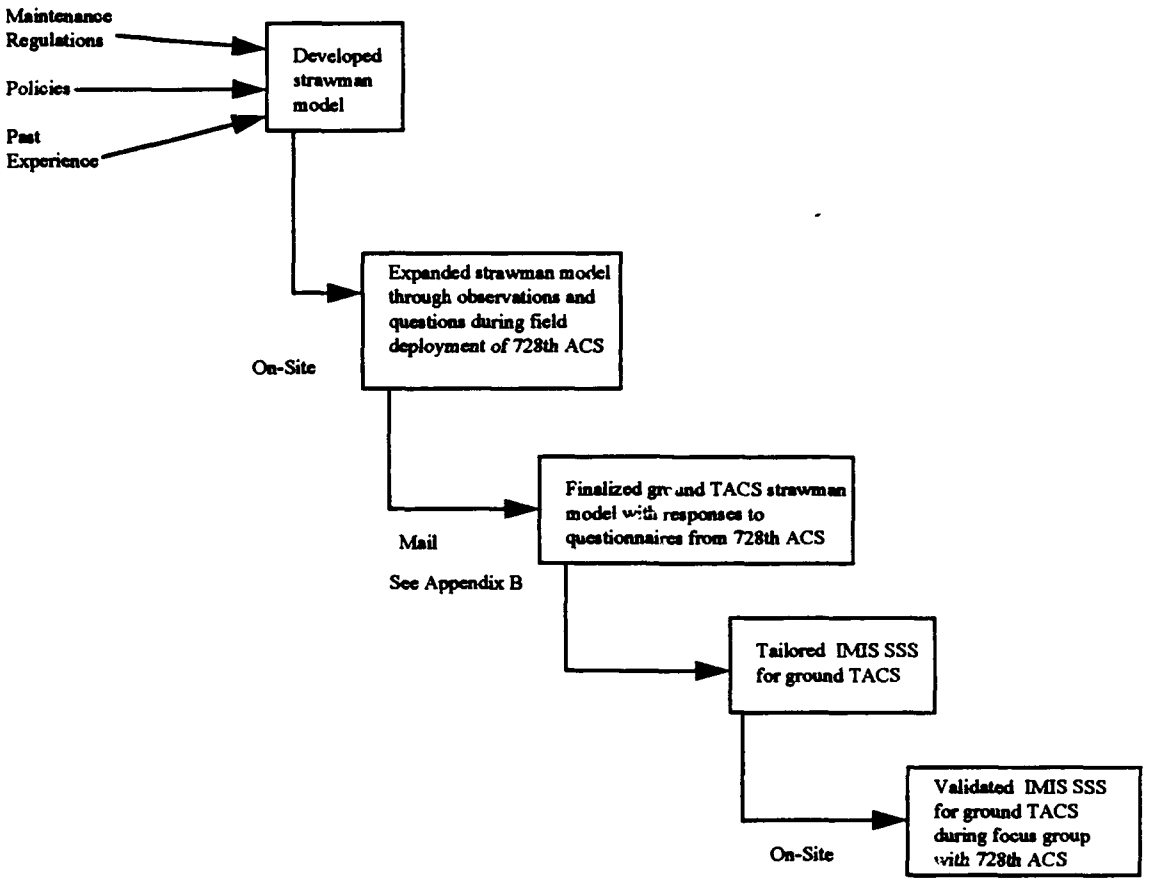

Figure 9. Major activities in determining functional IMIS requirements for ground TACS

strawman model outlined maintenance activities at both in-garrison (at home base) and at deployed locations. To make the strawman model more accurate, the researchers observed a ground TACS unit, the 728th Air Control Squadron, during a field deployment. The researchers also observed maintenance activities and asked a series of questions about maintenance information flows and hardware requirements for IMIS to support ground TACS equipment. Once the strawman model was improved with information gained during the field deployment, the researchers mailed copies of the improved strawman model and the hardware questions to maintenance experts from the 728th Air Control Squadron. Each manager independently reviewed the model and provided comments and revisions. See Appendix B for a copy of the strawman model and

questionnaire. The researchers used the group's comments and revised TACS strawman model to compile a final list of ground TACS functional maintenance requirements.

In the second phase, the researchers used information in the revised ground TACS maintenance model to tailor the IMIS aircraft maintenance System/Segment Specification (SSS) matrix to meet ground TACS maintenance needs. The data collection plan presented later in this chapter explains how the matrix was tailored. The SSS matrix assigns a detailed listing of maintenance requirements to specific IMIS hardware elements. The researchers included unique ground TACS maintenance functional requirements in the SSS matrix and deleted aircraft unique SSS matrix items.

The third phase was an on-site validation of the IMIS SSS matrix during a focus group session with the maintenance managers of the 728th Air Control Squadron which resulted in Appendix A. See Figure 9 for a chart depicting the major research activities accomplished to determine the IMIS functional requirements for ground TACS units.

Methodology Literature Review

Primary data was gathered through observation of maintenance activities during an actual field deployment, through a questionnaire to get specific comments or rephrasings on the ground TACS maintenance model, and through a focus group session to validate the revised IMIS SSS matrix for ground TACS.

Participation in the field deployment helped to flesh out a ground TACS maintenance model for training and wartime requirements. The researchers participated in the ground TACS field deployment rather than only observing it. Denzin stated that participation "simultaneously combines document analysis, interviewing of respondents and informants, direct participation and observation, and introspection" (Patton, 1990:206). The challenge for the researchers was to combine participation and observation to understand the activities as an insider while describing the activities as an

outsider (Patton, 1990:206). Participation as an observer brings in the potential of influencing behavior of the persons studied (Emory, 1991: 405). The challenge for the researcher was to participate in the deployment but not change the way maintenance activities were performed. Previous experience in communications maintenance and in command and control helped the researchers to identify to what extent their presence influenced the subjects.

Primary data was gathered again when the researchers mailed a package containing the revised ground TACS maintenance model and a questionnaire about hardware requirements for IMIS support of ground TACS to the 728th ACS maintenance supervisors. They were asked to work independently so the researchers could get a range of opinions and revisions. They collected the results from the ground TACS maintenance experts and used the results as a guide to tailor the IMIS SSS.

The researchers then used an on-site focus group session with the maintenance managers to validate the IMIS SSS. A focus group is a panel of 8 to 12 experts led by a moderator. The moderator uses principles of group dynamics to guide the group on a clearly understood subject (Emery, 1991:147). The focus group session was chosen as the validation method because of the large size and complexity of the IMIS SSS matrix. Though other methods using individual reviews may minimize peer influence on respondents, the researchers decided the size and complexity of the SSS matrix made it too clumsy and time consuming to review effectively unless it was guided in a group session.

In this study, secondary data was information collected by engineers and managers and compiled into regulations and the IMIS System/Segment Specification for aircraft. There are three primary uses for secondary data:

1) to fill a specific need for information on a subject.

2) as an integral part of a larger research study. An exploration to learn if the past can make a contribution to the present study.

3) as the sole basis for research (Emory, 1991: 286).

In the case of this study, points one and two are the most applicable. The researchers reviewed regulations to get an initial understanding of operations and maintenance at ground TACS locations. They also reviewed capabilities of IMIS technology as written in the aircraft System/Segment Specification. In each case, the researchers could not attempt to duplicate the time, cost, or efforts required to produce the amount of primary data contained in these technical documents. There are several advantages and disadvantages to using secondary data. The main advantage is "secondary data can usually be found more quickly and cheaply. Collection of primary data can be so costly and time-consuming as to be impractical"(Emory, 1991:287). In this case, the primary data in the technical manuals was acquired over many years of engineering and design research. The primary disadvantage is "secondary data often does not meet one's specific needs" (Emory,1991:287). In this study, the researchers assumed the secondary data was complete and provided the basis for ground TACS maintenance and IMIS design.

Description of Population and Sample

The population studied in this research was Air Force units that use ground TACS air control equipment. This study was not intended to apply to ground TACS units of the Marine Corps or to other air control systems used by the Air Force. The population is currently made up of some 39 squadrons. These squadrons are both active duty and National Guard and are found in the Pacific and European theaters, as well as the continental United States.

For this study the sample was the 728th Air Control Squadron at Duke Field, Florida. The 728th ACS was one of the first line units in the continental United States to

receive the new Modular Control Equipment (MCE). The 728th ACS, with its three MCE Tactical Air Operations Modules, has both garrison and mobility commitments. The size of this unit means it can deploy ground TACS systems to the field in a variety of configurations. These configurations, in which the 728th must remain proficient, represent the spectrum of all Air Force requirements and configurations of ground TACS.

Data Collection Plan

The initial information on ground TACS maintenance requirements was gathered by reviewing and using personal experience of the researchers, who have worked previously in Air Force command and control units. With this information, the researchers made an initial strawman model of maintenance for a ground TACS unit.

The researchers participated in a field deployment of the 728th ACS near Duke Field, Florida from 11 to 14 April 1994. This deployment allowed the researchers to observe the unit in both garrison and field conditions and see the mobility requirements necessary to make the transition. During the field visit, the researchers observed maintenance activities and interviewed maintenance technicians and managers about current maintenance needs and potential requirements of IMIS to support ground TACS maintenance. By seeing the deployment first hand, the researchers were able to gain a clearer understanding of the ground TACS environment. This information allowed the researchers to improve their strawman model of current ground TACS maintenance requirements. The strawman model included flowcharts representing the flow of maintenance information, diagrams representing the maintenance organization and a deployed site layout, and a series of questions about IMIS hardware.

Once the initial strawman model was revised with information from the field deployment, the researchers mailed copies of the ground TACS strawman model to the maintenance managers of the 728th ACS: Chief of Maintenance, Maintenance

Superintendent, Quality Assurance, Maintenance Control, and maintenance shop chiefs. They were asked to provide comments or rephrase the model to make it as accurate as possible. The researchers used the maintenance experts' comments to tailor the IMIS SSS for ground TACS maintenance. The researchers then visited the 728th ACS at its new facilities on Eglin AFB, Florida on 28 June 1994 to validate the tailored IMIS SSS. This validation was completed during a focus group session of the 728th ACS maintenance managers lead by the researchers. The group reviewed the IMIS SSS line by line and agreed on items by consensus. This research will provide ground TACS maintenance managers and Armstrong Laboratory engineers a starting point to apply IMIS technology to ground TACS maintenance.

Summary

This chapter laid out the research methodology to determine what the IMIS system would have to do to support ground TACS system maintenance. The researchers relied on expert knowledge from ground TACS system maintainers and their own experience to finalize a model of the current ground TACS maintenance environment and identify unique requirements to support ground TACS. Literature was reviewed on the methodology, and the population and sample were described. Finally, the data plan was explained.

IV. Discussion of Data

Introduction

The purpose of this research is to define the functional requirements for the Integrated Maintenance Information System (IMIS) to support Air Force ground Tactical Air Control Squadrons (TACS). This was accomplished by tailoring the existing IMIS System/Segment Specification (SSS) matrix for aircraft maintenance to support ground TACS. The proposed IMIS SSS matrix for ground TACS is found in Appendix A. This chapter will discuss changes made to the IMIS SSS matrix. The quantitative summary in this chapter will present the number and percentage of line item changes from the original IMIS SSS matrix to the proposed IMIS SSS matrix for ground TACS. The qualitative analysis will discuss the rationale behind each of the major changes found in the proposed IMIS SSS matrix for ground TACS.

Quantitative Summary

The researchers examined the IMIS SSS matrix for aircraft line by line, and tailored it to the needs of ground TACS maintenance. Most line items were left unchanged, others were changed or deleted. The researchers added new line items for ground TACS needs that were not found in the original IMIS SSS matrix for aircraft. The IMIS SSS matrix is broken into six modes: define status, allocate resources, perform maintenance, staff support, training, and control. A section of varied system requirements completes the matrix. Table 1 below summarizes the line item changes found in the proposed IMIS SSS matrix for ground TACS. This data is of interest since the overall small number of major changes suggests the possible ease of IMIS meeting the requirements of ground TACS.

TABLE 1

LINE ITEM CHANGES IN PROPOSED GROUND TACS SSS MATRIX

MODE	No Change	Minor Changes	Delete	Add	Intent Changes	Totals
DEF STAT	80	45	21	0	2	148
ALLO RES	134	55	14	2	3	208
PER MAINT	203	28	32	3	1	267
STAFF SUP	150	25	33	0	5	213
TRAINING	96	1	1	1	1	100
CONTROL	204	0	11	5	1	221
REMAINING SECTIONS	434	2	75	1	0	512
TOTAL	1301	156	187	12	13	1669

Table 2 summarizes the percentage of changes to the original IMIS SSS matrix. The first column provides percentages of either no or minor line item changes. The second column provides percentages of line item deletions, additions, and intent changes.

TABLE 2

PERCENTAGE OF LINE ITEM CHANGES IN PROPOSED SSS MATRIX FOR GROUND TACS

Mode	No/Minor Changes	Deletions/Additions/Intent Changes	Totals
DEF STAT	84.46%	15.54%	100.00%
ALLO RES	90.87%	9.13%	100.00%
PER MAINT	86.52%	13.48%	100.00%
STAFF SUP	82.16%	17.84%	100.00%
TRAINING	97.00%	3.00%	100.00%
CONTROL	92.31%	7.69%	100.00%
REMAINING SECTIONS	85.16%	14.84%	100.00%
Totals	87.30%	12.70%	100.00%

Qualitative Analysis

The matrix for ground TACS was validated by a group of maintenance technicians from the 728th Air Control Squadron. These technicians represented every major work center in a typical ground TACS unit. The researchers, along with these technicians, discussed each line item of the matrix individually. Any major differences on line item content among the technicians were resolved by discussion before changes were made to the matrix. The remainder of this chapter discusses the major changes to the matrix by section.

Define Status Mode. The Define Status Mode beginning on line number 3.2.1.1.1.1 had the greatest number of deletions, additions, and major changes when the researchers adapted the IMIS SSS matrix from aircraft maintenance to ground TACS maintenance. The Define Status Mode supports the maintenance activity of defining the status of the weapons systems and Support/Test Equipment assets to be maintained (General Dynamics, 1993:1-9). The majority of the deletions in this section are attributed to the difference between flightline maintenance procedures and communications-computer maintenance procedures. On the flightline, pilots are debriefed by crew chiefs on aircraft status and problems. Crew chiefs notify expediters of aircraft problems. Expediters notify maintenance controllers which contact maintenance work centers to perform specific maintenance on the aircraft. In communications maintenance, the crew chief and maintenance work center functions are combined and there are no expediters. Except for operators reporting a failure of a component, there are no pilot debriefs or crew chiefs to pass on maintenance information. Other aircraft-unique causes for deletions are items such as safe-checking munitions, parking aircraft, receiving aircraft downlinks, incoming flight notifications, roving flightline trucks, and Aircraft Interface Panels. The Aircraft Interface Panel, a major segment of IMIS, is not found in ground TACS.

Two major changes involved how information was presented by IMIS. The first relaxed the restrictions on technicians input to multiple choice items to facilitate accurate entries. The maintenance technicians at the 728th ACS felt the original text was too restrictive. Multiple choice entries remained to facilitate entries of common data items while adding the option to manually fill in odd or uncommon data. The second major change provided for a rejection and display of incorrect data entries with list of suggested corrections. The researchers and technicians felt that the suggested corrections list would aid the technician who may be uncertain as to what data to enter.

The remainder of the changes in the Define Status mode were minor, most dealt with only changing the term "aircraft" to "equipment", or the term "Production Superintendent" to "Maintenance Officer".

Allocate Resources Mode. The Allocate Resources Mode beginning on line item 3.2.1.1.2.1 provides support for allocation of resources for both On-Equipment and Off-Equipment maintenance (General Dynamics, 1993:1-10). Deletions for aircraft-unique activities included items on aircraft generation, special loading, tail numbers, sortie rates, FOD damage, Individual Mobilization Augmentees, and alert status.

The researchers added line items to include the squadron mobility officer as a recipient of reports, and to include equipment transfers in the squadron status reports respectively.

There were three major line item changes. The first added a display of ARM/Ground Attack/Air Attack/NBC alert information on the IMIS equipment. This change represents the difference between aircraft emergency information needs and ground maintenance emergency information needs. The other two changes reflect the need for two specialists to be present on a job involving high voltage electricity.

The remainder of the changes in the Allocate Resources mode are minor, most were changing the term "aircraft" to "equipment", or the titles such as "Production Superintendent" to "Maintenance Officer".

Perform Maintenance Mode. The Perform Maintenance Mode beginning on line item 3.2.1.1.3.1 supports maintenance activities such as troubleshooting, ordering parts, repairing, performing standard service, and technical order processing (General Dynamics, 1993:1-10). The deleted line items were related to aircraft maintenance practices which did not apply to communications maintenance, such as outside work center quality checks on maintenance, aircraft unique supply points, future mission success rates, aircraft skin repairs, tail number tracking, and aircraft interface panels with IMIS.

Three new line items for ground TACS maintenance did the following: highlighted wirepaths or subsystems in a diagram, allowed authorized personnel to take actions beyond the scope of normal technical data, and used National Stock Numbers in parts ordering. The technicians at the 728 ACS told the researchers they used NSNs to order most of their parts and they could not understand why it was initially left out of the matrix.

The only major change dealt with availability of parts on-base, on-site, or available from support base. This change reflects the ground TACS mission of deploying to remote sites world-wide without collocated support units. The nearest U.S. or allied base regardless of type is then used to support deployed units.

The remainder of the changes in the Perform Maintenance mode are minor; most were changing the term "aircraft" to "equipment", or the titles such as "Production Superintendent" to "Maintenance Officer".

Staff Support Mode. The Staff Support Mode beginning on line item 3.2.1.1.4.1 had the second highest percentage of line item deletions for the proposed IMIS SSS matrix for ground TACS. The Staff Support Mode supports management of the maintenance complex (General Dynamics, 1993:1-11). The line item deletions from the

original aircraft IMIS SSS matrix were all related to aircraft maintenance unique activities such as interfacing with aircraft scheduling equipment, Pilot Reporting Discrepancies, aircraft generation planning, aircraft unique tracking programs, debriefings, aircraft alert forces, and munitions deliveries

Maintenance Training Mode. The Maintenance Training Mode beginning on line item 3.2.1.1.5.1 supports training of the maintenance technicians and staff (General Dynamics, 1993: 1-11). This mode also provides training on how to use the IMIS system. Not surprisingly, this mode had the fewest percentage of changes or deletions of any of the IMIS Modes. Items deleted concerned nuclear surety training and cockpit egress. Small arms training and self-aid buddy care were added for TACS maintenance personnel. Enlisted specialty training was expanded to include initial and advanced training.

The small number of changes reflects the standardization of training requirements between aircraft and ground TACS maintenance technicians.

IMIS Control Mode. The IMIS Control Mode beginning on line item 3.2.1.1.6.1 provides operation and management of IMIS as a system (General Dynamics, 1993:1-11). The majority of this section will apply to an IMIS system regardless of who is using it or which system it is being used for. All line item deletions removed references to the Aircraft Interface Panel, which is not found on ground TACS equipment.

A major change involved changing the minimum allowable cursor movement to include all directions. This change was made to facilitate tracing wiring diagrams and graphic presentations which may not be in straight lines.

The additions mainly centered on being able to use the PMA at night without external lighting. The technicians asked for a backlit, full alpha/numeric keyboard which is viewable from other than straight on angle. This allows more than one technician to see the screen at once. The RF link between PMA and MIW must be secure for up to Top Secret data.

Miscellaneous Sections. The final sections of the IMIS matrix contain many diverse, non-mode specific IMIS system requirements. Section 3.2.2 defines the system capability . This matrix lists the system capabilities that are available in each mode of the two operating states of IMIS. This section of the matrix was not addressed by the researchers and is recommended for future research.

Section 3.2.3 defines the systems external interface requirements. All deletions concerned aircraft specific data bases such as CEMS, BLMAS, and interfaces with the weapons system itself. Ground TACS equipment does not have weapon system interfaces. The additional interface requirement in this section is item 3.2.2.6a "Base On-line Weather System."

Section 3.2.4 addresses the physical characteristics of the hardware. These requirements are derived primarily from the physical requirements of the respective system segments (General Dynamics, 3-106). There were no changes made to the present system specifications.

Section 3.2.5 is System Quality Factors. These factors include reliability, maintainability, and availability. Also survivability, vulnerability, and others are included.(General Dynamics, 3-106, 107). No changes were made to the present system specifications.

Section 3.2.6 concerns Environmental Conditions the IMIS is expected to be operated in. No changes were made to this section.

Section 3.2.7 concerns the transportability of the IMIS hardware components. Line item 3.2.7-c "AIP will be at DOL whenever the aircraft is" was deleted. No other changes were made in this section.

Section 3.2.8 Flexibility and Expansion addresses considerations of future technology advances for hardware and software. No changes were made in this section.

Section 3.3 is a major area covering the design and construction requirements of the IMIS hardware. Items 3.3.2.1-a and 3.3.4.2-c were deleted because they pertain to the Aircraft Interface Panel (AIP), which ground TACS does not have. No other items were changed in this section.

Section 3.3.6 addresses safety considerations. No changes were made to this section.

Section 3.3.7 concerns human factors requirements. Item 3.3.7.3.5-b, "Mobile, ruggedized MIW accommodates operation at a level approximating unprotected operations," was changed. This requirement from the aircraft community reflects the assumption that maintenance supervision functions at home base or even deployed will take place in a hardened, NBC protected environment. Ground TACS units will operate out of austere locations, usually in unhardened shelters and tents. The researchers changed this item to read "Mobile, ruggedized MIW supports use by personnel wearing normal or NBC protective gear." Items 3.3.7.5 through item 3.3.7.5.4-f are deleted because they are requirements for the AIP.

Sections 3.4 and 3.5 are contractor documentation requirements.

Section 3.6 covers Personnel and Training. In item 3.6.2.b-1 the word aircraft was changed to equipment.

Conclusion

The proposed IMIS SSS matrix for ground TACS has many changes from the original IMIS SSS matrix for aircraft. Most of these changes are minor wording changes that do not affect the intent of the original requirement. The major changes, additions, deletions, and changes of intent are related to the differences in flight line maintenance practices, the differences in aircraft verses ground communications and computer equipment, and in the lack of an established interface panel on ground TACS equipment

that IMIS equipment can readily connect to. In the next chapter we will discuss the conclusions made from these changes as to the extent IMIS can be applied to the ground TACS environment.

V. Conclusion and Recommendations

Introduction

While Armstrong Laboratory is actively working the IMIS program to automate maintenance information, there is no application for this system in the U.S. Air Force outside of aircraft maintenance. Many other maintenance intensive systems exist in the U.S. Air Force that have maintenance information needs similar to those of aircraft maintenance. The communications and computer systems supporting the U.S. Air Force's ground Tactical Air Control Squadrons (TACS) are a prime target for computerized maintenance information. The objective of this research was to develop IMIS requirements for TACS.

To develop IMIS requirements for ground TACS, a series of steps were taken to identify TACS maintenance information requirements. The researchers used the TACS information requirements to create an IMIS System/Segment Specification (SSS) matrix for ground TACS. This tailored IMIS SSS matrix was validated during a focus group session with maintenance managers of the 728th ACS. Chapter 4 analyzed the proposed IMIS SSS matrix for ground TACS and examined the major changes between the proposed matrix and the original IMIS SSS matrix for aircraft. This chapter will present a summary of findings, factors affecting the results, implications of results, and recommendations for follow-on research. The chapter will conclude with a summary of the thesis research.

Summary of Findings

Though a large number of changes were made to the current IMIS SSS matrix for

aircraft to adapt it to ground TACS maintenance, none of the changes eliminates IMIS as a concept to support ground TACS. Minor or no changes made up 87.3 percent of the IMIS SSS line items. The minor changes generally changed aircraft nomenclature to fit ground TACS terminology. Line item deletions made up 11.2 percent of the proposed IMIS SSS matrix for ground TACS. These typically were aircraft-unique requirements, such as the Aircraft Interface Panel or nuclear surety training not found in ground TACS. Additions and major line item changes that altered the intent of the original aircraft matrix line items made up 1 percent. Some of these additions and changes were made to meet the unique deployment and field requirements of ground TACS, such as tracking small arms training or use of the MIW while wearing chemical warfare gear. Other changes were made at the request of the ground TACS technicians, such as backlit PMA keyboards.

Factors Affecting the Results

From the outset, this research has been based on the subjective decisions of the researchers and the maintenance managers and technicians of the 728 ACS. The 728 ACS is considered by Air Combat Command managers to be one of the most experienced and representative TACS units in the U.S. Air Force. However, maintenance experts from another unit may have provided differing information to the researchers. The researchers recommend letting other TACS units review and comment on the proposed ground-TACS SSS matrix.

Implications of Results

This thesis provides a tailored IMIS SSS matrix for ground TACS. It can be used as a starting point for ground TACS managers at Air Combat Command and IMIS engineers at Armstrong Laboratory to continue research to apply IMIS technology to

ground TACS units. In the future, ground TACS units could deploy with a light-weight IMIS-based maintenance information system rather than a heavy paper-based system. Maintenance work centers could link with each other and the deployed squadron command post and share maintenance information rather than send runners throughout the site. Armstrong Laboratory's technology demonstrations on aircraft have shown marked improvements in the time to perform maintenance, a dramatic decrease in false removals, and a significant maintenance cost savings. Ground TACS units should share in these improvements.

Conclusions

The IMIS concept has already been proven for aircraft maintenance. IMIS will work for ground-TACS maintenance because of the strong similarities with aircraft maintenance management and practices. Maintenance practices between aircraft and ground-TACS are similar. Both aircraft maintenance and TACS maintenance share a similar maintenance management structure and perform similar maintenance practices. Both maintenance organizations rely on technical orders, quality assurance, and on-the-job-training. The basic actions in performing maintenance are also similar. Both aircraft and TACS maintenance technicians perform similar actions such as remove and replace, calibrate, test, and inspect equipment. The functional IMIS requirements for aircraft and ground-TACS are approximately the same with 87 percent of the line-item requirements identical. Hardware requirements will differ because of the differences of environments between the flightline and deployed TACS locations. IMIS can provide ground-TACS the same benefits enjoyed by aircraft maintenance managers.

Recommendations for Follow-on Research

This research identified the maintenance information needs for ground TACS and tailored the IMIS SSS matrix to meet those needs. The 728 ACS managers and technicians are now familiar with the IMIS concept. Future researchers could make a IMIS system/segments subset with minimum functional requirements for TACS. Next they could create prototype software and use exiting PMAs in a field test with the 728 ACS. User feedback could then provide updates to the IMIS SSS for TACS. These IMIS field test would be similar to those done for aircraft maintenance. See chapter 2 for a description of the technology demonstrations.

A maintenance information workstation could be set up with the 728 ACS during a field deployment and connected with work center PMAs via radio links to relay maintenance information. This would aid in developing the best network use of IMIS technology to support a deployed ground TACS unit.

Maintenance managers both at 728 ACS and at Air Combat Command were concerned about the PMA's cost and the number of PMAs required to support a ground-TACS units. The researchers recommend a study to determine the number of PMAs that would be issued to each work center.

Summary

While weapons systems are getting more and more complex, the U.S. Air Force is forced to become more and more efficient. Computer automation has developed to the point where great computing power can be concentrated economically in small, portable machines. The IMIS program has demonstrated it can greatly improve aircraft maintenance.

The U.S. Air Force has other systems which can benefit from this technology. Armstrong Laboratory personnel and Air Combat Command managers requested research

be performed to create an IMIS SSS matrix for ground TACS. Initial decisions on ground TACS maintenance requirements were made by the researchers with the help of regulations, observations during a field deployment with the 728 ACS, and a questionnaire sent to the maintenance managers of the 728 ACS (see Appendix B). The researchers tailored the IMIS SSS matrix with information gathered up to that time. The validation of the proposed IMIS SSS matrix for ground TACS was made during a focus group meeting with maintenance experts of the 728 ACS.

The proposed IMIS SSS matrix for ground TACS has changes from the original IMIS SSS matrix for aircraft. These changes were due to aircraft-unique requirements, the unique field needs of deployed ground TACS squadrons, and the suggestions of the maintenance technicians and managers of the 728 ACS. None of the differences between the IMIS SSS matrixes for aircraft or ground TACS were profound enough to block IMIS technology use by ground TACS units. IMIS will work for ground-TACS maintenance.

Appendix A: Ground Theater Air Control System Maintenance IMIS Requirements List

ACT	PARAGRAPH	MODE	REQUIREMENT
C	**3.2.1.1.1.1**	**DEF STAT**	**Receive Discrepancy**
			Perform Pilot Interview
D	**3.2.1.1.1.1.1**	**DEF STAT**	**Receive Aircraft Downlink**
D	**3.2.1.1.1.1.1-a**	**DEF STAT**	**Accept automatic entry of aircraft and systems data from aircraft through RF downlink**
D	**3.2.1.1.1.1.1-b**	**DEF STAT**	**Open appropriate work orders**
D	**3.2.1.1.1.1.1-c**	**DEF STAT**	**Forward aircraft/system information directly to maintenance for assessment**
D	**3.2.1.1.1.1.1-d**	**DEF STAT**	**Assess current mission capability of the aircraft against mission requirements**
D	**3.2.1.1.1.1.1-e**	**DEF STAT**	**If the assessment dictates:**
D	**3.2.1.1.1.1.1-e.1**	**DEF STAT**	**Dispatch technician to repair discrepancy immediately**
D	**3.2.1.1.1.1.1-e.2**	**DEF STAT**	**Dispatch technician to enable repair of the aircraft upon landing**
D	**3.2.1.1.1.1.1-e.3**	**DEF STAT**	**Determine Support/Test Equipment (S/TE) availability to support the maintenance task**
C	**3.2.1.1.1.1.2**	**DEF STAT**	**Accept manual entry of equipment data and condition codes**
			Accept manual entry of aircraft and systems data and condition codes for uses specified in 3.2.1.1.1.1.1-a
NC	3.2.1.1.1.1.2-a	DEF STAT	When opening a work order, perform the following functions:
NC	3.2.1.1.1.1.2-a.1	DEF STAT	Open work orders using IMIS-assigned JCN for any discrepancies indicated
NC	3.2.1.1.1.1.2-a.2	DEF STAT	Make automated work order entries for information such as part number, MDS, priority, and location
NC	3.2.1.1.1.1.2-a.3	DEF STAT	Complete work order entries by selecting from menus presenting choices for required data
C	**3.2.1.1.1.1.2-a.4**	**DEF STAT**	**Notify Maintenance Officer or Superintendent of the open work order if priority dictates**
			Notify APG Flightline Expediter or Production Superintendent and the MOC of the open work order
NC	3.2.1.1.1.1.2-b	DEF STAT	Determine the initial resource requirements necessary to support work orders as opened
NC	3.2.1.1.1.1.2-b.1	DEF STAT	Access CAMS or use technical data to make this determination of requirements

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ACT	PARAGRAPH	MODE	REQUIREMENT
C	3.2.1.1.1.1.2-b.3	DEF STAT	**Allow work center NCOIC to request resources through IMIS when no recommendation is made** *Allow production managers to request resources through IMIS when no recommendation is made*
D	3.2.1.1.1.1.2-c	DEF STAT	**Notify fighter squadron of the incoming flight**
NC	3.2.1.1.1.1.2-c.1	DEF STAT	Establish WCE
NC	3.2.1.1.1.1.2-c.2	DEF STAT	Send the WCE to the following:
C	3.2.1.1.1.1.2-c.2.a	DEF STAT	**Appropriate Work Center** *Fighter squadron Specialist Dispatch Section*
D	3.2.1.1.1.1.2-c.2.b	DEF STAT	**Roving truck**
D	3.2.1.1.1.1.2-c.2.c	DEF STAT	**ILMFs, such as the Propulsion Flight, the Avionics Flight, the Accessory Flight, and the Fabrication Flight**
NC	3.2.1.1.1.1.2-c.3	DEF STAT	Identify and correlate a specific PMA with a specific individual or function
NC	3.2.1.1.1.1.2-d	DEF STAT	Determine ETIC for a work order
NC	3.2.1.1.1.1.2-d.1	DEF STAT	Use histories of similar Work Unit and How Malfunction codes
NC	3.2.1.1.1.1.2-d.2	DEF STAT	Maintain ETICs from previous work orders
NC	3.2.1.1.1.1.2-d.3	DEF STAT	Calculate ETIC based upon historical data for same maintenance task
NC	3.2.1.1.1.1.2-d.4	DEF STAT	Review maintenance repair priority designations
C	3.2.1.1.1.1.2-d.5	DEF STAT	**Automatically notify Maintenance Control of the ETIC update** *Automatically notify APG Flightline Expediter, Production Superintendent and the MOC of ETIC update*
C	3.2.1.1.1.1.2-e	DEF STAT	**Define equipment (specific van) condition** *Define aircraft condition*
C	3.2.1.1.1.1.2-e.1	DEF STAT	**Based on technician/operator assessment, using maintenance regulations and open work orders, set the initial code for:** *Based on pilot assessment, using the MESL and open work orders, set the initial code for:*
C	3.2.1.1.1.1.2-e.1.a	DEF STAT	**Equipment (specific van) condition** *Aircraft condition*
C	3.2.1.1.1.1.2-e.1.b	DEF STAT	**Equipment (specific van) status** *Aircraft status*

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ACT	PARAGRAPH	MODE	REQUIREMENT
C	**3.2.1.1.1.1.2-e.2**	**DEF STAT**	**Provide appropriate notification if IMIS-generated code does not agree with the technician/operator assessment** ***Provide appropriate notification if IMIS-generated code does not agree with the pilot's assessment***
NC	3.2.1.1.1.1.2-f	DEF STAT	Provide the latest status when any work order is opened or updated
NC	3.2.1.1.1.1.2-f.1	DEF STAT	Maintain a mission status internal to IMIS
C	**3.2.1.1.1.1.2-f.2**	**DEF STAT**	**Drive large screen status displays in the Maintenance (Job) Control center** ***Drive large screen status displays in the MOC or wherever they are placed***
NC	3.2.1.1.1.1.2-g	DEF STAT	In the event that there is some change in status which must be communicated:
NC	3.2.1.1.1.1.2-g.1	DEF STAT	Notify selected maintenance managers whenever there is a change in one of the following:
NC	3.2.1.1.1.1.2-g.1.a	DEF STAT	Status
NC	3.2.1.1.1.1.2-g.1.b	DEF STAT	Other predetermined criteria
NC	3.2.1.1.1.1.2-g.2	DEF STAT	Indicate the change in status through visual or audio alerts
NC	3.2.1.1.1.1.2-g.3	DEF STAT	Require the operator to respond to the alert
C	**3.2.1.1.1.1.2-g.4**	**DEF STAT**	**Notify the appropriate work center and/or Maintenance (Job) Control of the change is status:** ***Notify the appropriate crew chief and specialist dispatch section of the change in status***
NC	3.2.1.1.1.1.3	DEF STAT	Review Maintenance History
C	**3.2.1.1.1.1.3-a**	**DEF STAT**	**Display equipment (specific van) history data** ***Display aircraft history data***
NC	3.2.1.1.1.1.3-b	DEF STAT	Display data regarding systems reported as deficient
NC	3.2.1.1.1.1.3-c	DEF STAT	Compare this historical data to reported deficiencies
NC	3.2.1.1.1.1.3-d	DEF STAT	Identify if the reported discrepancies are repeat or recurring
NC	3.2.1.1.1.1.3-e	DEF STAT	Assist in determining required maintenance actions by comparison with similar histories
C	**3.2.1.1.1.1.4**	**DEF STAT**	**Technician Assessment** ***Perform Debrief***
D	**3.2.1.1.1.1.4-a**	**DEF STAT**	**Assist in collecting information in the event that the RF link is unavailable**

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ACT	PARAGRAPH	MODE	REQUIREMENT
D	**3.2.1.1.1.1.4-a.1**	**DEF STAT**	**Collect data using the AIP or other aircraft interface locations**
D	**3.2.1.1.1.1.4-a.2**	**DEF STAT**	**Collect data via download of DTUs**
C	**3.2.1.1.1.1.4-a.3**	**DEF STAT**	**Accept site/equipment information manually from the technician** *Accept aircraft information manually from the technician to augment automatic process*
NC	3.2.1.1.1.1.4-a.4	DEF STAT	Include plain language interpretation of fault and other coded data
NC	3.2.1.1.1.1.4-b	DEF STAT	Interrogate systems for specific conditions or additional diagnostic information
NC	3.2.1.1.1.1.4-c	DEF STAT	Accumulate and store all reported data with the repair work order
C	**3.2.1.1.1.1.4-d**	**DEF STAT**	**Develop equipment status question sets** *Develop debriefing question sets*
C	**3.2.1.1.1.1.4-d.1**	**DEF STAT**	**Analyze information from the technician/operator and data previously collected** *Analyze information from pilot and flight data previously collected*
D	**3.2.1.1.1.1.4-d.2**	**DEF STAT**	**Produce description of in-flight conditions**
C	**3.2.1.1.1.1.4-d.3**	**DEF STAT**	**Analyze discrepancies, equipment status and related conditions** *Analyze discrepancies, sortie data, flight data, and aircraft and system conditions*
C	**3.2.1.1.1.1.4-d.4**	**DEF STAT**	**Access equipment and associated maintenance histories to compare with present information** *Access aircraft and associated maintenance histories to compare and present historical flight information*
C	**3.2.1.1.1.1.4-d.5**	**DEF STAT**	**Analyze trends and generate appropriate questions** *Analyze trends and generate appropriate debrief questions*
NC	3.2.1.1.1.1.4-d.6	DEF STAT	Generate questions that are adaptable to include the following:
C	**3.2.1.1.1.1.4-d.6.a**	**DEF STAT**	**Feedback from previous maintenance actions** *Feedback from previous debriefing and maintenance actions*
NC	3.2.1.1.1.1.4-d.6.b	DEF STAT	Information about the local maintenance organization and policies
NC	3.2.1.1.1.1.4-d.6.c	DEF STAT	Type, model, and age of the system
NC	3.2.1.1.1.1.4-d.6.d	DEF STAT	Mission

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.1.1.4-d.6.e	DEF STAT	Environment in which the weapon system must perform
C	**3.2.1.1.1.1.4-d.7**	**DEF STAT**	**Present equipment status questions and query for response** *Present debrief questions and query for responses*
C	**3.2.1.1.1.1.4-d.8**	**DEF STAT**	**Accept responses from equipment status questions** *Accept responses from debrief questions*
NC	3.2.1.1.1.1.4-d.9	DEF STAT	Determine if additional information is needed and select relevant questions to obtain that information
C	**3.2.1.1.1.1.4-d.10**	**DEF STAT**	**Accept questions and responses entered directly by the technician/ operator** *Accept questions and responses entered directly by the debriefer*
NC	3.2.1.1.1.1.4-d.11	DEF STAT	Consider use of rule-based or model-based expert system for question sets
C	**3.2.1.1.1.2**	**DEF STAT**	**Determine Equipment Condition** *Determine Aircraft Worthiness*
D	**3.2.1.1.1.2.1**	**DEF STAT**	**Safe and Shutdown Aircraft**
C	**3.2.1.1.1.2.1-a**	**DEF STAT**	**Collect battle damage and contamination information** *Assist the EOR crew to collect quick-look battle damage and contamination information*
D	**3.2.1.1.1.2.1-b**	**DEF STAT**	**Assist the production superintendent in making decisions about where to park incoming aircraft**
C	**3.2.1.1.1.2.1-c**	**DEF STAT**	**Access shutdown procedures if required and present them for use** *Access safe and shutdown procedures if required and present them for use*
NC	3.2.1.1.1.2.1-d	DEF STAT	Accept acknowledgment from the maintenance technician upon completion of the procedures
NC	3.2.1.1.1.2.2	DEF STAT	Determine Inspection Requirements
NC	3.2.1.1.1.2.2-a	DEF STAT	Access rotating maintenance and operations schedule
C	**3.2.1.1.1.2.2-b**	**DEF STAT**	**Provide recommendations on inspection types and schedule** *Provide recommendations on inspection type based on planned flying requirements*
C	**3.2.1.1.1.2.3**	**DEF STAT**	**Perform Equipment Inspection** *Perform Aircraft Inspection*
NC	3.2.1.1.1.2.3-a	DEF STAT	Present appropriate instructions to be used during inspection

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.1.2.3-b	DEF STAT	Save the results of the inspection, including:
NC	3.2.1.1.1.2.3-b.1	DEF STAT	Discrepancy
NC	3.2.1.1.1.2.3-b.2	DEF STAT	Trace of instructions performed
NC	3.2.1.1.1.2.3-b.3	DEF STAT	Time of start and completion
NC	3.2.1.1.1.2.3-b.4	DEF STAT	Name of technician who performed the inspection
NC	3.2.1.1.1.2.3-c	DEF STAT	Automatically document the opening and closing of work orders for recurring maintenance
NC	3.2.1.1.1.2.3-d	DEF STAT	Allow technician to review documentation of maintenance actions
NC	3.2.1.1.1.2.3-e	DEF STAT	Verify signoff authority of inspector
NC	3.2.1.1.1.2.3-f	DEF STAT	Deny unauthorized signoff of inspection
NC	3.2.1.1.1.3	DEF STAT	Review Scheduled Maintenance
C	**3.2.1.1.1.3.1**	**DEF STAT**	**Provide access to all information from the current operations and maintenance schedule** *Provide access to all information from the current flying and maintenance schedule*
C	**3.2.1.1.1.3.2**	**DEF STAT**	**Display all scheduled maintenance requirements presently maintained in the equipment work history file** *Display all scheduled maintenance requirements presently maintained on the AFTO Forms 781K*
NC	3.2.1.1.1.3.3	DEF STAT	Allow access to other maintenance data, technical data, local policies, etc.
C	**3.2.1.1.1.4**	**DEF STAT**	**Set Equipment Condition** *Set Aircraft Condition*
C	**3.2.1.1.1.4.1**	**DEF STAT**	**Estimate Equipment Condition Code** *Estimate Aircraft Condition code*
C	**3.2.1.1.1.4.1-a**	**DEF STAT**	**Update the initial equipment condition and status codes based on the following:** *Update the initial aircraft condition and status codes based on the following:*
C	**3.2.1.1.1.4.1-a.1**	**DEF STAT**	**Technician/operator assessment according to mission requirements** *Pilot assessment using the MESL*
C	**3.2.1.1.1.4.1-a.2**	**DEF STAT**	**Data collected during initial assessment and inspection** *Data collected during debriefing and initial inspection*
NC	3.2.1.1.1.4.1-b	DEF STAT	Present information to maintenance managers for approval or modification

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ACT	PARAGRAPH	MODE	REQUIREMENT
C	**3.2.1.1.1.4.1-c**	**DEF STAT**	**Post this condition code update to internal, maintenance work center and Job Control status**
			Post this condition code update to internal, fighter squadron, and MOC status
NC	3.2.1.1.1.4.2	DEF STAT	Allow revision of condition and status code only after appropriate actions have been taken
C	**3.2.1.1.1.4.3**	**DEF STAT**	**Establish Equipment ETIC**
			Establish Aircraft ETIC
C	**3.2.1.1.1.4.3-a**	**DEF STAT**	**Evaluate ETICs of each open work order for each individual van**
			Evaluate ETICs of each open work order for an individual aircraft
NC	3.2.1.1.1.4.3-b	DEF STAT	Update ETIC after troubleshooting, after parts obtained, and if any new discrepancies found during repair
NC	3.2.1.1.1.4.3-c	DEF STAT	Notify designated personnel and work centers of the update
NC	3.2.1.1.1.4.3-d	DEF STAT	Automatically slip ETICs for air raid warnings Red or Black
D	**3.2.1.1.1.4.3-e**	**DEF STAT**	**Adjust tail number sequences based on slipped ETICs**
C	**3.2.1.1.1.4.3-f**	**DEF STAT**	**Monitor and warn of Higher Headquarters LIMFACS**
			Monitor and warn of hangar queen status or Higher Headquarters LIMFACs
NC	3.2.1.1.1.5	DEF STAT	Information Aid
NC	3.2.1.1.1.6	DEF STAT	Determine Status for Off-Equipment Maintenance
NC	3.2.1.1.1.6.1	DEF STAT	Determine Status for Reparable Assets
NC	3.2.1.1.1.6.1-a	DEF STAT	Summarize and display maintenance deficiencies
NC	3.2.1.1.1.6.1-b	DEF STAT	Generate list of tasks to be performed on an asset
NC	3.2.1.1.1.6.1-c	DEF STAT	Record tasks for each asset when the list has been approved
NC	3.2.1.1.1.6.1-d	DEF STAT	Transmit list of tasks to appropriate work center
D	**3.2.1.1.1.6.1-e**	**DEF STAT**	**Provide MFLs data to ILMFs/ILMSs, either directly, through local or remote network interfaces, or via other systems (e.g.,CAMS)**
NC	3.2.1.1.1.6.2	DEF STAT	Define Status of Assets in Maintenance or Inspection
C	**3.2.1.1.1.6.2-a**	**DEF STAT**	**Support planning for major inspection or maintenance of equipment**
			Support planning for a major inspection or maintenance of aircraft, engines, and FLSE input into I-level
NC	3.2.1.1.1.6.2-b	DEF STAT	Integrate relevant information contained in or accessible through IMIS

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ACT	PARAGRAPH	MODE	REQUIREMENT
C	**3.2.1.1.1.6.2-c**	**DEF STAT**	**Overlay other maintenance requirements on this network and assist maintenance managers in evaluating impact**
			Overlay other maintenance requirements on this network and assist dock chief in evaluating impact
NC	3.2.1.1.1.6.2-d	DEF STAT	Maintain constraints imposed by any inspection requirement
C	**3.2.1.1.1.6.2-e**	**DEF STAT**	**Allow "what if" scenarios to evaluate maintenance scheduling**
			Allow "what if" scenarios to evaluate I-level shop scheduling
D	**3.2.1.1.1.6.2-f**	**DEF STAT**	**Interface with CEMS to acquire pertinent TCTOs, Time Change, and serial number data**
NC	3.2.1.1.1.7	DEF STAT	Maintenance Data Collection
NC	3.2.1.1.1.7.1	DEF STAT	Collect Data
NC	3.2.1.1.1.7.1-a	DEF STAT	Interactively and automatically record data from maintenance actions
NC	3.2.1.1.1.7.1-b	DEF STAT	Automatically attach standard narratives at the job site
NC	3.2.1.1.1.7.1-c	DEF STAT	Facilitate manual entry of narrative information
NC	3.2.1.1.1.7.1-d	DEF STAT	Obtain information such as name and AFSC from login and personnel data files
NC	3.2.1.1.1.7.1-e	DEF STAT	Prompt technician for additional information which cannot be determined automatically
C	**3.2.1.1.1.7.1-f**	**DEF STAT**	**Allow technician input to multiple choice items to facilitate accurate entries with last option being fill-in choice**
			Restrict technician input to multiple choice items to facilitate accurate entries
NC	3.2.1.1.1.7.2	DEF STAT	Validate Data
NC	3.2.1.1.1.7.2-a	DEF STAT	Check validity of data entered by technician
NC	3.2.1.1.1.7.2-b	DEF STAT	Automatically perform syntax and semantic checks on the data to maximize accuracy of the collected data
C	**3.2.1.1.1.7.2-c**	**DEF STAT**	**Reject and display incorrect data entries with list suggested corrections.**
			Reject and display incorrect data entries
NC	3.2.1.1.1.7.3	DEF STAT	Distribute Data
NC	3.2.1.1.1.7.3-a	DEF STAT	Compile maintenance data
NC	3.2.1.1.1.7.3-b	DEF STAT	Transmit maintenance data to work centers and MDBs
***	**********	**********	**********
*			
C	**3.2.1.1.2.1**	**ALLO RES**	**Collect Squadron Status**
			Collect Wing Status
C	**3.2.1.1.2.1.1**	**ALLO RES**	**Collect Equipment Status**
			Collect Aircraft Status

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ACT	PARAGRAPH	MODE	REQUIREMENT
C	3.2.1.1.2.1.1-a	ALLO RES	**Accept information on equipment** *Accept information on assigned aircraft*
C	3.2.1.1.2.1.1-b	ALLO RES	**Accept information on temporarily assigned equipment** *Accept information on temporary transient aircraft*
C	3.2.1.1.2.1.1-c	ALLO RES	**Forward information concerning maintenance actions taken on temporarily assigned equipment:** *Forward information concerning maintenance actions taken at a base on transient aircraft:*
NC	3.2.1.1.2.1.1-c.1	ALLO RES	Electronically
C	3.2.1.1.2.1.1-c.2	ALLO RES	**By printing information** *By printing information to be given to the aircrew*
C	3.2.1.1.2.1.1-d	ALLO RES	**Collect and determine an overall condition code for each piece of equipment** *Collect and determine an overall condition code for each aircraft*
C	3.2.1.1.2.1.1-e	ALLO RES	**Collect ETIC for each piece of equipment** *Collect ETIC for each aircraft*
NC	3.2.1.1.2.1.1-f	ALLO RES	Review status and severity of each open work order each time the status of a work order changes
C	3.2.1.1.2.1.1-g	ALLO RES	**Monitor each assigned equipment van's location** *Monitor each assigned aircraft's location*
C	3.2.1.1.2.1.1-h	ALLO RES	**Monitor current status of each piece of equipment** *Monitor current status of each assigned aircraft's configuration*
D	3.2.1.1.2.1.1-i	ALLO RES	**Monitor status of ICTs and generation/load outs**
D	3.2.1.1.2.1.1-j	ALLO RES	**Maintain status within special loading operations**
C	3.2.1.1.2.1.1-k	ALLO RES	**Review all TCTO, time change, and calendar and special inspection requirements due against the equipment** *Review all TCTO, time change, and calendar and special inspection requirements due against the aircraft*
NC	3.2.1.1.2.2	ALLO RES	Analyze Maintenance Needs
NC	3.2.1.1.2.2.1	ALLO RES	Perform Discrepancy Analysis
C	3.2.1.1.2.2.1-a	ALLO RES	**Establish maintenance profile for each piece of equipment** *Establish maintenance profile for each aircraft*
NC	3.2.1.1.2.2.1-b	ALLO RES	For each discrepancy, perform an analysis to determine the following:
NC	3.2.1.1.2.2.1-b.1	ALLO RES	Optimal time to repair discrepancy
NC	3.2.1.1.2.2.1-b.2	ALLO RES	AFSC required for repair
NC	3.2.1.1.2.2.1-b.3	ALLO RES	Number of technicians needed
NC	3.2.1.1.2.2.1-b.4	ALLO RES	Type of repair equipment required

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.2.2.1-b.5	ALLO RES	Facilities required
NC	3.2.1.1.2.2.1-b.6	ALLO RES	Parts availability
NC	3.2.1.1.2.2.2	ALLO RES	Collect parts status from SBSS of critical items on back order
NC	3.2.1.1.2.2.3	ALLO RES	Collect Specialist Status
NC	3.2.1.1.2.2.3-a	ALLO RES	Monitor availability of specialists by AFSC
NC	3.2.1.1.2.2.3-b	ALLO RES	Show dispatched and dispersed personnel at their current locations
NC	3.2.1.1.2.2.3-c	ALLO RES	Access training records to ensure that the selected specialists are qualified
NC	3.2.1.1.2.2.4	ALLO RES	Collect Equipment Status
C	**3.2.1.1.2.2.4-a**	**ALLO RES**	**Maintain status of support equipment and vehicles** *Maintain status of FLSE*
C	**3.2.1.1.2.2.4-b**	**ALLO RES**	**Include critical level and status of maintenance actions delayed because of support equipment in summary status** *Include critical level and status of maintenance actions delayed because of FLSE in summary status*
C	**3.2.1.1.2.2.4-c**	**ALLO RES**	**When certain support equipment/vehicle/parts falls below specified threshold availability criteria:** *When certain FLSE falls below specified threshold availability criteria:*
NC	3.2.1.1.2.2.4-c.1	ALLO RES	Flash warning on appropriate status screens
NC	3.2.1.1.2.2.4-c.2	ALLO RES	Monitor that equipment by specific location
C	**3.2.1.1.2.2.4-c.3**	**ALLO RES**	**Notify appropriate Managers of status** *Notify appropriate Production Managers of status*
NC	3.2.1.1.2.2.5	ALLO RES	Collect Facility Status
NC	3.2.1.1.2.2.5-a	ALLO RES	Accept manual entries to monitor status of all facilities
NC	3.2.1.1.2.2.5-b	ALLO RES	Monitor permanent and temporary facility limitations
NC	3.2.1.1.2.2.5-c	ALLO RES	Include the following information in the status:
NC	3.2.1.1.2.2.5-c.1	ALLO RES	Resources presently at the facility
NC	3.2.1.1.2.2.5-c.2	ALLO RES	Estimate of the facility's availability
NC	3.2.1.1.2.2.6	ALLO RES	Collect Off-Equipment Asset Status
NC	3.2.1.1.2.2.6-a	ALLO RES	Collect and display information on the status of:
NC	3.2.1.1.2.2.6-a.1	ALLO RES	Assets in Awaiting Parts (AWP)
NC	3.2.1.1.2.2.6-a.2	ALLO RES	Assets in Awaiting Maintenance (AWM)
NC	3.2.1.1.2.2.6-b	ALLO RES	Summarize data for a set of similar assets
NC	3.2.1.1.2.2.6-c	ALLO RES	Display the current status of assigned shop specialists and equipment
NC	3.2.1.1.2.2.6-d	ALLO RES	Develop schedule recommendations for assets in AWM
NC	3.2.1.1.2.2.6-e	ALLO RES	Monitor NRTS code reporting

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ACT	PARAGRAPH	MODE	REQUIREMENT
C	**3.2.1.1.2.2.6-f**	**ALLO RES**	**Monitor status of parts availability necessary for support and test equipment** ***Monitor status of parts availability necessary for NRTS equipment.***
NC	3.2.1.1.2.2.6-g	ALLO RES	Monitor PMEL requirements
NC	3.2.1.1.2.2.6-h	ALLO RES	Alert users when PMEL equipment is due for calibration or inspection
NC	3.2.1.1.2.2.6-i	ALLO RES	Track all parts that have been cannibalized to support in-shop repairs
NC	3.2.1.1.2.3	ALLO RES	Build Maintenance Plans and Schedules
NC	3.2.1.1.2.3.1	ALLO RES	Develop Yearly Flying Schedule
NC	3.2.1.1.2.3.1-a	ALLO RES	To evaluate yearly flying resources:
NC	3.2.1.1.2.3.1-a.1	ALLO RES	Analyze yearly flying requirements for impact on personnel, equipment, and facilities
NC	3.2.1.1.2.3.1-a.2	ALLO RES	Report resource adjustments necessary to support yearly flying requirements
NC	3.2.1.1.2.3.1-b	ALLO RES	Allocate yearly flying hours by month and quarter
NC	3.2.1.1.2.3.1-c	ALLO RES	Support "what if" scenarios to assess impact on flying schedules
C	**3.2.1.1.2.3.2**	**ALLO RES**	**Develop Maintenance Schedules and Plans** ***Develop Rotating Schedule***
C	**3.2.1.1.2.3.2-a**	**ALLO RES**	**In generating the maintenance schedule, perform the following functions:** ***In generating the rotating schedule, perform the following functions:***
NC	3.2.1.1.2.3.2-a.1	ALLO RES	Draft maintenance plans and schedules
C	**3.2.1.1.2.3.2-a.2**	**ALLO RES**	**Present draft maintenance plans and schedules to managers for modification and approval** ***Present draft maintenance plans and schedules to production managers for modification and approval***
NC	3.2.1.1.2.3.2-a.3	ALLO RES	Store and update the following as far in advance as possible:
NC	3.2.1.1.2.3.2-a.3.a)	ALLO RES	Scheduled maintenance requirements
NC	3.2.1.1.2.3.2-a.3.b)	ALLO RES	TCTOs
NC	3.2.1.1.2.3.2-a.3.c)	ALLO RES	Time changes
NC	3.2.1.1.2.3.2-a.3.d)	ALLO RES	Modification schedules

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ACT	PARAGRAPH	MODE	REQUIREMENT
C	**3.2.1.1.2.3.2-a.3.e)**	**ALLO RES**	**Exercise/TDY commitments** ***Alert commitments***
D	**3.2.1.1.2.3.2-a.4**	**ALLO RES**	**Schedule flying requirements by tail number one month ahead**
C	**3.2.1.1.2.3.2-a.5**	**ALLO RES**	**Schedule PDM by equipment I.D. number** ***Schedule PDM and major phases by tail number***
NC	3.2.1.1.2.3.2-a.6	ALLO RES	Provide baseline scheduling template
NC	3.2.1.1.2.3.2-a.7	ALLO RES	Generate step-by-step actions to take the user through the schedule generation process
NC	3.2.1.1.2.3.2-a.8	ALLO RES	Reduce complexities of prioritizing and scheduling by applying AI and linear programming techniques
C	**3.2.1.1.2.3.2-a.9**	**ALLO RES**	**Exercise "what-if" scenarios to support development of maintenance schedule and exercise/TDY commitments** ***Exercise "what-if" scenarios to support development of the flying and maintenance schedule***
NC	3.2.1.1.2.3.2-b	ALLO RES	To obtain operational flying and mission requirements:
NC	3.2.1.1.2.3.2-b.1	ALLO RES	Access Operations systems
NC	3.2.1.1.2.3.2-b.2	ALLO RES	Accept manual entry of operational flying requirements
C	**3.2.1.1.2.3.3**	**ALLO RES**	**Support Contingency Schedule** ***Support Contingency Flying Schedule***
NC	3.2.1.1.2.3.3-a	ALLO RES	Evaluate FRAG by performing the following functions:
NC	3.2.1.1.2.3.3-a.1	ALLO RES	Interface with the Operations system that lists these requirements
C	**3.2.1.1.2.3.3-a.2**	**ALLO RES**	**Compare them with current equipment status** ***Compare them with current aircraft status***
D	**3.2.1.1.2.3.3-a.3**	**ALLO RES**	**Recommend a reasonable number of sorties**
NC	3.2.1.1.2.3.3-b	ALLO RES	Disseminate changes to priorities and configurations to the appropriate maintenance personnel
NC	3.2.1.1.2.3.4	ALLO RES	Update Schedules and Establish Maintenance Priorities
C	**3.2.1.1.2.3.4-a**	**ALLO RES**	**Integrate new status information into the maintenance schedules** ***Integrate new status information into the rotating flying and maintenance schedules***
D	**3.2.1.1.2.3.4-b**	**ALLO RES**	**Incorporate tail number, configuration, and takeoff time changes into the weekly and monthly schedules**
NC	3.2.1.1.2.3.4-c	ALLO RES	Obtain approval of updates

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.2.3.4-d	ALLO RES	Distribute approved schedule updates to appropriate maintenance personnel
C	3.2.1.1.2.3.4-e	ALLO RES	**Sequence maintenance tasks to optimize equipment availability**
			Sequence maintenance tasks to optimize aircraft availability
C	3.2.1.1.2.4	ALLO RES	**Represent Squadron Status**
			Represent Wing Status
NC	3.2.1.1.2.4.1	ALLO RES	Report Status
C	3.2.1.1.2.4.1-a	ALLO RES	**To support the compilation of a single squadron maintenance profile**
			To support the compilation of a single asset/fleet maintenance profile:
C	3.2.1.1.2.4.1-a.1	ALLO RES	**Present squadron maintenance profile to:**
			Present asset/wing maintenance profile to:
C	3.2.1.1.2.4.1-a.1.a)	ALLO RES	**Squadron Commander**
			Wing Commander
C	3.2.1.1.2.4.1-a.1.b)	ALLO RES	**Chief of Maintenance**
			Logistics Group Commander
C	3.2.1.1.2.4.1-a.1.c)	ALLO RES	**Operations Officer**
			Operations Group Commander
C	3.2.1.1.2.4.1-a.1.d)	ALLO RES	**Work Center Supervisor**
			Production Managers
A	3.2.1.1.2.3.1-a.1.e)	ALLO RES	**Mobility Officer**
NC	3.2.1.1.2.4.1-a.2	ALLO RES	Update profiles at the beginning of each shift or upon request
NC	3.2.1.1.2.4.1-a.3	ALLO RES	Annotate differences between last and current profiles
NC	3.2.1.1.2.4.1-b	ALLO RES	To support the preparation of status briefings:
NC	3.2.1.1.2.4.1-b.1	ALLO RES	Provide various predeveloped layout templates to accommodate standard briefings
NC	3.2.1.1.2.4.1-b.2	ALLO RES	Support establishment of custom layouts for briefing materials
NC	3.2.1.1.2.4.1-b.3	ALLO RES	Insert required briefing data into specified layout
NC	3.2.1.1.2.4.1-b.4	ALLO RES	Provide packages of briefing materials that can be generated for a given periodic meeting
NC	3.2.1.1.2.4.1-b.5	ALLO RES	Present these materials in the following formats:
NC	3.2.1.1.2.4.1-b.5.a	ALLO RES	Hardcopy (paper or viewgraph)
NC	3.2.1.1.2.4.1-b.5.b	ALLO RES	On-line via an interface to a large display screen or projector device
NC	3.2.1.1.2.4.1-b.6	ALLO RES	Provide automatic computation on summary templates

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ACT	PARAGRAPH	MODE	REQUIREMENT
C	**3.2.1.1.2.4.1-c**	**ALLO RES**	**To support maintenance manager queries for information:** *To support production manager queries for information:*
C	**3.2.1.1.2.4.1-c.1**	**ALLO RES**	**Provide the following status information to maintenance managers upon request:** *Provide the following status information to production managers upon request:*
A	**3.2.1.1.2.4.1-c.1a1)**	**ALLO RES**	**Equipment Transfers**
C	**3.2.1.1.2.4.1-c.1.a)**	**ALLO RES**	**In-progress maintenance by equipment type** *In-progress maintenance by aircraft tail number/asset serial number*
C	**3.2.1.1.2.4.1-c.1.b)**	**ALLO RES**	**Personnel assigned to each work center** *Personnel assigned to each aircraft*
NC	3.2.1.1.2.4.1-c.1.c)	ALLO RES	Personnel assigned to each asset
C	**3.2.1.1.2.4.1-c.1.d)**	**ALLO RES**	**Equipment assigned to each work center** *Equipment assigned to each aircraft*
NC	3.2.1.1.2.4.1-c.1.e)	ALLO RES	Equipment assigned to each asset
C	**3.2.1.1.2.4.1-c.1.f)**	**ALLO RES**	**Parts status to support equipment specific assets** *Parts status to support aircraft/specific assets*
C	**3.2.1.1.2.4.1-c.1.g)**	**ALLO RES**	**Total primary mission equipment authorized** *Total aircraft authorized (fighter squadron/wing)*
C	**3.2.1.1.2.4.1-c.1.h)**	**ALLO RES**	**Total primary mission equipment assigned** *Total aircraft assigned (fighter squadron/wing)*
C	**3.2.1.1.2.4.1-c.1.i)**	**ALLO RES**	**Total primary mission equipment possessed** *Total aircraft possessed (fighter squadron/wing)*
C	**3.2.1.1.2.4.1-c.1.j)**	**ALLO RES**	**Total squadron primary mission equipment summary status** *Total fighter squadron/wing aircraft summary status:*
C	**3.2.1.1.2.4.1-c.1.j)1)**	**ALLO RES**	**Primary mission equipment transfer** *Aircraft Transfer*
NC	3.2.1.1.2.4.1-c.1.j)2)	ALLO RES	Depot
NC	3.2.1.1.2.4.1-c.1.j)3)	ALLO RES	Major Maintenance Awaiting AFMC Decision
NC	3.2.1.1.2.4.1-c.1.j)4)	ALLO RES	On-Loan

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.2.4.1-c.1.j)5)	ALLO RES	Mission Capable (MC)
NC	3.2.1.1.2.4.1-c.1.j)6)	ALLO RES	Fully Mission Capable (FMC)
NC	3.2.1.1.2.4.1-c.1.j)7)	ALLO RES	Total Not Mission Capable Maintenance (TNMCM)
NC	3.2.1.1.2.4.1-c.1.j)8)	ALLO RES	Total Not Mission Capable Supply (TNMCS)
NC	3.2.1.1.2.4.1-c.1.j)9)	ALLO RES	Total Not Mission Capable Both (TNMCB)
NC	3.2.1.1.2.4.1-c.1.j)10)	ALLO RES	Total Partially Mission Capable Maintenance (TPMCM)
NC	3.2.1.1.2.4.1-c.1.j)11)	ALLO RES	Total Partially Mission Capable Supply (TPMCS)
NC	3.2.1.1.2.4.1-c.1.j)12)	ALLO RES	Total Partially Mission Capable Both (TPMCB)
NC	3.2.1.1.2.4.1-c.2	ALLO RES	Provide status of parts on backorder
NC	3.2.1.1.2.4.1-c.3	ALLO RES	Allow managers to search through the data available for more details
NC	3.2.1.1.2.4.2	ALLO RES	Report Effectiveness Information
D	**3.2.1.1.2.4.2-a**	**ALLO RES**	**Display products from BLMAS including the following:**
D	**3.2.1.1.2.4.2-a.1**	**ALLO RES**	**Sorties analysis**
D	**3.2.1.1.2.4.2-a.2**	**ALLO RES**	**Hours operated analysis**
NC	3.2.1.1.2.4.2-a.3	ALLO RES	Maintenance effectiveness analysis
NC	3.2.1.1.2.4.2-a.4	ALLO RES	Planning and scheduling effectiveness
NC	3.2.1.1.2.4.2-a.5	ALLO RES	Logistics losses analysis
NC	3.2.1.1.2.4.2-a.6	ALLO RES	Break rate
D	**3.2.1.1.2.4.2-a.7**	**ALLO RES**	**Abort rate**
NC	3.2.1.1.2.4.2-a.8	ALLO RES	Cannibalization rate
NC	3.2.1.1.2.4.2-a.9	ALLO RES	Fix rate (6, 8, and 12 hours)
D	**3.2.1.1.2.4.2-a.10**	**ALLO RES**	**Foreign object damage (FOD) rate**
NC	3.2.1.1.2.4.2-a.11	ALLO RES	AWM rate
NC	3.2.1.1.2.4.2-a.12	ALLO RES	AWP rate
NC	3.2.1.1.2.4.2-a.13	ALLO RES	Average repair day analysis
D	**3.2.1.1.2.4.2-b**	**ALLO RES**	**Adapt BLMAS products for presentation to maintenance managers**

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NC	3.2.1.1.2.4.2-c	ALLO RES	Allow maintenance managers to set up thresholds on given criteria and indicators
NC	3.2.1.1.2.4.2-d	ALLO RES	Alert maintenance manager if a given threshold is reached or exceeded
NC	3.2.1.1.2.4.3	ALLO RES	Enhance Communications
C	**3.2.1.1.2.4.3-a**	**ALLO RES**	**Allow Work Center to monitor personnel dispatched to assigned jobs**
			Allow flight line expediters to track all personnel dispatched to assigned weapons systems
C	**3.2.1.1.2.4.3-b**	**ALLO RES**	**Allow Job Control to monitor job start and completion**
			Allow flight line expediters to coordinate job start and completion
C	**3.2.1.1.2.4.3-c**	**ALLO RES**	**Allow coordination with other work center managers and Job Control to update work status in the Job Control**
			Allow coordination with other unit managers and the MOC to update work status in the MOC
NC	3.2.1.1.2.4.3-d	ALLO RES	In a contingency or emergency situation:
C	**3.2.1.1.2.4.3-d1**	**ALLO RES**	**Display ARM/Ground Attack/Air Attack/NBC alert information**
			Display aircraft generation presentations, EWO, general war plans, strike, mass loads, and other special missions data
C	**3.2.1.1.2.4.3-d.2**	**ALLO RES**	**Notify all units of the states and stages of alert using buzzers and flashing screens**
C	**3.2.1.1.2.4.3-d.3**	**ALLO RES**	**Display appropriate response action checklists**
NC	3.2.1.1.2.4.3-d.4	ALLO RES	Display mobility requirements, to include mobility personnel and S/TE required to meet contingency commitments
D	**3.2.1.1.2.4.3-d.5**	**ALLO RES**	**Display missile generation order, monitor aircraft status, and revise the preselected sequence as changes occur, by flying squadron**
D	**3.2.1.1.2.4.3-d.6**	**ALLO RES**	**Display Individual Mobilization Augmentation (IMA) authorization to support wartime manpower requirements**
D	**3.2.1.1.2.4.3-d.7**	**ALLO RES**	**Display status of Alert Force Aircraft**
NC	3.2.1.1.2.4.3-e	ALLO RES	In providing job turnover status logs, perform the following functions:
C	**3.2.1.1.2.4.3-e.1**	**ALLO RES**	**Maintain equipment and shop turnover logs for communicating detailed status to assigned technicians**
			Maintain tail number and shop turnover logs for communicating detailed status to assigned technicians
NC	3.2.1.1.2.4.3-e.2	ALLO RES	Restrict access to these logs to ensure that accurate information is recorded

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.2.4.3-e.3	ALLO RES	Maintain message data collected during shifts
NC	3.2.1.1.2.5	ALLO RES	Assign Resources
NC	3.2.1.1.2.5.1	ALLO RES	Assign Specialist
C	**3.2.1.1.2.5.1-a**	**ALLO RES**	**Recommend assignment of the most qualified specialists to a job** *Recommend assignment of the most qualified specialist to a job*
NC	3.2.1.1.2.5.1-b	ALLO RES	Obtain qualifications of available maintenance personnel from the appropriate external data base
C	**3.2.1.1.2.5.1-c**	**ALLO RES**	**Allow recommended specialists assignments to be approved** *Allow recommended specialist assignment to be approved*
NC	3.2.1.1.2.5.1-d	ALLO RES	Allow alternate specialist to be assigned
C	**3.2.1.1.2.5.1-e**	**ALLO RES**	**Convey that decision to the appropriate technician in the form of a work order to the affected work center** *Convey that decision to the appropriate production manager/technician in the form of a work order to the affected work center.*
NC	3.2.1.1.2.5.1-f	ALLO RES	Ensure that all necessary resources are available and approved for dispatch before dispatching those resources
NC	3.2.1.1.2.5.2	ALLO RES	Assign Equipment
NC	3.2.1.1.2.5.2-a	ALLO RES	Compare equipment availability against all known requirements
NC	3.2.1.1.2.5.2-b	ALLO RES	Recommend assignment based on current mission priorities
NC	3.2.1.1.2.5.2-c	ALLO RES	Allow maintenance technicians or managers to approve recommendations
NC	3.2.1.1.2.5.2-d	ALLO RES	Allow maintenance technicians or managers to make alternate selections
NC	3.2.1.1.2.5.3	ALLO RES	Assign Facilities
C	**3.2.1.1.2.5.3-a**	**ALLO RES**	**Recommend the assignment of appropriate facilities** *Recommend the assignment of appropriate facilities or parking locations*
NC	3.2.1.1.2.5.3-b	ALLO RES	Allow maintenance managers to approve recommendations
NC	3.2.1.1.2.5.3-c	ALLO RES	Allow maintenance managers to direct alternate facility choices
NC	3.2.1.1.2.5.3-d	ALLO RES	Display types of S/TE and personnel assigned to the facility
NC	3.2.1.1.2.5.4	ALLO RES	Cannibalization
NC	3.2.1.1.2.5.4-a	ALLO RES	Compare the following information to determine cannibalization recommendation:
NC	3.2.1.1.2.5.4-a.1	ALLO RES	ETICs
NC	3.2.1.1.2.5.4-a.2	ALLO RES	Priorities

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.2.5.4-a.3	ALLO RES	Mission requirements
NC	3.2.1.1.2.5.4-b	ALLO RES	Recommend identification and location of parts to be cannibalized
NC	3.2.1.1.2.5.4-c	ALLO RES	Collect and control all data required to document cannibalizations, including:
NC	3.2.1.1.2.5.4-c.1	ALLO RES	Generation and issue of cannibalization numbers
NC	3.2.1.1.2.5.4-c.2	ALLO RES	Routing of cannibalization requests for proper approval and verification
NC	3.2.1.1.2.5.4-c.3	ALLO RES	Due-In From Maintenance (DIFM) document number of the awaiting part (AWP) end item and the due-out document numbers of the associated bits and pieces
NC	3.2.1.1.2.5.4-d	ALLO RES	Ensure the TCTO and time change records are updated
NC	3.2.1.1.2.5.4-e	ALLO RES	Ensure that configurations are updated to reflect moved parts
C	**3.2.1.1.2.5.4-f**	**ALLO RES**	**Monitor list of parts removed from all cannibalized equipment**
			Monitor list of parts removed from all cannibalized aircraft
C	**3.2.1.1.2.5.4-g**	**ALLO RES**	**Ensure that parts recommended for cannibalization are properly configured for the new equipment**
			Ensure that parts recommended for cannibalization are properly configured for the new aircraft
NC	3.2.1.1.2.5.5	ALLO RES	Deleted
NC	3.2.1.1.2.5.5-a	ALLO RES	Deleted
NC	3.2.1.1.2.5.5-b	ALLO RES	Deleted
***	**********	**********	**********
*			****
C	**3.2.1.1.3.1**	**PER MAINT**	**Troubleshoot Equipment**
			Troubleshoot Aircraft
NC	3.2.1.1.3.1.1	PER MAINT	Provide maintenance personnel access to all previously collected information relating to the discrepancy
NC	3.2.1.1.3.1.2	PER MAINT	Obtain Troubleshooting Equipment
NC	3.2.1.1.3.1.2-a	PER MAINT	Provide availability and location information of Support and Test Equipment
NC	3.2.1.1.3.1.2-b	PER MAINT	Request such equipment for the job
NC	3.2.1.1.3.1.3	PER MAINT	Duplicate and Diagnose the Discrepancy
NC	3.2.1.1.3.1.3-a	PER MAINT	Fault Isolation
NC	3.2.1.1.3.1.3-a.1	PER MAINT	Analyze collected information for fault isolation
NC	3.2.1.1.3.1.3-a.2	PER MAINT	Provide results of analysis to technician

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.3.1.3-a.3	PER MAINT	If insufficient data exists to isolate to a fault:
NC	3.2.1.1.3.1.3-a.3.a	PER MAINT	Request special assistance
NC	3.2.1.1.3.1.3-a.3.b	PER MAINT	Document any requirement for changes to existing data or additional data to accomplish the job
C	**3.2.1.1.3.1.3-a.4**	**PER MAINT**	**Restrict troubleshooting to mission-critical components when so instructed by the Chief of Maintenance or Superintendent** *Restrict troubleshooting to mission-critical components when so instructed by the production manager*
NC	3.2.1.1.3.1.3-a.5	PER MAINT	Consider implementation of:
NC	3.2.1.1.3.1.3-a.5.a	PER MAINT	Rule-based expert system for failure data analysis
NC	3.2.1.1.3.1.3-a.5.b	PER MAINT	Model-based expert system for failure data analysis
NC	3.2.1.1.3.1.3-a.5.c	PER MAINT	Pattern recognition techniques or an equivalent implementation to accommodate multiple symptoms
C	**3.2.1.1.3.1.3-a.6**	**PER MAINT**	**Integrate fault isolation implementation with in- shop tests** *Integrate fault isolation implementation with the I-level tests and debriefing*
NC	3.2.1.1.3.1.3-a.7	PER MAINT	Take into account the following information to determine the recommended test sequence:
NC	3.2.1.1.3.1.3-a.7.a	PER MAINT	Time required to perform given tests on the weapon system/asset
NC	3.2.1.1.3.1.3-a.7.b	PER MAINT	Estimate of access and maintenance times for given faults
C	**3.2.1.1.3.1.3-a.7.c**	**PER MAINT**	**Availability of parts on base/on site/or available from support base** *Availability of parts on base*
NC	3.2.1.1.3.1.3-a.7.d	PER MAINT	MTBF
NC	3.2.1.1.3.1.3-a.7.e	PER MAINT	Probable cause of failure (PCOF) of components
NC	3.2.1.1.3.1.3-a.8	PER MAINT	Supply reasoning for indicated recommendations upon request
NC	3.2.1.1.3.1.3-a.9	PER MAINT	Consider the following capabilities in the IMIS diagnostic tool:
NC	3.2.1.1.3.1.3-a.9.a	PER MAINT	On-line learning
NC	3.2.1.1.3.1.3-a.9.b	PER MAINT	Nonlinear pattern matching

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.3.1.3-a.9.c	PER MAINT	*Programmable hypothesis testing look-up table*
NC	3.2.1.1.3.1.3-a.9.d	PER MAINT	Nearest-neighbor response
NC	3.2.1.1.3.1.3-b	PER MAINT	Upon request, present the following information to support the *on-going maintenance action:*
NC	3.2.1.1.3.1.3-b.1	PER MAINT	Theory of operations data
NC	3.2.1.1.3.1.3-b.2	PER MAINT	Available weapon system/asset schematics, wiring diagrams, and design data
A	**3.2.1.1.3.1.3-b.2a)**	**PER MAINT**	**Highlight a specific wirepath or subsystem in a diagram**
NC	3.2.1.1.3.1.3-c	PER MAINT	To assist the technician in identifying the discrepancy:
NC	3.2.1.1.3.1.3-c.1	PER MAINT	Maintain and display a functional graphic presentation of weapon system/asset
NC	3.2.1.1.3.1.3-c.2	PER MAINT	Present components and test points involved in troubleshooting
NC	3.2.1.1.3.1.3-c.3	PER MAINT	Present associated weapon system/asset subsystems or components to help orient the user
NC	3.2.1.1.3.1.3-d	PER MAINT	Interpret test results to confirm failures or serviceability without removing modules from weapon system
C	**3.2.1.1.3.1.3-e**	**PER MAINT**	**Use troubleshooting data for in-shop repair of LRU** *Use troubleshooting data for I-level repair of LRU*
NC	3.2.1.1.3.1.3-e.1	PER MAINT	Troubleshoot to the Shop Replaceable Unit (SRU) level
C	**3.2.1.1.3.1.3-e.2**	**PER MAINT**	**Store this data for use in in-shop and D-level facilities to expedite the off-equipment repair** *Store this data for use at I-level or D-level facilities to expedite the off-equipment repair*
NC	3.2.1.1.3.1.3-e.3	PER MAINT	Support clear decomposition of test and diagnostic functions to module, rack, and system levels
NC	3.2.1.1.3.1.3-e.4	PER MAINT	Support feasible test and evaluation of LRMs
D	**3.2.1.1.3.1.3-f**	**PER MAINT**	***To support retrieval of* LRM/TSMD data, provide the following:**
D	**3.2.1.1.3.1.3-f.1**	**PER MAINT**	**Interface to retrieve TSMD data resident on LRMs for postflight evaluation and data base storage**
D	**3.2.1.1.3.1.3-f.2**	**PER MAINT**	**Diagnosis and fault isolation of software as well as hardware and interface problems**
NC	3.2.1.1.3.1.3-g	PER MAINT	If the S/TE includes built-in-test/self-test capability, perform the following:
NC	3.2.1.1.3.1.3-g.1	PER MAINT	Interrogate S/TE built-in-test/self-test to help users troubleshoot defective units

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.3.1.3-g.2	PER MAINT	Query S/TE to obtain current configuration and mission-capable status
NC	3.2.1.1.3.1.3-h	PER MAINT	Prognostic capabilities consist of the following:
NC	3.2.1.1.3.1.3-h.1	PER MAINT	Access and display available prognostic data
NC	3.2.1.1.3.1.3-h.2	PER MAINT	Perform related calculations to assist maintenance technicians
D	**3.2.1.1.3.1.3-h.3**	**PER MAINT**	**Predict probability of a future mission's success**
NC	3.2.1.1.3.1.3-h.4	PER MAINT	Identify components which could prevent a successful mission
NC	3.2.1.1.3.1.3-h.5	PER MAINT	Track life remaining of modules with predictable service lives
A		**PER MAINT**	**Provide capability for authorized personnel to take steps beyond the scope of normal tech data**
C	**3.2.1.1.3.1.4**	**PER MAINT**	**Equipment Battle Damage Assessment and Repair** *Aircraft Battle Damage Assessment and Repair*
C	**3.2.1.1.3.1.4-a**	**PER MAINT**	**Under manual or automatic input of diagnostics, perform the following functions:** *Under automatic download diagnostics, perform the following functions:*
C	**3.2.1.1.3.1.4-a.1**	**PER MAINT**	**Determine extent of equipment damage** *Determine extent of aircraft damage*
C	**3.2.1.1.3.1.4-a.2**	**PER MAINT**	**Determine degradation in mission capability due to equipment damage** *Determine degradation in mission capability due to aircraft damage*
NC	3.2.1.1.3.1.4-a.3	PER MAINT	Provide indication of the extent of repairs required
NC	3.2.1.1.3.1.4-a.4	PER MAINT	Include appropriate checks to determine the following:
NC	3.2.1.1.3.1.4-a.4.a	PER MAINT	Integrity or operability
NC	3.2.1.1.3.1.4-a.4.b	PER MAINT	System serviceability criteria
NC	3.2.1.1.3.1.4-a.4.c	PER MAINT	Data which allow accurate assessments of the time, procedures, and resources required for repair
NC	3.2.1.1.3.1.4-b	PER MAINT	Provide access on the following two levels:
NC	3.2.1.1.3.1.4-b.1	PER MAINT	System diagnostics, to determine damage to a specific system
C	**3.2.1.1.3.1.4-b.2**	**PER MAINT**	**Location diagnostics, to assess all the systems within a specific location on the equipment (specific van)** *Location diagnostics, to assess all the systems within a specific location on the aircraft*
NC	3.2.1.1.3.1.4-c	PER MAINT	In initial assessment, perform the following functions:

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.3.1.4-c.1	PER MAINT	Present functional test options to aid technician in quantifying extent of damage or mission degradation
NC	3.2.1.1.3.1.4-c.2	PER MAINT	Provide security information and instructions for classified components
C	**3.2.1.1.3.1.4-c.3**	**PER MAINT**	**Aid in collection of BDAR-type data for BDAR assessment** *Aid in collection of special ABDAR-type data used for ABDAR assessment*
NC	3.2.1.1.3.1.4-c.4	PER MAINT	Estimate reduction of performance capability of the weapon segment/system if the repair is not performed
NC	3.2.1.1.3.1.4-c.5	PER MAINT	Estimate reduction of performance capability at different levels of battle damage repair
C	**3.2.1.1.3.1.4-c.6**	**PER MAINT**	**Provide repair/mission options based on mission/equipment status assessments** *Provide repair/mission options based on mission/aircraft status assessments*
NC	3.2.1.1.3.1.4-c.7	PER MAINT	Determine and display material required to support the repair
C	**3.2.1.1.3.1.4-d**	**PER MAINT**	**Provide the following graphics capabilities in support of BDAR:** *Provide the following graphics capabilities in support of ABDAR:*
NC	3.2.1.1.3.1.4-d.1	PER MAINT	Display 2-D and 3-D graphics in a CALS format
NC	3.2.1.1.3.1.4-d.2	PER MAINT	Provide displays from a static, isometric orientation
D	**3.2.1.1.3.1.4-d.3**	**PER MAINT**	**Provide views of damaged area with aircraft skin removed**
NC	3.2.1.1.3.1.4-d.4	PER MAINT	Display with selected components removed
NC	3.2.1.1.3.1.4-d.5	PER MAINT	Identify classified equipment in display
NC	3.2.1.1.3.1.4-d.6	PER MAINT	Display all the wire bundles and hydraulic lines of a weapon system
NC	3.2.1.1.3.1.4-d.7	PER MAINT	For operator-selected wire bundles and hydraulic lines, display the following:
NC	3.2.1.1.3.1.4-d.7.a	PER MAINT	Source and destination
NC	3.2.1.1.3.1.4-d.7.b	PER MAINT	Related systems capability information
NC	3.2.1.1.3.1.4-d.7.c	PER MAINT	Associated TO data
NC	3.2.1.1.3.1.4-d.8	PER MAINT	Identify software resident in, or applicable to, damaged regions
NC	3.2.1.1.3.1.4-d.9	PER MAINT	Allow assessor to specify which graphics are needed
C	**3.2.1.1.3.1.4-e**	**PER MAINT**	**To support BDAR documentation:** *To support ABDAR documentation:*
NC	3.2.1.1.3.1.4-e.1	PER MAINT	Automatically document damaged area from initial assessment inputs

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NC	3.2.1.1.3.1.4-e.2	PER MAINT	Supply assessor with a data base of symbols to define the given battle damage assessment
NC	3.2.1.1.3.1.4-f	PER MAINT	Provide simulation capability to execute TO-provided models
C	**3.2.1.1.3.1.4-g**	**PER MAINT**	**Maintain a log of actions taken, progress, and results during troubleshooting and BDAR** *Maintain a log of actions taken, progress, and results during troubleshooting and ABDAR*
NC	3.2.1.1.3.1.5	PER MAINT	Record Diagnostic Results
NC	3.2.1.1.3.1.5-a	PER MAINT	Record data accumulated as a result of troubleshooting performed on weapon systems
NC	3.2.1.1.3.1.5-b	PER MAINT	Via the routing function in the ICM, transmit the data collected to:
NC	3.2.1.1.3.1.5-b.1	PER MAINT	Appropriate work centers
NC	3.2.1.1.3.1.5-b.2	PER MAINT	Appropriate MDBs
NC	3.2.1.1.3.1.5-c	PER MAINT	Retain data from troubleshooting, repair actions, and standard service
NC	3.2.1.1.3.2	PER MAINT	Order Parts
NC	3.2.1.1.3.2.1	PER MAINT	Process Unserviceable Items
C	**3.2.1.1.3.2.1-a**	**PER MAINT**	**Extract part identification from system history files** *Extract part identification from aircraft or system history files*
NC	3.2.1.1.3.2.1-b	PER MAINT	Extract discrepancy summary from work order data
NC	3.2.1.1.3.2.1-c	PER MAINT	Check failed part identification against a warranty data base to see if the item is still under warranty. Mark and handle warranted part documentation, as required
C	**3.2.1.1.3.2.1-d**	**PER MAINT**	**Prefill equipment ID, JCN, When Discovered Code, WUC, and performing work center** *Prefill aircraft ID, JCN, When Discovered Code, WUC, and performing work center*
NC	3.2.1.1.3.2.1-e	PER MAINT	Prompt the maintenance personnel for any information not available in data bases
NC	3.2.1.1.3.2.1-f	PER MAINT	Transmit a message to SBSS to establish or change the DIFM status
NC	3.2.1.1.3.2.2	PER MAINT	Process Part Requests
NC	3.2.1.1.3.2.2-a	PER MAINT	To provide the most current supply status information, perform the following:
NC	3.2.1.1.3.2.2-a.1	PER MAINT	Provide technicians with real-time access to supply information
NC	3.2.1.1.3.2.2-a.2	PER MAINT	Provide managers the capability for real-time monitoring of:
NC	3.2.1.1.3.2.2-a.2.a)	PER MAINT	Parts usage

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NC	3.2.1.1.3.2.2-a.2.b)	PER MAINT	Maintenance and supply transactions
NC	3.2.1.1.3.2.2-a.2.c)	PER MAINT	Part backorder status
NC	3.2.1.1.3.2.2-a.3	PER MAINT	Process inventory requests for parts availability
NC	3.2.1.1.3.2.2-a.4	PER MAINT	Check alternative sources to obtain parts availability information:
C	**3.2.1.1.3.2.2-a.4.a)**	**PER MAINT**	**Material Control Supply Point/Benchstock**
			AGS Parts Store
C	**3.2.1.1.3.2.2-a.4.b)**	**PER MAINT**	**Shop Stock**
			Shop Service Center
D	**3.2.1.1.3.2.2-a.4.c)**	**PER MAINT**	**Ready Supply Point**
D	**3.2.1.1.3.2.2-a.4.d)**	**PER MAINT**	**Fighter squadron Forward Supply Point**
NC	3.2.1.1.3.2.2-a.4.e)	PER MAINT	Local Manufacturers
C	**3.2.1.1.3.2.2-a.4.f)**	**PER MAINT**	**Readiness Spares Packages**
			War Readiness Spares Kits
D	**3.2.1.1.3.2.2-a.4.g)**	**PER MAINT**	**Temporary Mission Support Kits**
NC	3.2.1.1.3.2.2-a.4.h)	PER MAINT	Bench Stock
NC	3.2.1.1.3.2.2-a.4.i)	PER MAINT	Repair Cycle Asset Status
NC	3.2.1.1.3.2.2-a.4.j)	PER MAINT	Parts Holding Bin
D	**3.2.1.1.3.2.2-a.4.k)**	**PER MAINT**	**Tail Number Bin**
NC	3.2.1.1.3.2.2-a.4.l)	PER MAINT	Cannibalization
NC	3.2.1.1.3.2.2-b	PER MAINT	Order Part
NC	3.2.1.1.3.2.2-b.1	PER MAINT	Identify the required parts during maintenance using one of the following:
NC	3.2.1.1.3.2.2-b.1.a	PER MAINT	Quick Reference Listing (QRL):
NC	3.2.1.1.3.2.2-b.1.a)1)	PER MAINT	Part Number
NC	3.2.1.1.3.2.2-b.1.a)2)	PER MAINT	WUC

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NC	3.2.1.1.3.2.2-b.1.a)3)	PER MAINT	Nomenclature
A	**3.2.1.1.3.2.2-b.1.a)4)**	**PER MAINT**	**National Stock Number (NSN)**
NC	3.2.1.1.3.2.2-b.1.b	PER MAINT	Illustrated Parts Breakdown (IPB)
NC	3.2.1.1.3.2.2-b.1.c	PER MAINT	The results of fault isolation (last branch of a fault tree in TO data)
NC	3.2.1.1.3.2.2-b.2	PER MAINT	Display an illustration of the identified part to help the technician confirm the selection
C	**3.2.1.1.3.2.2-b.3**	**PER MAINT**	**Check configuration of system to ensure that the right part is ordered** *Check configuration of aircraft or system to ensure that the right part is ordered*
NC	3.2.1.1.3.2.2-b.4	PER MAINT	Identify bench stock/hardware required to perform maintenance task
NC	3.2.1.1.3.2.2-b.5	PER MAINT	Obtain part information from the defective part
NC	3.2.1.1.3.2.2-b.6	PER MAINT	Forward parts request to SBSS
C	**3.2.1.1.3.2.2-b.7**	**PER MAINT**	**Accept and present acknowledgment of receipt of the order including Fill/Kill query, sent by SBSS, to the technician** *Accept and present acknowledgement of receipt of the order, sent by SBSS, to the technician*
NC	3.2.1.1.3.2.2-b.8	PER MAINT	Replenish bench stock
NC	3.2.1.1.3.2.2-b.9	PER MAINT	Assign a valid delivery priority code, based upon a review of all of the maintenance requirements
NC	3.2.1.1.3.2.2-b.10	PER MAINT	Monitor operating/shop stock
NC	3.2.1.1.3.2.2-b.11	PER MAINT	Monitor Special Purpose Recoverables Authorized Maintenance (SPRAM) assets
NC	3.2.1.1.3.2.2-b.12	PER MAINT	Monitor TCTO part kits
NC	3.2.1.1.3.2.2-c	PER MAINT	Prior to issuing parts request, validate the order by performing the following:
NC	3.2.1.1.3.2.2-c.1	PER MAINT	Verify technician's authorization
NC	3.2.1.1.3.2.2-c.2	PER MAINT	Prompt technician for additional information required for approval
NC	3.2.1.1.3.2.2-c.3	PER MAINT	Automatically route information about technician, job, and parts to applicable supervisor
NC	3.2.1.1.3.2.2-c.4	PER MAINT	Inform maintenance technician whether or not an order has been denied

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.3.2.2-c.5	PER MAINT	Accept and display denial/reject messages from SBSS
NC	3.2.1.1.3.2.2-c.6	PER MAINT	Identify incomplete or incorrect areas of the order when rejected
NC	3.2.1.1.3.2.2-c.7	PER MAINT	Attempt to correct the incorrect order automatically
NC	3.2.1.1.3.2.2-c.8	PER MAINT	Assist in correcting incorrect part order when unable to correct automatically
NC	3.2.1.1.3.2.2-c.9	PER MAINT	If an identical part has already been ordered against a work order, display a message asking the user to review part data
NC	3.2.1.1.3.2.2-c.10	PER MAINT	Inform the technician when the part has been backordered
C	**3.2.1.1.3.2.2-c.11**	**PER MAINT**	**Accept part order validation by Work Center supervisor** *Accept part order validation by Production Managers*
NC	3.2.1.1.3.2.2-d	PER MAINT	Upon maintenance technician's request, display or transmit the following:
NC	3.2.1.1.3.2.2.d.1	PER MAINT	Due-out release messages from SBSS
NC	3.2.1.1.3.2.2.d.2	PER MAINT	Cancellation messages from SBSS
NC	3.2.1.1.3.2.2.d.3	PER MAINT	SBSS cannibalization action reports
NC	3.2.1.1.3.2.3	PER MAINT	Provide Back Order Status
NC	3.2.1.1.3.2.3-a	PER MAINT	*Provide technicians with real-time access to supply back order information*
NC	3.2.1.1.3.2.3-b	PER MAINT	Access status of back ordered parts for a weapon system
NC	3.2.1.1.3.2.3-c	PER MAINT	Accept or reject messages from SBSS for requests for back order status
NC	3.2.1.1.3.2.3-d	PER MAINT	Track all off-base requisitions
C	**3.2.1.1.3.2.3-e**	**PER MAINT**	**Accept backorder validation by Job Control** *Accept backorder validation by Production Managers*
NC	3.2.1.1.3.3	PER MAINT	Repair Asset
NC	3.2.1.1.3.3.1	PER MAINT	Perform Maintenance Action
NC	3.2.1.1.3.3.1-a	PER MAINT	To assist the technician in accomplishing corrective action, perform the following:
NC	3.2.1.1.3.3.1-a.1	PER MAINT	Select and display relevant maintenance instructions at the appropriate skill level
C	**3.2.1.1.3.3.1-a.2**	**PER MAINT**	**Provide work center supervisor with status updates and maintenance-identified discrepancies** *Provide production managers with status updates and maintenance-identified discrepancies*
NC	3.2.1.1.3.3.1-a.3	PER MAINT	Generate WCE for unserviceable item
C	**3.2.1.1.3.3.1-a.4**	**PER MAINT**	**Collect information to help identify items sent to in-shop** *Collect information to help identify items sent to I-level shop*

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NC	3.2.1.1.3.3.1-a.5	PER MAINT	Notify appropriate personnel of its availability for transport
NC	3.2.1.1.3.3.1-b	PER MAINT	Produce hardcopy of AFTO 350 to identify unserviceable item
D	**3.2.1.1.3.3.2**	**PER MAINT**	**Inspect Maintenance Work**
D	**3.2.1.1.3.3.2-a**	**PER MAINT**	**To allow an inspector to check work in progress and work completed, perform the following:**
D	**3.2.1.1.3.3.2-a.1**	**PER MAINT**	**Determine inspection type requirements**
D	**3.2.1.1.3.3.2-a.2**	**PER MAINT**	**Determine type of qualified personnel/equipment to support inspection of the maintenance task**
D	**3.2.1.1.3.3.2-a.3**	**PER MAINT**	**Transmit request for a designated person to inspect the work via a WCE**
D	**3.2.1.1.3.3.2-a.4**	**PER MAINT**	**Adapt inspection requirements for qualification of technician**
D	**3.2.1.1.3.3.2-a.5**	**PER MAINT**	**Allow technician to approve or disapprove IMIS-determined inspections**
D	**3.2.1.1.3.3.2-a.6**	**PER MAINT**	**Allow technician to select another inspection type if the IMIS-determined selection disapproved**
D	**3.2.1.1.3.3.2-a.7**	**PER MAINT**	**Present the appropriate instructions to be used by the technician during the inspection**
D	**3.2.1.1.3.3.2-a.8**	**PER MAINT**	**Include the capability to record additional discrepancies into the IMIS, to support updating status of the aircraft or asset**
D	**3.2.1.1.3.3.2-b**	**PER MAINT**	**In signing off an inspection, perform the following:**
D	**3.2.1.1.3.3.2-b.1**	**PER MAINT**	**Save results of inspection, including:**
D	**3.2.1.1.3.3.2-b.1.a**	**PER MAINT**	**Trace of every step in the instructions that was performed**
D	**3.2.1.1.3.3.2-b.1.b**	**PER MAINT**	**Time of start and completion**
D	**3.2.1.1.3.3.2-b.1.c**	**PER MAINT**	**Identification of technicians performing inspection**
D	**3.2.1.1.3.3.2-b.2**	**PER MAINT**	**Allow the inspector to review the results**
D	**3.2.1.1.3.3.2-b.3**	**PER MAINT**	**Allow inspector to sign off the inspection**
D	**3.2.1.1.3.3.2-b.4**	**PER MAINT**	**Verify sign-off authority of the inspector and prohibit unauthorized signoff**

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NC	3.2.1.1.3.3.3	PER MAINT	Record Repair Data accumulated upon completion of repair and maintenance actions
NC	3.2.1.1.3.4	PER MAINT	*Perform Standard Service*
NC	3.2.1.1.3.4.1	PER MAINT	Obtain Configuration Requirements
C	**3.2.1.1.3.4.1-a**	**PER MAINT**	**Compare current configuration of the equipment and configuration required for mission** *Compare current configuration of the aircraft and configuration required for next mission*
NC	3.2.1.1.3.4.1-b	PER MAINT	Obtain desired configuration requirements from daily maintenance plan
NC	3.2.1.1.3.4.1-c	PER MAINT	Request dispatch of appropriate resources
NC	3.2.1.1.3.4.1-d	PER MAINT	Present the required personnel (task-qualified) to perform the tasks
NC	3.2.1.1.3.4.2	PER MAINT	Generate Checklists
D	**3.2.1.1.3.4.3**	**PER MAINT**	**Upload Executable Instructions**
D	**3.2.1.1.3.4.3-a**	**PER MAINT**	**Upload executable instructions to aircraft systems**
D	**3.2.1.1.3.4.3-b**	**PER MAINT**	**Reprogram/reconfigure aircraft systems by performing data and software uploads**
D	**3.2.1.1.3.4.3-c**	**PER MAINT**	**Upload executable instructions pertaining to configuration of S/TE as applicable**
NC	3.2.1.1.3.4.4	PER MAINT	Support Exceptional Release
NC	3.2.1.1.3.4.4-a	PER MAINT	Present data collected for exceptional release
NC	3.2.1.1.3.4.4-b	PER MAINT	Authenticate exceptional release
D	**3.2.1.1.3.4.4-c**	**PER MAINT**	**Report aircraft status change to "crew ready" after exceptional release**
NC	3.2.1.1.3.5	PER MAINT	Provide Technical Orders
NC	3.2.1.1.3.5.1	PER MAINT	TO Assembly
NC	3.2.1.1.3.5.1-a	PER MAINT	Upon request, sequence and present applicable TOs
NC	3.2.1.1.3.5.1-b	PER MAINT	Accept CALS type B or C compatible data
NC	3.2.1.1.3.5.1-c	PER MAINT	Reformat data as necessary for IMIS presentation
NC	3.2.1.1.3.5.1-d	PER MAINT	Prepare and provide PMA memory or memory module loads of TO data subsets
NC	3.2.1.1.3.5.1-e	PER MAINT	Query the technician for additional inputs to complete insufficient data
NC	3.2.1.1.3.5.1-f	PER MAINT	Provide a means to augment initial TO selection from internal files or additional procedures

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.3.5.1-g	PER MAINT	Accept real-time updates of TOs in the MIW data base as they come from TODO
NC	3.2.1.1.3.5.1-h	PER MAINT	Manage currency of PMA data bases
NC	3.2.1.1.3.5.1-i	PER MAINT	Provide access to all TOs available in JCALS
NC	3.2.1.1.3.5.2	PER MAINT	Adaptation
NC	3.2.1.1.3.5.2-a	PER MAINT	*Within limits consistent with TO policies and procedures, adapt TO data to the following:*
NC	3.2.1.1.3.5.2-a.1	PER MAINT	*Individual technician skill level*
NC	3.2.1.1.3.5.2-a.2	PER MAINT	*Weapon system configuration*
NC	3.2.1.1.3.5.2-a.3	PER MAINT	*Discrepancy situation*
NC	3.2.1.1.3.5.2-b	PER MAINT	*Provide more detail than the minimum established upon request*
NC	3.2.1.1.3.5.2-c	PER MAINT	*Prevent inexperienced technicians from choosing displays with insufficient detail*
NC	3.2.1.1.3.5.3	PER MAINT	Presentation
NC	3.2.1.1.3.5.3-a	PER MAINT	*Present job-related information randomly accessed according to the technician's selection*
NC	3.2.1.1.3.5.3-b	PER MAINT	*Display within same TO related data from other sources*
C	**3.2.1.1.3.5.3-c**	**PER MAINT**	**Allow technician to selectively view diagnostics, Battle Damage Repair (BDR), R & R instructions or repair data as appropriate** *Allow technician to selectively view diagnostics, Aircraft Battle Damage Repair (ABDR) data, R&R instructions or repair data as appropriate*
NC	3.2.1.1.3.5.3-d	PER MAINT	*Reference and display local policy requirements at appropriate locations in TO data*
NC	3.2.1.1.3.5.3-e	PER MAINT	*Allow user to mark TO display for later retrieval to annotate change recommendations*
NC	3.2.1.1.3.5.3-f	PER MAINT	*Present TO warnings and alerts at all levels of adaptation*
NC	3.2.1.1.3.5.3-g	PER MAINT	*Choose extent to which tools and other support data are presented*
NC	3.2.1.1.3.5.3-h	PER MAINT	*Adapt format to display device*
NC	3.2.1.1.3.5.3-i	PER MAINT	*Track and record all TO steps taken*
NC	3.2.1.1.3.5.4	PER MAINT	Accessing Classified Technical Orders
NC	3.2.1.1.3.5.4-a	PER MAINT	*Provide access to classified TOs*
NC	3.2.1.1.3.5.4-b	PER MAINT	*Monitor/change access codes for use of classified data*
***	**********	**********	**********
NC	3.2.1.1.4.1	STAFF SUP	Manage and Analyze *Maintenance Requirements*
NC	3.2.1.1.4.1.1	STAFF SUP	Review Long-Term and Short-Term Planning

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.4.1.1-a	STAFF SUP	Overlay long- and short-term maintenance and mission requirements on current rotating maintenance plan
NC	3.2.1.1.4.1.1-b	STAFF SUP	Analyze impacts of these changes on maintenance resources
NC	3.2.1.1.4.1.1-c	STAFF SUP	Provide maintenance planners with selectable "what if" scenarios to evaluate impacts
D	**3.2.1.1.4.1.1-c**	**STAFF SUP**	**Interface with the Automated Scheduling Module (ASM)**
D	**3.2.1.1.4.1.1-c**	**STAFF SUP**	**Review the Pilot Reporting Discrepancy (PRA) planning requirement background program for additional sortie information**
D	**3.2.1.1.4.1.1-c**	**STAFF SUP**	**Review the Workable TCTO Report (WTR) background program to determine long-range maintenance requirements**
NC	3.2.1.1.4.1.2	STAFF SUP	Develop Mobility Plan
C	**3.2.1.1.4.1.2-a**	**STAFF SUP**	**Generate mobility plan, including evaluations and assignment of appropriate resource** *Generate mobility and dispersal plan, including evaluations and assignment of appropriate resources*
C	**3.2.1.1.4.1.2-b**	**STAFF SUP**	**Provide means to tag resources for mobility requirements** *Provide means to tag resouces for mobility or dispersal requirements*
C	**3.2.1.1.4.1.2-c**	**STAFF SUP**	**Support Squadron plans for developing a transport loading plan** *Support Wing plans for developing a transport loading plan*
NC	3.2.1.1.4.1.2-d	STAFF SUP	Maintain a Capability Assessment of Current Operations to include: recent site surveys, plan implementation checklists, squadron checklists, working papers, operational plans and unit supplements
C	**3.2.1.1.4.1.3**	**STAFF SUP**	**Develop Re-generation Plan** *Develop Generation Plan*
C	**3.2.1.1.4.1.3-a**	**STAFF SUP**	**Support development of re-generation plan** *Support development of local generation plan*
D	**3.2.1.1.4.1.3-b**	**STAFF SUP**	**Once the local generation plan has been approved and implemented, update line numbers according to current aircraft configurations and ETICs. These plans are in line with data currently found on the AF Form 2408 (Generation Maintenance Plan)**
NC	3.2.1.1.4.1.3-c	STAFF SUP	Support design and adjustment of proposed changes required
C	**3.2.1.1.4.1.3-d**	**STAFF SUP**	**Integrate proposed changes into the re-generation plan** *Integrate proposed changes into the local generation plan*

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C	3.2.1.1.4.1.3-e	STAFF SUP	**Present to maintenance managers a re-generation sequence action schedule to track the re-generation process** *Present to Production Managers an aircraft generation sequence action (per AF Form 2409) schedule to track aircraft in the generation process*
C	3.2.1.1.4.1.3-f	STAFF SUP	**Save results of re-generation** *Save results of local generation*
NC	3.2.1.1.4.1.3-g	STAFF SUP	Provide the following to maintenance planners for review:
NC	3.2.1.1.4.1.3-g.1	STAFF SUP	Mission requirements
NC	3.2.1.1.4.1.3-g.2	STAFF SUP	Personnel authorizations and assignments
NC	3.2.1.1.4.1.3-g.3	STAFF SUP	Facility and equipment authorizations
NC	3.2.1.1.4.1.3-h	STAFF SUP	Maintain all HHQ/Wing operational plans requiring support from the maintenance complex
NC	3.2.1.1.4.1.4	STAFF SUP	Support MOIs
NC	3.2.1.1.4.1.4-a	STAFF SUP	Display Maintenance Operating Instructions (MOIs)
NC	3.2.1.1.4.1.4-b	STAFF SUP	Display a title and MOI number that can be sorted, grouped, and selected
NC	3.2.1.1.4.1.4-c	STAFF SUP	Support development of MOIs using text editor capability
C	3.2.1.1.4.2	STAFF SUP	**Provide Information to Job Control** *Provide Information to the Maintenance Complex*
NC	3.2.1.1.4.2.1	STAFF SUP	Analyze Maintenance Data
NC	3.2.1.1.4.2.1-a	STAFF SUP	Perform studies to identify possible trends in the maintenance complex
NC	3.2.1.1.4.2.1-b	STAFF SUP	Track possible "bad actors"
NC	3.2.1.1.4.2.1-c	STAFF SUP	Report identified "bad actors"
NC	3.2.1.1.4.2.1-d	STAFF SUP	Provide trend data to QA
NC	3.2.1.1.4.2.1-e	STAFF SUP	Monitor and report out of limit performance to the Analysis Section
NC	3.2.1.1.4.2.1-f	STAFF SUP	Provide analysis of referrals to solve major problems
C	3.2.1.1.4.2.1-g	STAFF SUP	**Open a maintenance analysis referral report** *Open a maintenance analysis referral (Form 2422) to initiate the referral report*
NC	3.2.1.1.4.2.1-h	STAFF SUP	Perform analysis which can be used to improve Support/ Test Equipment usage
NC	3.2.1.1.4.2.1-i	STAFF SUP	Analyze the performance of selected systems, subsystems and components (LRUs) to determine problems affecting the mission of the unit
NC	3.2.1.1.4.2.2	STAFF SUP	Improve Aspects of Maintenance

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NC	3.2.1.1.4.2.2-a	STAFF SUP	Review the following information that may show poor troubleshooting, inadequate repair, etc.
NC	3.2.1.1.4.2.2-a.1	STAFF SUP	Analysis studies
NC	3.2.1.1.4.2.2-a.2	STAFF SUP	Deferred discrepancy files and lists
NC	3.2.1.1.4.2.2-a.3	STAFF SUP	Document files
D	**3.2.1.1.4.2.2-a.4**	**STAFF SUP**	**Debriefing forms**
NC	3.2.1.1.4.2.2-a.5	STAFF SUP	*Training data*
NC	3.2.1.1.4.2.2-b	STAFF SUP	Analyze performance of Systems, Subsystems, Components, and TMDE
NC	3.2.1.1.4.2.2-c	STAFF SUP	Recommend improvements relating to:
NC	3.2.1.1.4.2.2-c.1	STAFF SUP	Equipment use
NC	3.2.1.1.4.2.2-c.2	STAFF SUP	Inspection frequency
NC	3.2.1.1.4.2.2-c.3	STAFF SUP	Maintenance procedures
NC	3.2.1.1.4.2.2-c.4	STAFF SUP	*Training*
NC	3.2.1.1.4.2.2-c.5	STAFF SUP	Manpower
NC	3.2.1.1.4.2.2-c.6	STAFF SUP	System reliability
D	**3.2.1.1.4.2.2-c.7**	**STAFF SUP**	**Base repair and Intermediate Repair Enhancement Program (IREP)**
C	**3.2.1.1.4.2.2-d**	**STAFF SUP**	**Propose and present additions to the In-Process Inspection listing to maintenance managers** *Propose and present additions to the In-Process Inspection listing to production managers*
NC	3.2.1.1.4.2.2-e	STAFF SUP	Evaluate deviations from maintenance plan to identify system problems
NC	3.2.1.1.4.2.3	STAFF SUP	Utilize Maintenance Models for Analysis
NC	3.2.1.1.4.2.3-a	STAFF SUP	*Provide analysis/simulation capability based on model(s)*
NC	3.2.1.1.4.2.3-b	STAFF SUP	Display model which includes on- and off-equipment and staff functions
NC	3.2.1.1.4.2.3-c	STAFF SUP	Graphically present model for management review
NC	3.2.1.1.4.2.3-d	STAFF SUP	Allow user to traverse simulation model
NC	3.2.1.1.4.2.3-e	STAFF SUP	Allow user to select items from model diagram
NC	3.2.1.1.4.2.3-f	STAFF SUP	Display pertinent data on selected items, such as data elements, data source/sink information, personnel
NC	3.2.1.1.4.2.3-g	STAFF SUP	Support scenarios to move through model /drive simulation
NC	3.2.1.1.4.2.3-h	STAFF SUP	Use performance data base to drive simulations of aspects of the maintenance organization
NC	3.2.1.1.4.2.3-i	STAFF SUP	Allow users to modify data bases to perform "what if" scenarios

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C	**3.2.1.1.4.2.4**	**STAFF SUP**	**Analyze Equipment Utilization** *Analyze Aircraft Utilization*
NC	3.2.1.1.4.2.4-a	STAFF SUP	Assess the following for input to the utilization rate:
NC	3.2.1.1.4.2.4-a.1	STAFF SUP	S/TE
NC	3.2.1.1.4.2.4-a.2	STAFF SUP	Personnel capabilities
C	**3.2.1.1.4.2.4-a.3**	**STAFF SUP**	**Equipment assets** *Projected airframe assets*
C	**3.2.1.1.4.2.4-a.4**	**STAFF SUP**	**Previous maintenance schedules** *Previous flying/maintenance schedules*
C	**3.2.1.1.4.2.4-a.5**	**STAFF SUP**	**Equipment configurations** *Aircraft configurations*
D	**3.2.1.1.4.2.4-a.6**	**STAFF SUP**	**Launch and recovery patterns**
C	**3.2.1.1.4.2.4-b**	**STAFF SUP**	**Input data in the utilization rate (UTE rate) planning process annually and as indicated by the Chief of Maintenance** *Input data in the utilization rate (UTE rate) planning process annually and as indicated by the Logistics Group Commander*
D	**3.2.1.1.4.2.4-c**	**STAFF SUP**	**Compare IMIS calculated UTE rates with BLMAS**
NC	3.2.1.1.4.2.4-d	STAFF SUP	Identify problems encountered as necessary
C	**3.2.1.1.4.2.4-e**	**STAFF SUP**	**Recommend reallocation of resources as necessary** *Recommend reallocation of hours or resources to fighter squadron or shops as necessary*
NC	3.2.1.1.4.2.5	STAFF SUP	Evaluate Schedule Effectiveness
NC	3.2.1.1.4.2.5-a	STAFF SUP	Present maintenance scheduling effectiveness reports
D	**3.2.1.1.4.2.5-b**	**STAFF SUP**	**Obtain and justify the schedule effectiveness generated by BLMAS**
NC	3.2.1.1.4.2.5-c	STAFF SUP	Evaluate deviations from the maintenance plan
NC	3.2.1.1.4.2.6	STAFF SUP	Managers Information Aid
NC	3.2.1.1.4.2.6-a	STAFF SUP	Display products of external MDBs that perform analysis
NC	3.2.1.1.4.2.6-b	STAFF SUP	Draw data from MDBs and perform analysis internally
NC	3.2.1.1.4.2.7	STAFF SUP	Higher Level Reporting
NC	3.2.1.1.4.2.7-a	STAFF SUP	Summarize and format data needed for HHQ and local reports
NC	3.2.1.1.4.2.7-b	STAFF SUP	Continuously monitor status of HHQ identified critical resource LIMFACs

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C	**3.2.1.1.4.2.7-c**	**STAFF SUP**	**Identify potential problems based on Chief of Maintenance defined criteria and notify Chief of Maintenance** *Identify potential problems based on Logistics Group Commander defined criteria and notify Logistics Group Commander*
C	**3.2.1.1.4.2.7-d**	**STAFF SUP**	**Format and forward necessary reports to Chief of Maintenance** *Format and forward necessary reports to Logistics Group Commander*
NC	3.2.1.1.4.2.7-e	STAFF SUP	Retrieve maintenance data and generate quality charts and reports
NC	3.2.1.1.4.2.7-f	STAFF SUP	Compile information for presentation to managers
NC	3.2.1.1.4.2.7-g	STAFF SUP	Provide various predeveloped layout templates to accommodate standard briefings
NC	3.2.1.1.4.2.7-h	STAFF SUP	Establish custom layouts for briefing materials
NC	3.2.1.1.4.2.7-i	STAFF SUP	Supply required data to specified layout when prompted by the user
NC	3.2.1.1.4.2.7-j	STAFF SUP	Establish packages of briefing materials that can be generated upon request
NC	3.2.1.1.4.2.7-k	STAFF SUP	Present materials in various formats such as paper/viewgraph or on-line screen or projector
NC	3.2.1.1.4.3	STAFF SUP	Regulate and Improve Maintenance Operations
NC	3.2.1.1.4.3.1	STAFF SUP	Quality Assurance
D	**3.2.1.1.4.3.1-a**	**STAFF SUP**	**Functional check flight program**
D	**3.2.1.1.4.3.1-a.1**	**STAFF SUP**	**Facilitate functional check flights by alerting QA personnel of flight schedule**
D	**3.2.1.1.4.3.1-a.2**	**STAFF SUP**	**Present Form 781A information required for the flight**
D	**3.2.1.1.4.3.1-a.3**	**STAFF SUP**	**Collect administration information from check flight**
D	**3.2.1.1.4.3.1-a.4**	**STAFF SUP**	**Maintain the data required presently on the AF Form 2400 (Functional Check Flight Log)**
D	**3.2.1.1.4.3.1-a.5**	**STAFF SUP**	**Present an aircraft mission profile**
D	**3.2.1.1.4.3.1-a.6**	**STAFF SUP**	**Present an FCF Checklist for QA personnel to support the flight**
D	**3.2.1.1.4.3.1-b**	**STAFF SUP**	**Weight and balance program**

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ACT	PARAGRAPH	MODE	REQUIREMENT
D	**3.2.1.1.4.3.1-b.1**	**STAFF SUP**	**Recalculate weight and balance upon weapon system reconfiguration**
D	**3.2.1.1.4.3.1-b.2**	**STAFF SUP**	**Alert QA when center-of-gravity limits are about to be exceeded**
C	**3.2.1.1.4.3.1-b.3**	**STAFF SUP**	**Present all TCTOs and equipment modification information to QA personnel for analysis** *Present all TCTOs and aircraft modification information to QA personnel for analysis*
NC	3.2.1.1.4.3.1-c	STAFF SUP	Material deficiency reporting
NC	3.2.1.1.4.3.1-c.1	STAFF SUP	Categorize and analyze information used by QA to determine causes of poor maintenance
NC	3.2.1.1.4.3.1-c.2	STAFF SUP	Identify, access, and analyze faulty TO or diagnostic routines
NC	3.2.1.1.4.3.1-c.3	STAFF SUP	Identify and display remedial or corrective actions
NC	3.2.1.1.4.3.1-c.4	STAFF SUP	Forward recommendations for changes to TOs through JCALS
NC	3.2.1.1.4.3.1-c.5	STAFF SUP	Support accounting, delivery, and responses for material deficiency reporting
D	**3.2.1.1.4.3.1-c.6**	**STAFF SUP**	**Review debriefing forms and aircraft abort information to assist in the identification of problem aircraft or systems/subsystems**
NC	3.2.1.1.4.3.1-c.7	STAFF SUP	Review deferred discrepancy lists for technical errors or negative trends
NC	3.2.1.1.4.3.1-c.8	STAFF SUP	Review repeat and recurring discrepancy lists for problems
NC	3.2.1.1.4.3.1-c.9	STAFF SUP	Support QA in the inspection of maintenance that has been performed
NC	3.2.1.1.4.3.1-d	STAFF SUP	Quality Assurance Program (QAP) evaluations
NC	3.2.1.1.4.3.1-d.1	STAFF SUP	Support the following QA evaluations, inspections and observation activities:
NC	3.2.1.1.4.3.1-d.1.a	STAFF SUP	Personnel Evaluations
NC	3.2.1.1.4.3.1-d.1.a)1	STAFF SUP	Task Evaluation (TE)
NC	3.2.1.1.4.3.1-d.1.a)2	STAFF SUP	Evaluator Proficiency Evaluation (EPE)
NC	3.2.1.1.4.3.1-d.1.b	STAFF SUP	Inspections
NC	3.2.1.1.4.3.1-d.1.b)1	STAFF SUP	Technical Inspections (TI)
NC	3.2.1.1.4.3.1-d.1.b)2	STAFF SUP	Management Inspection (MI)
NC	3.2.1.1.4.3.1-d.1.b)3	STAFF SUP	Special Inspection (SI)

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.4.3.1-d.1.b)4	STAFF SUP	Document File Inspection
C	**3.2.1.1.4.3.1-d.1.b)5**	**STAFF SUP**	**Equipment Acceptance Inspection** ***Aircraft Acceptance Inspection***
NC	3.2.1.1.4.3.1-d.1.b)6	STAFF SUP	Task Follow-up Inspection
NC	3.2.1.1.4.3.1-d.1.c	STAFF SUP	Observations
NC	3.2.1.1.4.3.1-d.1.c)1	STAFF SUP	Detected Safety Violation (DSV)
NC	3.2.1.1.4.3.1-d.1.c)2	STAFF SUP	Technical Data Violation (TDV)
NC	3.2.1.1.4.3.1-d.1.c)3	STAFF SUP	Unsatisfactory Condition Report (UCR)
NC	3.2.1.1.4.3.1-d.2	STAFF SUP	Determine evaluation frequency/type for each individual
NC	3.2.1.1.4.3.1-d.3	STAFF SUP	Allow inspector to approve or disapprove IMIS-determined selection
NC	3.2.1.1.4.3.1-d.4	STAFF SUP	Present inspection technical data to inspector
NC	3.2.1.1.4.3.1-d.5	STAFF SUP	Save the results of the inspection
NC	3.2.1.1.4.3.1-d.6	STAFF SUP	Maintain a trace of every step in the instructions that was performed, including start/completion time
NC	3.2.1.1.4.3.1-d.7	STAFF SUP	Record the technician's name or employee number
NC	3.2.1.1.4.3.1-d.8	STAFF SUP	Allow inspector to review inspection results
C	**3.2.1.1.4.3.1-d.9**	**STAFF SUP**	**Allow inspector to sign off the evaluation** ***Allow inspector to sign off the evaluation (ACC Form 30, Maintenance Evaluation/Inspection)***
NC	3.2.1.1.4.3.1-d.10	STAFF SUP	Verify sign-off authority of the inspector
NC	3.2.1.1.4.3.1-d.11	STAFF SUP	Prevent unauthorized sign-off
NC	3.2.1.1.4.3.1-e	STAFF SUP	Certification/Decertification
NC	3.2.1.1.4.3.1-e.1	STAFF SUP	Assist in the review and update of personnel training records
NC	3.2.1.1.4.3.1-e.2	STAFF SUP	Determine qualification level of personnel
NC	3.2.1.1.4.3.1-e.3	STAFF SUP	Present results of personnel training evaluation to QA for verification
NC	3.2.1.1.4.3.1-e.4	STAFF SUP	Analyze results of personnel evaluations and recommend changes in training techniques
NC	3.2.1.1.4.3.1-e.5	STAFF SUP	Generate recommendations on maintenance improvement profiles
NC	3.2.1.1.4.3.1-e.6	STAFF SUP	Update the appropriate MDB with training evaluation results

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ACT	PARAGRAPH	MODE	REQUIREMENT
D	**3.2.1.1.4.3.1-e.7**	**STAFF SUP**	**Interface with Personnel Evaluation Analysis Program (PEAP) to track personnel evaluations**
D	**3.2.1.1.4.3.1-e.8**	**STAFF SUP**	**Interface with Quality Assurance Tracking and Trend Analysis System (QANTTAS) to review personnel evaluations**
NC	3.2.1.1.4.3.1-f	STAFF SUP	TO management
NC	3.2.1.1.4.3.1-f.1	STAFF SUP	Support base-level TO activities for the maintenance organization
NC	3.2.1.1.4.3.1-f.2	STAFF SUP	Interface with base-level JCALS functions
NC	3.2.1.1.4.3.1-f.3	STAFF SUP	Provide data and support to assist in command certification of TOs
NC	3.2.1.1.4.3.1-f.4	STAFF SUP	Provide a means of initiating required changes to TOs
NC	3.2.1.1.4.3.1-f.5	STAFF SUP	Provide means of tracking status of changes to TOs
NC	3.2.1.1.4.3.1-f.6	STAFF SUP	Provide record keeping and reporting on compliance with TCTO data
NC	3.2.1.1.4.3.1-f.7	STAFF SUP	Keep records on paper data assigned to base accounts
NC	3.2.1.1.4.3.1-f.8	STAFF SUP	Perform other TODO functions determined by Command and local policies
NC	3.2.1.1.4.3.1-f.9	STAFF SUP	Update IMIS-owned data files for operation in absence of JCALS interface
NC	3.2.1.1.4.3.1-f.10	STAFF SUP	Generate "usage profiles" of TOs
NC	3.2.1.1.4.3.1-f.11	STAFF SUP	Track all One-Time Inspections (OTIs) data, to include estimated manhours to accomplish the inspection, a required completion date, and reporting instructions
NC	3.2.1.1.4.3.1-f.12	STAFF SUP	Maintain all Modification Proposals presently on the AF Form 1067 (Modified Proposal)
NC	3.2.1.1.4.3.2	STAFF SUP	Programs Section
NC	3.2.1.1.4.3.2-a	STAFF SUP	Provide administrative support to maintain data on the following:
NC	3.2.1.1.4.3.2-a.1	STAFF SUP	Authorizations
NC	3.2.1.1.4.3.2-a.2	STAFF SUP	Assignments
NC	3.2.1.1.4.3.2-a.3	STAFF SUP	Maintenance personnel utilization
NC	3.2.1.1.4.3.2-a.4	STAFF SUP	Equipment utilization
NC	3.2.1.1.4.3.2-a.5	STAFF SUP	Facilities utilization
NC	3.2.1.1.4.3.2-a.6	STAFF SUP	Vehicle Utilization
NC	3.2.1.1.4.3.2-b	STAFF SUP	Prepare financial requirements for inclusion in base financial plan, budget estimates, and operating budget
NC	3.2.1.1.4.3.2-c	STAFF SUP	Provide "what if" simulation capability to evaluate new mission requirements
NC	3.2.1.1.4.3.3	STAFF SUP	Maintenance Operations Division

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.4.3.3-a	STAFF SUP	Store HHQ and depot requirements, including:
NC	3.2.1.1.4.3.3-a.1	STAFF SUP	TCTO
NC	3.2.1.1.4.3.3-a.2	STAFF SUP	Time changes
NC	3.2.1.1.4.3.3-a.3	STAFF SUP	Programmed Depot Maintenance (PDM)
NC	3.2.1.1.4.3.3-a.4	STAFF SUP	Warranty Program
NC	3.2.1.1.4.3.3-a.5	STAFF SUP	One Time Inspection requirements
D	**3.2.1.1.4.3.3-a.6**	**STAFF SUP**	**Hangar Queen Program status**
D	**3.2.1.1.4.3.3-a.7**	**STAFF SUP**	**Monitor Alert Force**
D	**3.2.1.1.4.3.3-a.8**	**STAFF SUP**	**Track ECM and Sensor Pods**
NC	3.2.1.1.4.3.3-b	STAFF SUP	Schedule HHQ and depot requirements in the rotating schedule
NC	3.2.1.1.4.3.3-c	STAFF SUP	Interface with SBSS to perform the following:
NC	3.2.1.1.4.3.3-c.1	STAFF SUP	Order appropriate kits and parts
NC	3.2.1.1.4.3.3-c.2	STAFF SUP	Monitor estimated delivery dates of parts
NC	3.2.1.1.4.3.3-c.3	STAFF SUP	Schedule installation of ordered parts
NC	3.2.1.1.4.3.3-d	STAFF SUP	Monitor time change serial-numbered control items
C	**3.2.1.1.4.3.3-e**	**STAFF SUP**	**Maintain and display the status and location of prime equipment maintained or supported by the squadron** *Maintain and display the status and location of all aircraft on station, maintained or supported by the wing.*
C	**3.2.1.1.4.3.3-f**	**STAFF SUP**	**Present equipment Estimated Time in Commission (ETIC) to support Maintenance Managers** *Present aircraft Estimated Time in Commission (ETIC) to support Production Managers*
NC	3.2.1.1.4.3.3-g	STAFF SUP	Update data in real time, with the updated items highlighted until acknowledgment is received
C	**3.2.1.1.4.3.3-h**	**STAFF SUP**	**Interface via an MIW display screen or a large screen display that may replace the Job Control status boards** *Interface via an MIW display screen or a large screen display that may replace the MOC aircraft status boards*
D	**3.2.1.1.4.3.3-i**	**STAFF SUP**	**Monitor/schedule munitions delivery priorities with flying squadrons and munitions maintenance activities**
C	**3.2.1.1.4.3.3-j**	**STAFF SUP**	**Include a "template" for a Job Control status board containing a standard set of data items** *Include a "template" for a MOC aircraft status board containing a standard set of data items*

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C	**3.2.1.1.4.3.3-k**	**STAFF SUP**	**Maintain information to support ground mobile radio program** *Maintain information to support aircraft maintenance nontactical radio program for the Operations and Logistic groups*
D	**3.2.1.1.4.3.3-m**	**STAFF SUP**	**Monitor the progress of aircraft Functional Check Flight (FCF) program to support the maintenance program**
C	**3.2.1.1.4.3.3-n**	**STAFF SUP**	**Display all changes to the weekly/daily maintenance schedules** *Display all changes to the weekly/daily flying and maintenance schedules*
NC	3.2.1.1.4.3.3-o	STAFF SUP	Display/track the status of all Aerospace Ground Equipment (AGE) designated as mission critical
NC	3.2.1.1.4.3.3-p	STAFF SUP	Monitor and display severe weather warnings/emergency messages to appropriate personnel
C	**3.2.1.1.4.3.3-q**	**STAFF SUP**	**Display procedural checklist to support contingency response (fire, severe weather, evacuations, accidents)** *Display procedural checklists to support massloads, combat turnarounds, Broken Arrows, aircraft crashes, flightline fires, severe weather warnings and evacuation procedures*
C	**3.2.1.1.4.3.3-r**	**STAFF SUP**	**Monitor and track maintenance personnel working on scheduled maintenance requirements** *Monitor and track Logistic Group Maintenance Squadron specialists working on aircraft scheduled maintenance requirements*
D	**3.2.1.1.4.3.3-s**	**STAFF SUP**	**Monitor and track Selected Generation Aircraft (SGA) required to support EWO or contingency commitments**
D	**3.2.1.1.4.3.4**	**STAFF SUP**	**Deleted. (Incorporated into Section 3.2.1.1.4.3.3, above)**
D	**3.2.1.1.4.3.4-a**	**STAFF SUP**	**Deleted.(Incorporated into Section 3.2.1.1.4.3.3, above)**
D	**3.2.1.1.4.3.4-b**	**STAFF SUP**	**Deleted.(Incorporated into Section 3.2.1.1.4.3.3, above)**
D	**3.2.1.1.4.3.4-c**	**STAFF SUP**	**Deleted.(Incorporated into Section 3.2.1.1.4.3.3, above)**
D	**3.2.1.1.4.3.4-d**	**STAFF SUP**	**Deleted.(Incorporated into Section 3.2.1.1.4.3.3, above)**
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NC	3.2.1.1.5.1	TRAINING	Familiarization Training
NC	3.2.1.1.5.1.1	TRAINING	IMIS Familiarization
NC	3.2.1.1.5.1.1-a	TRAINING	Provide familiarization training in the use of IMIS to perform maintenance operations

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.5.1.1-b	TRAINING	Provide on-line Computer-Aided Instruction pertaining to the operation of all IMIS segments
NC	3.2.1.1.5.1.1-c	TRAINING	Tailor CAI instructions to fit technician's need
NC	3.2.1.1.5.1.1-d	TRAINING	Include, at a minimum, the following in IMIS familiarization training:
NC	3.2.1.1.5.1.1-d.1	TRAINING	Overview information on IMIS
NC	3.2.1.1.5.1.1-d.2	TRAINING	Hardware and software information
NC	3.2.1.1.5.1.1-d.3	TRAINING	Tutorials on how to operate IMIS
NC	3.2.1.1.5.1.1-e	TRAINING	Provide context-sensitive on-line help instructions
NC	3.2.1.1.5.1.2	TRAINING	Maintenance Familiarization
NC	3.2.1.1.5.1.2-a	TRAINING	Provide the following standard training capabilities:
NC	3.2.1.1.5.1.2-a.1	TRAINING	Facilitate technicians' practice with tools used in the performance of actual maintenance tasks
NC	3.2.1.1.5.1.2-a.2	TRAINING	Obtain training courses from Computer-Aided Instruction System
NC	3.2.1.1.5.1.2-a.3	TRAINING	Tailor maintenance instructions to fit individual need of the technicians
NC	3.2.1.1.5.1.2-a.4	TRAINING	Allow training to be scored or unscored
NC	3.2.1.1.5.1.2-a.5	TRAINING	Provide option to automatically log transactions performed during training familiarization
NC	3.2.1.1.5.1.2-b	TRAINING	Provide the following capabilities for the use of the maintenance model:
NC	3.2.1.1.5.1.2-b.1	TRAINING	Include training capabilities based on the model of the maintenance process
NC	3.2.1.1.5.1.2-b.2	TRAINING	Depict, through the model, the following maintenance environment functions:
NC	3.2.1.1.5.1.2-b.2.a	TRAINING	On-equipment functions
NC	3.2.1.1.5.1.2-b.2.b	TRAINING	Off-equipment functions
NC	3.2.1.1.5.1.2-b.2.c	TRAINING	Staff functions
NC	3.2.1.1.5.1.2-b.3	TRAINING	Graphically present the model for user review
NC	3.2.1.1.5.1.2-b.4	TRAINING	Allow technician to traverse model
NC	3.2.1.1.5.1.2-b.5	TRAINING	Allow technician to select items from a model diagram
NC	3.2.1.1.5.1.2-b.6	TRAINING	Display pertinent data for a selected item, including the following:
NC	3.2.1.1.5.1.2-b.6.a	TRAINING	Narrative of the maintenance tasks involved
NC	3.2.1.1.5.1.2-b.6.b	TRAINING	Data elements

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NC	3.2.1.1.5.1.2-b.6.c	TRAINING	Data source information
NC	3.2.1.1.5.1.2-b.6.d	TRAINING	Data sink information
NC	3.2.1.1.5.1.2-b.6.e	TRAINING	Personnel involved
NC	3.2.1.1.5.1.2-b.7	TRAINING	Include a set of scenarios that can be used to move throughout the model
NC	3.2.1.1.5.1.2-b.8	TRAINING	Instruct the technicians by using the scenarios to simulate given situations
NC	3.2.1.1.5.1.2-b.9	TRAINING	Facilitate a testing cycle using these scenarios
NC	3.2.1.1.5.1.2-b.10	TRAINING	Highlight parts of the model
NC	3.2.1.1.5.1.2-b.11	TRAINING	Display multiple choice questions to be answered by the trainee
NC	3.2.1.1.5.1.2-b.12	TRAINING	Score each session
NC	3.2.1.1.5.1.2-b.13	TRAINING	Track the score from session to session.
NC	3.2.1.1.5.1.2-b.14	TRAINING	Allow instructors to modify and add to the scenarios and information data bases to set up tailored training sessions
NC	3.2.1.1.5.2	TRAINING	Simulation Control
NC	3.2.1.1.5.2.1	TRAINING	Source of Simulations
NC	3.2.1.1.5.2.1-a	TRAINING	Initiate selected simulations obtained from external sources or maintained internal to IMIS
NC	3.2.1.1.5.2.1-b	TRAINING	Support development of instructor defined training simulations
NC	3.2.1.1.5.2.2	TRAINING	Freeze Frame
NC	3.2.1.1.5.2.2-a	TRAINING	Include ability to stop the action/scenario (freeze frame) at any given point
NC	3.2.1.1.5.2.2-b	TRAINING	Restart the scenario at predefined points, including the point of the freeze frame
NC	3.2.1.1.5.2.3	TRAINING	Allow training to be either scored or unscored
NC	3.2.1.1.5.2.4	TRAINING	Include an option that will automatically log maintenance tasks performed as part of training simulations
NC	3.2.1.1.5.3	TRAINING	Mock-Up and OJT
NC	3.2.1.1.5.3.1	TRAINING	Develop Training Scenarios
NC	3.2.1.1.5.3.1-a	TRAINING	Obtain training scenarios from external sources
NC	3.2.1.1.5.3.1-b	TRAINING	Accept maintenance instructor commands to build tailored scenarios

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NC	3.2.1.1.5.3.1-c	TRAINING	Record real maintenance repair situation for use as scenarios
NC	3.2.1.1.5.3.2	TRAINING	Logging of Mock-Up/OJT
NC	3.2.1.1.5.3.2-a	TRAINING	Automatically log Mock-up and OJT transactions
NC	3.2.1.1.5.3.2-b	TRAINING	Allow logging capability to be enabled or disabled by maintenance management and training personnel
NC	3.2.1.1.5.3.2-c	TRAINING	Track progress of individuals who are upgrade and task qualification training
NC	3.2.1.1.5.3.2-d	TRAINING	Assist trainers in their proficiency training
NC	3.2.1.1.5.3.2-e	TRAINING	Upon completion of the current training session, perform one of the following:
NC	3.2.1.1.5.3.2-e.1	TRAINING	Recommend recurring training, if necessary
NC	3.2.1.1.5.3.2-e.2	TRAINING	Provide additional training, if necessary
NC	3.2.1 1.5.3.2-e.3	TRAINING	Proceed to the next appropriate level of training
NC	3.2.1.1.5.3.2-f	TRAINING	Analyze the results of all personnel evaluations conducted by QA
NC	3.2.1.1.5.4	TRAINING	Training Support
NC	3.2.1.1.5.4.1	TRAINING	Administration Assistance
NC	3.2.1.1.5.4.1-a	TRAINING	Assist in developing the following:
NC	3.2.1.1.5.4.1-a.1	TRAINING	Detailed training guides
NC	3.2.1.1.5.4.1-a.2	TRAINING	Work center training plans
NC	3.2.1.1.5.4.1-b	TRAINING	Identify study areas requiring additional attention
NC	3.2.1.1.5.4.1-c	TRAINING	Record results of training sessions and simulations
NC	3.2.1.1.5.4.1-d	TRAINING	Perform task planning
NC	3.2.1.1.5.4.1-e	TRAINING	Identify additional training required for less experienced personnel
NC	3.2.1.1.5.4.1-f	TRAINING	Display ongoing simulations, mockup sessions, OJT in real time
NC	3.2.1.1.5.4.1-g	TRAINING	Provide capability for instructor development, enhancement of simulation, and scenario conditions
NC	3.2.1.1.5.4.1-h	TRAINING	Display and schedule all formal and ancillary training
NC	3.2.1.1.5.4.1-i	TRAINING	Include intelligent training capabilities that tailor CAI to fit requirements of technicians and training sites
NC	3.2.1.1.5.4.1-j	TRAINING	Track all Cross-Utilization Training (CUT)
NC	3.2.1.1.5.4.1-k	TRAINING	Identify shortfalls in CUT
NC	3.2.1.1.5.4.1-l	TRAINING	Provide and display maintenance training forms for updating training records at the training site
NC	3.2.1.1.5.4.1-m	TRAINING	Display different types of in-depth training schematics for troubleshooting procedures

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ACT	PARAGRAPH	MODE	REQUIREMENT
C	**3.2.1.1.5.4.1-n**	**TRAINING**	**Maintain Enlisted Specialty Training (EST) and information on initial, recurring technical, and remedial training for maintenance personnel** *Maintain Enlisted Specialty Training (EST) and Aircraft Maintenance Qualification Programs (AMQP) to support both Logistics and Operations Groups*
NC	3.2.1.1.5.4.1-o	TRAINING	Assist in the development and tracking of the Special Qualifications Programs
NC	3.2.1.1.5.4.1-p	TRAINING	Track/schedule the following courses to support training maintenance personnel
NC	3.2.1.1.5.4.1-p.1.	TRAINING	Field Training Detachment (FTD) Courses
NC	3.2.1.1.5.4.1-p.2.	TRAINING	All individual Proficiency Training
NC	3.2.1.1.5.4.1-p.3.	TRAINING	AGE Training
C	**3.2 1.1.5.4.1-p.4.**	**TRAINING**	**Small Arms Training** *Egress (Cockpit) Familiarization Training*
NC	3.2.1.1.5.4.1-p.5.	TRAINING	*Fire Extinguisher Training*
D	**3.2.1.1.5.4.1-p.6.**	**TRAINING**	**Nuclear Surety Training**
NC	3.2.1.1.5.4.1-p.7	TRAINING	Cardio-Pulmonary Resuscitation (CPR) Training
A	**3.2.1.1.5.3.1-p8.**	**TRAINING**	**Self-Aid Buddy Care**
NC	3.2.1.1.5.4.1-q	TRAINING	The IMIS will have the capability to print all Training Schedules
NC	3.2.1.1.5.4.2	TRAINING	Scoring Assistance
NC	3.2.1.1.5.4.2-a	TRAINING	Score multiple choice tests by comparing technician's response to the correct answer
NC	3.2.1.1.5.4.2-b	TRAINING	Identify strengths and weaknesses in the technician's procedures by analyzing previously collected data
NC	3.2.1.1.5.4.2-c	TRAINING	Compare scores to qualification requirements and recommend qualification
NC	3.2.1.1.5.4.2-d	TRAINING	Compile scoring results and other pertinent information:
NC	3.2.1.1.5.4.2-d.1	TRAINING	For internal storage
NC	3.2.1.1.5.4.2-d.2	TRAINING	For transmission to the appropriate MDB
***	**********	**********	**********
NC	3.2.1.1.6.1	CONTROL	System Start-Up/Restart
NC	3.2.1.1.6.1.1	CONTROL	Coldstart IMIS
NC	3.2.1.1.6.1.1-a	CONTROL	System Coldstart

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.6.1.1-a.1	CONTROL	Process operator commands to initiate and perform coldstart operations
NC	3.2.1.1.6.1.1-a.2	CONTROL	Load required system files, once power has been cycled through a particular system component
NC	3.2.1.1.6.1.1-a.3	CONTROL	Configure system components in preparation for initialization
NC	3.2.1.1.6.1.1-b	CONTROL	MIW coldstart
NC	3.2.1.1.6.1.1-b.1	CONTROL	Initiate MIW coldstart procedures upon operator request
NC	3.2.1.1.6.1.1-b.2	CONTROL	Load MIW system files after power has been cycled
NC	3.2.1.1.6.1.1-b.3	CONTROL	Prompt operator for PMA information
NC	3.2.1.1.6.1.1-b.4	CONTROL	Provide listing or download of information for associated PMAs
NC	3.2.1.1.6.1.1-c	CONTROL	PMA coldstart
NC	3.2.1.1.6.1.1-c.1	CONTROL	PMA contains its own system files and PMA-specific files
NC	3.2.1.1.6.1.1-c.2	CONTROL	Load installation data, configuration data, TO data, and other application data in PMA
NC	3.2.1.1.6.1.1-c.3	CONTROL	Establish communication with associated MIW by passing PMA-identifier
NC	3.2.1.1.6.1.1-d	CONTROL	Confirm communication with MIW
NC	3.2.1.1.6.1.1-e	CONTROL	Deleted. (Incorporated elsewhere)
NC	3.2.1.1.6.1.2	CONTROL	Warmstart IMIS
NC	3.2.1.1.6.1.2-a	CONTROL	MIW warmstart
NC	3.2.1.1.6.1.2-a.1	CONTROL	Initiate MIW warmstart upon operator request
NC	3.2.1.1.6.1.2-a.2	CONTROL	Reload MIW system files
NC	3.2.1.1.6.1.2-a.3	CONTROL	Reconfigure MIW with PMA IDs
NC	3.2.1.1.6.1.2-b	CONTROL	PMA warmstart
NC	3.2.1.1.6.1.2-b.1	CONTROL	Reload the following data from memory load or from the MIW:
NC	3.2.1.1.6.1.2-b.1.a	CONTROL	Appropriate internal system files
NC	3.2.1.1.6.1.2-b.1.b	CONTROL	PMA-specific files
NC	3.2.1.1.6.1.2-b.1.c	CONTROL	System configuration data
NC	3.2.1.1.6.1.2-b.1.d	CONTROL	TO and applications data
NC	3.2.1.1.6.1.2-b.2	CONTROL	Reestablish communications with MIW by passing its identification to the MIW
D	**3.2.1.1.6.1.2-c**	**CONTROL**	**AIP warmstart**
NC	3.2.1.1.6.2	CONTROL	Data Routing
NC	3.2.1.1.6.2.1	CONTROL	Identify primary/secondary data paths
NC	3.2.1.1.6.2.2	CONTROL	Acquire Data
NC	3.2.1.1.6.2.2-a	CONTROL	Automatically obtain data from best available source

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.6.2.2-b	CONTROL	Reformat accessed data as necessary
NC	3.2.1.1.6.2.3	CONTROL	Send Data
NC	3.2.1.1.6.2.3-a	CONTROL	Automatically extract data for transmission to MDBs
NC	3.2.1.1.6.2.3-b	CONTROL	Compile and reformat data to send to MDBs, as necessary
NC	3.2.1.1.6.2.3-c	CONTROL	Send extracted data to appropriate MDBs
NC	3.2.1.1.6.2.4	CONTROL	Temporarily Store Data
NC	3.2.1.1.6.2.4-a	CONTROL	Detect whether the receiving MDB is temporarily off-line
NC	3.2.1.1.6.2.4-b	CONTROL	Retain collected data if receiving MDB is off-line
NC	3.2.1.1.6.2.4-c	CONTROL	Inform operator of off-line MDB and continue storing collected data
NC	3.2.1.1.6.2.4-d	CONTROL	Download data to off-line storage, oldest data first
NC	3.2.1.1.6.2.4-e	CONTROL	Allow operator to disable download storage
NC	3.2.1.1.6.2.4-f	CONTROL	Allow transfer of data held in off-line storage when communication with the MDBs re-established
NC	3.2.1.1.6.3	CONTROL	Self-Test
NC	3.2.1.1.6.3.1	CONTROL	Initiate Self-Test
NC	3.2.1.1.6.3.1-a	CONTROL	Operator initiated
NC	3.2.1.1.6.3.1-a.1	CONTROL	Initiate self-test on its system components of the entire system upon operator request
NC	3.2.1.1.6.3.1-a.2	CONTROL	IMIS designed so that an authorized operator may initiate self-test on his associated PMA
NC	3.2.1.1.6.3.1-a.3	CONTROL	MIW self-test initiated only by a designated operator for that MIW
NC	3.2.1.1.6.3.1-a.4	CONTROL	Allow MIW to initiate PMA self-test
NC	3.2.1.1.6.3.1-a.5	CONTROL	PMA self-test requested by an MIW operator does not interfere with or interrupt PMA function
NC	3.2.1.1.6.3.1-a.6	CONTROL	System-wide IMIS self-test initiated by designated system controller
NC	3.2.1.1.6.3.1-b	CONTROL	PMA self-test includes:
NC	3.2.1.1.6.3.1-b.1	CONTROL	Self-test of each PMA functional section
NC	3.2.1.1.6.3.1-b.2	CONTROL	End-to-end self test to check functional connectivity
NC	3.2.1.1.6.3.1-b.3	CONTROL	Test of PMA interfaces
NC	3.2.1.1.6.3.1-c	CONTROL	MIW self-test
NC	3.2.1.1.6.3.1-c.1	CONTROL	Forward request from PMA to MIW for MIW self-test
NC	3.2.1.1.6.3.1-c.2	CONTROL	Acknowledge receipt of request from PMA for MIW self-test
NC	3.2.1.1.6.3.1-c.3	CONTROL	Notify all actively interfaced peripherals of self test on MIW
NC	3.2.1.1.6.3.1-c.4	CONTROL	Initiate self test of MIW, which includes:
NC	3.2.1.1.6.3.1-c.4.a	CONTROL	Tests of each of the functional portions of the MIW

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NC	3.2.1.1.6.3.1-c.4.b	CONTROL	End-to-end test to check connectivity
NC	3.2.1.1.6.3.1-c.4.c	CONTROL	Test of the MIW interfaces
NC	3.2.1.1.6.3.1-c.5	CONTROL	Display results of MIW self-test
NC	3.2.1.1.6.3.1-c.6	CONTROL	Interpret results of MIW self-test
NC	3.2.1.1.6.3.1-c.7	CONTROL	Save identified discrepancies for which maintenance can be deferred in a test result file
NC	3.2.1.1.6.3.1-d	CONTROL	System test
NC	3.2.1.1.6.3.1-d.1	CONTROL	System controller capable of initiating a self-test at any intercommunicating MIW
NC	3.2.1.1.6.3.1-d.2	CONTROL	Perform the following functions
NC	3.2.1.1.6.3.1-d.2.a	CONTROL	Notify all system components that a system-wide health test is to be initiated
NC	3.2.1.1.6.3.1-d.2.b	CONTROL	Initiate self-test of all system segments
NC	3.2.1.1.6.3.1-d.2.c	CONTROL	Analyze and summarize system self-test results
NC	3.2.1.1.6.3.1-d.2.d	CONTROL	Display results of system self-test
D	**3.2.1.1.6.3.1-e**	**CONTROL**	**AIP-initiated self-test**
D	**3.2.1.1.6.3.1-e.1**	**CONTROL**	***Initiate AIP self test from attached PMA, to include:***
D	**3.2.1.1.6.3.1-e.1.a**	**CONTROL**	**Test all functional portions of AIP from PMA**
D	**3.2.1.1.6.3.1-e.1.b**	**CONTROL**	**End-to-end checks for connectivity**
D	**3.2.1.1.6.3.1-e.1.c**	**CONTROL**	**Test of all interfaces**
D	**3.2.1.1.6.3.1-e.2**	**CONTROL**	**Analyze and display the results to the requesting operator**
D	**3.2.1.1.6.3.1-e.3**	**CONTROL**	***AIP self-test may be initiated from the AIP keypad (if the AIP has a keypad and display)***
NC	3.2.1.1.6.3.2	CONTROL	Continuous Self-Test
NC	3.2.1.1.6.3.2-a	CONTROL	Continuously monitor system health, to include, but not be limited to:
NC	3.2.1.1.6.3.2-a.1	CONTROL	*Monitoring of interface connectivity*
NC	3.2.1.1.6.3.2-a.2	CONTROL	Data integrity checks
NC	3.2.1.1.6.3.2-a.3	CONTROL	High-level health checks
NC	3.2.1.1.6.3.2-b	CONTROL	Display results from continuous self-test whenever a discrepancy condition is detected
NC	3.2.1.1.6.3.2-c	CONTROL	Upon detecting a potential degradation in system health:

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NC	3.2.1.1.6.3.2-c.1	CONTROL	Notify system controller that an abnormal system condition exists
NC	3.2.1.1.6.3.2-c.2	CONTROL	Recommend any system or system component tests which should be performed
NC	3.2.1.1.6.4	CONTROL	IMIS Configuration Control
NC	3.2.1.1.6.4.1	CONTROL	Initial Installation
NC	3.2.1.1.6.4.1-a	CONTROL	Configure IMIS to work with specific base maintenance environment
NC	3.2.1.1.6.4.1-b	CONTROL	Load base-dependent data in IMIS
NC	3.2.1.1.6.4.1-c	CONTROL	Establish communication interfaces
NC	3.2.1.1.6.4.1-d	CONTROL	Provide easy-to-follow, step-by-step instructions for system installers
NC	3.2.1.1.6.5	CONTROL	Log-On and Access Control
NC	3.2.1.1.6.5.1	CONTROL	Access Control
NC	3.2.1.1.6.5.1-a	CONTROL	Control access to IMIS components
NC	3.2.1.1.6.5.1-b	CONTROL	Restrict number of attempts to access the system
NC	3.2.1.1.6.5.1-c	CONTROL	Record all failed attempts to access the system
NC	3.2.1.1.6.5.1-d	CONTROL	Comply with all security requirements
NC	3.2.1.1.6.5.2	CONTROL	Log-On Process
NC	3.2.1.1.6.5.2-a	CONTROL	Collect user data at log-in
NC	3.2.1.1.6.5.2-b	CONTROL	Maintain user data for use by all IMIS activities
NC	3.2.1.1.6.6	CONTROL	Database Management
NC	3.2.1.1.6.6.1	CONTROL	TO Data Base
NC	3.2.1.1.6.6.1-a	CONTROL	Convert TO data from CDM to run time format
NC	3.2.1.1.6.6.1-b	CONTROL	Store and manage converted TO data
NC	3.2.1.1.6.6.2	CONTROL	Standard Relational Data Bases
NC	3.2.1.1.6.6.2-a	CONTROL	Provide English type query language
NC	3.2.1.1.6.6.2-b	CONTROL	Consider distributed relational data base
NC	3.2.1.1.6.6.3	CONTROL	User Profile Data Base, to contain the following:
NC	3.2.1.1.6.6.3-a	CONTROL	One modifiable record assigned per user
NC	3.2.1.1.6.6.3-b	CONTROL	Security restrictions associated with the user
NC	3.2.1.1.6.6.3-c	CONTROL	User's password
NC	3.2.1.1.6.6.3-d	CONTROL	User-system interaction and display preference
NC	3.2.1.1.6.6.4	CONTROL	User Text Files
NC	3.2.1.1.6.6.4-a	CONTROL	Store and display user generated text files
NC	3.2.1.1.6.6.4-b	CONTROL	Automatically assign relational indicator to text file
NC	3.2.1.1.6.6.4-c	CONTROL	Allocate storage space for user text files by individual user
NC	3.2.1.1.6.6.4-.1	CONTROL	Deleted.

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.6.7	CONTROL	IMIS includes commercial quality word processor capability
NC	3.2.1.1.6.7.1	CONTROL	Notepad allows user to develop recallable notes attached to specific IMIS functions or screens
NC	3.2.1.1.6.7.2	CONTROL	Free-Standing Text Files accessible by user only when performing word processing functions
NC	3.2.1.1.6.8	CONTROL	Navigation allows user to retrieve maintenance instructions and data more quickly than using paper
NC	3.2.1.1.6.8.1	CONTROL	Sequencing
NC	3.2.1.1.6.8.1-a	CONTROL	Allow user to move forward and backward through data in sequence
NC	3.2.1.1.6.8.1-b	CONTROL	Allow user to move forward to view the next piece of information in a sequence
NC	3.2.1.1.6.8.1-c	CONTROL	Permit the user to review any information previously viewed in a sequence
NC	3.2.1.1.6.8.1-d	CONTROL	Allow user to return to the last point from which a new type of data was selected to be examined
NC	3.2.1.1.6.8.2	CONTROL	Data Access
NC	3.2.1.1.6.8.2-a	CONTROL	Select data related to information being viewed
NC	3.2.1.1.6.8.2-b	CONTROL	Support multiple methods of data access
NC	3.2.1.1.6.8.2-c	CONTROL	Present options for data display via hierarchical menus
NC	3.2.1.1.6.8.2-d	CONTROL	Make cross-referenced information easily accessible through an option selection process
NC	3.2.1.1.6.8.2-e	CONTROL	Return to display from which cross-reference was accessed
NC	3.2.1.1.6.8.2-f	CONTROL	Allow user to search for information by issuing search command
NC	3.2.1.1.6.8.2-g	CONTROL	Display list of available information
NC	3.2.1.1.6.8.2-h	CONTROL	Allow listing of available information to function as a menu
NC	3.2.1.1.6.8.3	CONTROL	Bookmarking and Exit
NC	3.2.1.1.6.8.3-a	CONTROL	Mark screen or item of information for later retrieval or access
NC	3.2.1.1.6.8.3-b	CONTROL	Allow user to quit or exit the system or data presentation
NC	3.2.1.1.6.8.3-c	CONTROL	Provide user option to save current location or process for later resumption
NC	3.2.1.1.6.9	CONTROL	Input
NC	3.2.1.1.6.9-a	CONTROL	Input function requires user to make minimal inputs

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.6.9-b	CONTROL	Function keys, number pad, or other devices employed to reduce user input
A	**3.2.1.1.6.9-b1**	**CONTROL**	**Full Alpha/numeric keyboard**
NC	3.2.1.1.6.9-c	CONTROL	Clearly labeled function key options displayed on screen
NC	3.2.1.1.6.9-d	CONTROL	Cursor movement controlled by user
C	**3.2.1.1.6.9-e**	**CONTROL**	**Minimum allowable cursor movement includes all directions** *Minimum allowable cursor movement includes up, down, left, right*
NC	3.2.1.1.6.9-f	CONTROL	User selects functions and data through use of a select function
NC	3.2.1.1.6.9-g	CONTROL	User alphanumeric input echoed and user notified when any other type of transaction occurs
A	**3.2.11.6.9-h**	**CONTROL**	**Keyboard must be backlit to support night operations**
NC	3.2.1.1.6.10	CONTROL	Communications
NC	3.2.1.1.6.10-a	CONTROL	Notify user of process and termination
NC	3.2.1.1.6.10-b	CONTROL	Indicate to the user that the process is underway and the expected length of processing time required
NC	3.2.1.1.6.10-c	CONTROL	Notify user as to the success or failure of a process or transaction
NC	3.2.1.1.6.10-d	CONTROL	Include easily understood diagnosis for failure and a prescription for successful processing
NC	3.2.1.1.6.10-e	CONTROL	Support user mailboxes and posting of notices for general user population
NC	3.2.1.1.6.10-f	CONTROL	Support construction and display of messages and notices
NC	3.2.1.1.6.10-g	CONTROL	Support display of messages and notices
NC	3.2.1.1.6.10-h	CONTROL	The MIW and PMA segments shall allow the user to send and review memos at any time
A	**3.2.1.1.6.10-i**	**CONTROL**	**RF link between PMA and MIW must be secure for up to Top Secret data**
NC	3.2.1.1.6.11	CONTROL	Display
NC	3.2.1.1.6.11-a	CONTROL	Support a display function that presents data to a user
A	**3.2.1.1.6.11-a1**	**CONTROL**	**Display must be viewable from other than straight on angle to support multiple simultaneous users**
A	**3.2.1.1.6.11-a2**	**CONTROL**	**Display must be backlit to support night operations**
A	**3.2.1.1.6.11-a3**	**CONTROL**	**Generic input port on PMA for connection of possible future devices**
NC	3.2.1.1.6.11-b	CONTROL	Support needs of different user groups to the level appropriate to those users

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.6.11-c	CONTROL	Present data in a format consistent within and across IMIS segments
NC	3.2.1.1.6.11-d	CONTROL	Data to be presented so that:
NC	3.2.1.1.6.11-d.1	CONTROL	Information is easily perceived and understood by the user
NC	3.2.1.1.6.11-d.2	CONTROL	Relationships among all information types easily accessible
NC	3.2.1.1.6.11-d.3	CONTROL	Relationships among all information types easily discernible
NC	3.2.1.1.6.11-e	CONTROL	Support presentation of TO data for no fewer than two levels of technical expertise
NC	3.2.1.1.6.11-f	CONTROL	Graphics presented clearly on the screen with the appropriate amount of detail
NC	3.2.1.1.6.11-g	CONTROL	Support zoom and scroll functions for use with graphic displays
NC	3.2.1.1.6.11-h	CONTROL	Support tailorability by the user for certain types of displays
NC	3.2.1.1.6.11-i	CONTROL	Store user preference in the user profile
NC	3.2.1.1.6.11-j	CONTROL	Displays tailorable, as a minimum, with regard to:
NC	3.2.1.1.6.11-j.1	CONTROL	Background and foreground color
NC	3.2.1.1.6.11-j.2	CONTROL	Font size of displayed text
NC	3.2.1.1.6.11-j.3	CONTROL	Cursor form
NC	3.2.1.1.6.11-j.4	CONTROL	User's data presentation style preference, in cases in which data can be displayed textually or graphically
NC	3.2.1.1.6.12	CONTROL	Error Correction
NC	3.2.1.1.6.12-a	CONTROL	User cancellation or modification of any user-instigated process
NC	3.2.1.1.6.12-b	CONTROL	Correction of entered data, to include:
NC	3.2.1.1.6.12-b.1	CONTROL	Delete
NC	3.2.1.1.6.12-b.2	CONTROL	Undo
NC	3.2.1.1.6.12-b.3	CONTROL	Cut and paste
NC	3.2.1.1.6.12-b.4	CONTROL	Overwrite
NC	3.2.1.1.6.12-c	CONTROL	Validation of input to determine appropriateness of format and suitability of content
NC	3.2.1.1.6.12-d	CONTROL	User notification of invalid user inputs, indicating nature of the invalid data and correct data type required
NC	3.2.1.1.6.12-e	CONTROL	Correction of user input error (by the user)
NC	3.2.1.1.6.13	CONTROL	Help
NC	3.2.1.1.6.13-a	CONTROL	Easily accessible context-sensitive help to supply user with guidance on the use of IMIS
NC	3.2.1.1.6.13-b	CONTROL	Easily accessible additional information concerning tasks performed using IMIS
NC	3.2.1.1.6.13-c	CONTROL	Indexed help function to allow users to examine instructions for other functions

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.1.1.6.14	CONTROL	System Termination
NC	3.2.1.1.6.14.1	CONTROL	IMIS System Termination
NC	3.2.1.1.6.14.1-a	CONTROL	Notify MIWs and PMAs of system termination
NC	3.2.1.1.6.14.1-b	CONTROL	Save all IMIS working files
NC	3.2.1.1.6.14.1-c	CONTROL	Terminate all internal processes
NC	3.2.1.1.6.14.1-d	CONTROL	Shut down upon receiving termination acknowledgment from all connected MIWs and associated PMAs
NC	3.2.1.1.6.14.2	CONTROL	MIW Termination
NC	3.2.1.1.6.14.2-a	CONTROL	Output termination notification to operators in communication with the specified MIW
NC	3.2.1.1.6.14.2-b	CONTROL	Close and save all working files
NC	3.2.1.1.6.14.2-c	CONTROL	Terminate all internal/independent processes for the MIW
NC	3.2.1.1.6.14.2-d	CONTROL	Output termination notice to system controller indicating that termination procedures have been completed
NC	3.2.1.1.6.14.2-e	CONTROL	Shut down MIW
NC	3.2.1.1.6.14.3	CONTROL	PMA Termination
NC	3.2.1.1.6.14.3-a	CONTROL	Close and save all PMA working files
NC	3.2.1.1.6.14.3-b	CONTROL	Terminate active PMA processes
NC	3.2.1.1.6.14.3-c	CONTROL	Output notification to operator and any associated MIWs that termination procedures complete
NC	3.2.1.1.6.14.3-d	CONTROL	Shut down PMA
D	**3.2.1.1.6.14.4**	**CONTROL**	**AIP Termination**
D	**3.2.1.1.6.14.4-a**	**CONTROL**	**Close and save all data transmissions to the PMA from the AIP**
D	**3.2.1.1.6.14.4-b**	**CONTROL**	**Output notification to operator indicating that termination procedures complete**
NC	3.2.2		System Capability Relationships
NC	3.2.3		IMIS External Interfaces
NC	3.2.3-a		Provide single point access to information in external databases
NC	3.2.3-b		Present information in format tailored to needs of specific user category
NC	3.2.3.1		CAMS Interface
NC	3.2.3.2		SBSS Interface
NC	3.2.3.3		JCALS Interface
D	**3.2.3.4**		**CEMS Interface**
D	**3.2.3.5**		**BLMAS Interface**

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ACT	PARAGRAPH	MODE	REQUIREMENT
D	**3.2.3.6**		**WCCS Interface**
D			**On-Line Vehicle Integrated Maintenance Status (OLVIMS) *interface***
D			**Automated Fleet Information System (AFIS) Interface**
A			**Base On-line Weather System Interface**
NC	3.2.3.7		Deleted.
NC	3.2.3.8		Deleted.
D	**3.2.3.9**		**Communicate with weapon system DTU reader/recorder**
D	**3.2.3.10**		**Weapon System Interface**
D	**3.2.3.10-a**		**Interface with on-aircraft maintenance bus(es) and in-flight parameter and fault recorders**
D	**3.2.3.10-b**		**Interface provides the following capabilities:**
D	**3.2.3.10-b.1**		**Analyze in-flight recorded parameter and failure data**
D	**3.2.3.10-b.2**		**Analyze on-board historical data**
D	**3.2.3.10-b.3**		**Upload and download aircraft software**
D	**3.2.3.10-b.4**		**Initiate and interpret on-aircraft tests**
D	**3.2.3.10-b.5**		**Upload configuration data**
D	**3.2.3.10-b.6**		**Download maintenance data**
NC	3.2.3.10-c		Crypto keying may be handled
D	**3.2.3.10-d**		**In addition to avionics systems, aircraft systems interfaced may include:**
D	**3.2.3.10-d.1**		**Engine Monitoring System**
D	**3.2.3.10-d.2**		**Environmental Control System**
D	**3.2.3.10-d.3**		**Flight Control System**
D	**3.2.3.10-d.4**		**Weapons Stores Management System**
D	**3.2.3.10-d.5**		**Airframe Time/Stress Measurement Devices**
D	**3.2.3.11**		**Support/Test Equipment Interface**
D	**3.2.3.11-a**		**Interrogate S/TE BIT to support troubleshooting**
D	**3.2.3.11-b**		**Query S/TE to obtain current configuration and health**
NC	3.2.4		Physical Characteristics
NC	3.2.5		System Quality Factors
NC	3.2.5.1		Reliability
NC	3.2.5.1-a		Identify reliability requirements per MIL-STD-785B tasks 101, 102, 201, 202, 203
NC	3.2.5.1-b		Employ a reliability requirements analysis to support reliability objectives
NC	3.2.5.2		Maintainability
NC	3.2.5.2-a		IMIS equipment rugged, reliable, and easy to maintain

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.5.2-b		No change in manning or supply procedures required to support IMIS
NC	3.2.5.2-c		No additional support equipment required by IMIS
NC	3.2.5.2-d		Each IMIS subsystem provides the following test capabilities:
NC	3.2.5.2-d.1		Self-test routines performed upon power-up and upon operator command
NC	3.2.5.2-d.2		Selectable BIT capability
NC	3.2.5.2-e		Self-test and BIT detect and isolate failures
NC	3.2.5.2-f		Combination of self-test and BIT:
NC	3.2.5.2-f.1		Detect at least 95% of all digital module failures
NC	3.2.5.2-f.2		Isolate to correct failed digital module 90% of the time
NC	3.2.5.2-g		No special tools/equipment required for fault isolation, repair at base level
NC	3.2.5.2-h		Complete maintenance cycle (MTTR) requires no more than 30 minutes
NC	3.2.5.2-i		Equipment prevents incorrect installation of modules, assemblies, and connecting cables
NC	3.2.5.2-j		Maintainability requirements further refined through a maintainability plan
NC	3.2.5.3		Availability
NC	3.2.5.3-a		Availability of IMIS commensurate with needs of weapon system availability
NC	3.2.5.3-b		Availability realized by cost-effective combination of reliability, testability, and maintainability
NC	3.2.5.4		Following additional quality factors will be the subject of a plan executed during Phase II
NC	3.2.5.4-a		Survivability/Vulnerability, identifying system vulnerabilities and improved design survivability
NC	3.2.5.4-b		Testability, defined in terms of ensuring that the system meets its maintainability goals
NC	3.2.5.4-c		Producibility, to address the manufacturing processes to promote efficient and economic production
NC	3.2.6		Environmental Conditions
NC	3.2.6-a		IMIS capable of fully effective employment in a warfare situation at dispersed operating locations
NC	3.2.6-b		Hardware elements withstand exposure to worst reasonable natural environment
NC	3.2.6-c		System Engineering analyses performed as defined in MIL-STD-210C and MIL-STD-810D

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.2.6-c.1		Analyses of climate/weather/operating conditions/hazards that IMIS may encounter
NC	3.2.6-c.2		Analyses are basis for input to design, performance, and test sections in IMIS specification
NC	3.2.6-c.3		Analysis results reflected in IMIS specification
NC	3.2.7		Transportability
NC	3.2.7-a		IMIS capable of being rapidly deployed
NC	3.2.7-b		Each hardware segment incorporates transportability in the design
D	**3.2.7-c**		**AIP will be at DOL whenever aircraft is**
NC	3.2.7-d		Transportability requirements of PMA include:
NC	3.2.7-d.1		Portable
NC	3.2.7-d.2		Shock and vibration resistant
NC	3.2.7-d.3		Virtually immune to both natural and operating environment hazards
NC	3.2.7-d.4		PMA transportable as loose cargo, requiring no container or restraint
NC	3.2.7-e		Transportability requirements of ruggedized MIW include:
NC	3.2.7-e.1		Transportable as palletized cargo or as installed equipment
NC	3.2.7-e.2		Capable of operation in host vehicle while in motion
NC	3.2.8		Flexibility and Expansion
NC	3.2.8-a		Flexibility and expansion shall be provided by design approach and initial capacity
NC	3.2.8-b		Design considerations include open architectures, modular software, and physical expansion
NC	3.2.8-c		PMA design is modular to allow for improved technology upgrades
NC	3.2.8-d		Consideration given to "plug-in" modules for the PMA
NC	3.3		Design and Construction
NC	3.3-a		MIL-T 28800 used as guidance for MIW and PMA design and construction
NC	3.3-b		MIL-E-5400T used as guidance for AIP design and construction
NC	3.3.1		Materials
NC	3.3.1-a		Identify strategic or critical materials required
NC	3.3.1-b		Invoke requirements for use of standard components
NC	3.3.1.1		No toxic products or formulations used
NC	3.3.2		Electromagnetic Radiation
NC	3.3.2.1		Electromagnetic emission and susceptibility governed by requirements in following sections of MIL-STD-461C

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ACT	PARAGRAPH	MODE	REQUIREMENT
D	**3.3.2.1-a**		**Part 2 defines requirements for AIP (Class A1, category b)**
NC	3.3.2.1-b		Part 2 defines requirements for PMA (Class A1, category c)
NC	3.3.2.1-c		Part 7 defines requirements for MIW (Class B)
NC	3.3.2.2		Electromagnetic compatibility requirements governed by MIL-E-6051D
NC	3.3.3		Nameplate and product marking requirements specified in respective segment specifications
NC	3.3.4		Requirements for acceptable workmanship criteria
NC	3.3.4.1		Parts and assembled equipment cleaned of foreign material after fabrication
NC	3.3.4.2		Threaded parts or devices
NC	3.3.4.2-a		Screws, nuts, bolts show no evidence of cross-threading, mutilation, or burrs
NC	3.3.4.2-b		Screws, nuts, bolts firmly secured
D	**3.3.4.2-c**		**AIP uses self-locking nuts and/or nut plates**
NC	3.3.4.3		Bearing Assemblies
NC	3.3.4.3-a		Bearing assemblies free of rust, discoloration, and imperfections
NC	3.3.4.3-b		Contacting surfaces free of surface-type defects
NC	3.3.4.3-c		No detrimental interference, binding, or galling
NC	3.3.4.4		Wires and cables protected from rough surfaces and sharp edges
NC	3.3.4.5		Shielding
NC	3.3.4.5-a		Shielding on wires and cables secured to prevent contacting or shorting exposed parts
NC	3.3.4.5-b		Ends of shielding secured to prevent fraying
NC	3.3.5		System segments of a given kind interchangeable
NC	3.3.5.1		Interchangeable items
NC	3.3.5.1-a		Interchangeable items permit installation without regard to source of supply
NC	3.3.5.1-b		Software transportable between like devices
NC	3.3.5.1-c		Software designed and written for maximal independence from hardware
NC	3.3.5.2		Design tolerances permit using replacements without degrading performance
NC	3.3.5.3		Use of standard items
NC	3.3.5.3-a		Standard items used when available

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.3.5.3-b		Design does not preclude use of standard item if it becomes available
NC	3.3.5.3-c		Appropriate space, mounting holes, and other provisions provided
NC	3.3.5.3-d		Identify standard item to be used for replacement
NC	3.3.6		Safety
NC	3.3.6-a		System safety program established per MIL-STD-882B
NC	3.3.6-b		Safety provisions implemented to maximize safety and prevent damage
NC	3.3.6-c		Design of AIP and PMA precludes precipitating explosion or ignition of flammable materials
NC	3.3.6-d		Safety requirements of MIL-STD-454L, Requirement 1, include the following:
NC	3.3.6-d.1		Provide fail-safe interlocks during installation, operation, and maintenance
NC	3.3.6-d.2		Incorporate protection from electrical shock hazards
NC	3.3.6-d.3		Power cut-off provided when installing, replacing, or changing IMIS subsystems
NC	3.3.6-d.4		All external parts, surfaces, and shields are at ground electrical potential
NC	3.3.7		Human Engineering
NC	3.3.7.1		Anthropometrics
NC	3.3.7.1-a		Accommodate fifth to ninety-fifth percentile ranges
NC	3.3.7.1-b		Apply wider distribution where ranges differ for males and females
NC	3.3.7.1-c		Consider specialized anthropometric data bases
NC	3.3.7.2		System Design Constraints
NC	3.3.7.2-a		Constraints on the design of IMIS established in accordance with the following:
NC	3.3.7.2-a.1		MIL-STD-1472D
NC	3.3.7.2-a.2		Human factors engineering activities described in paragraph 3.3.7.2
NC	3.3.7.2-a.3		Additional principles available from recent research and guidelines
NC	3.3.7.2-b		Hardware and displays ergonomically designed
NC	3.3.7.2-c		IMIS design takes into account the following:
NC	3.3.7.2-c.1		Size
NC	3.3.7.2-c.2		Shape
NC	3.3.7.2-c.3		Physical relationship to the user
NC	3.3.7.2-c.4		Safety
NC	3.3.7.2-c.5		Look and feel

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.3.7.2-c.6		Layout of the keyboard/controls/knobs/indicators
NC	3.3.7.2-d		Displays and menus designed using latest human factors concepts
NC	3.3.7.2-e		System response time based on users' perception of a responsive system
NC	3.3.7.2-f		System designed to meet following response time limits:
NC	3.3.7.2-f.1		Time to install a system at a base
NC	3.3.7.2-f.2		Time to respond with a quick acknowledgment of a command
NC	3.3.7.2-f.3		Time to respond with an answer to a given question (data on-system)
NC	3.3.7.2-f.4		Time to gain access to the system (from coldstart to log-on)
NC	3.3.7.2-f.5		Time to warmstart the system
NC	3.3.7.2-f.6		Time to reconfigure a system
NC	3.3.7.2.1		IMIS supplies user with three types of feedback
NC	3.3.7.2.1.1		IMIS supplies prompts and cues for every user-system interaction
NC	3.3.7.2.1.2		IMIS supplies the user with continuous feedback indicating the following:
NC	3.3.7.2.1.2-a		User's most current interaction with IMIS, including:
NC	3.3.7.2.1.2-a.1		Where the user is in a maintenance procedure or process
NC	3.3.7.2.1.2-a.2		Status of in-process computer execution of commands
NC	3.3.7.2.1.2-a.3		Context or location of the current task within its related data structures
NC	3.3.7.2.1.2-b		Current data structure's relationship to other data structures within the process
NC	3.3.7.2.1.3		IMIS requirements for error handling
NC	3.3.7.2.1.3-a		IMIS assures correctness of user-entered data
NC	3.3.7.2.1.3-a.1		Perform validity and reasonableness checks on all user input
NC	3.3.7.2.1.3-a.2		Inform the user in the event that non-valid or out-of-range data has been entered
NC	3.3.7.2.1.3-a.3		Indicate the steps the user should undertake to rectify the error
NC	3.3.7.2.1.3-b		IMIS provides method to prevent accidental actuation of potentially destructive control actions
NC	3.3.7.2.1.3-c		IMIS requires user to acknowledge critical entries prior to execution
NC	3.3.7.2.1.3-d		IMIS facilitates error recovery
NC	3.3.7.2.1.3-d.1		Allow the user to stop the control process at any point in a sequence as a result of an indicated error
NC	3.3.7.2.1.3-d.2		Allow the user to return to previous levels in multi-step process to nullify an error
NC	3.3.7.2.2		IMIS provides context-sensitive on-line help

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.3.7.2.3		IMIS has an index of available help screens
NC	3.3.7.2.4		IMIS is easy to learn for personnel without previous computer experience through on-the-job training
NC	3.3.7.2.4-a		IMIS provides prompts, cues, feedback, and help functions
NC	3.3.7.2.4-b		IMIS uses menus as primary means of user-system interactions
NC	3.3.7.2.4-c		IMIS uses Romulain Empire command language for information access
NC	3.3.7.2.5		Concurrent presentation of information for multiple tasks and subtasks supported
NC	3.3.7.2.5-a		Use of technical data in a serial or parallel presentation is supported
NC	3.3.7.2.5-b		User allowed to select preferred task sequencing
NC	3.3.7.2.6		IMIS provides support for multiple user access without requiring the original user to log-out
NC	3.3.7.2.7		IMIS user-system interface will be tailorable with regard to detail provided
NC	3.3.7.2.7.1		IMIS supports a default user profile and user-system interface
NC	3.3.7.2.7.2		User's supervisor must identify access and security restrictions for nonstandard interface
NC	3.3.7.2.8		Input/Output devices selected for each segment provide maximum flexibility
NC	3.3.7.2.8.1		Input devices considered
NC	3.3.7.2.8.2		Output devices considered
NC	3.3.7.2.9		IMIS provides appropriate formats for user-system interactions
NC	3.3.7.2.9.1		Data entry requires explicit completion action
NC	3.3.7.2.9.2		Cursors employed by IMIS user
NC	3.3.7.2.9.2.1		IMIS provides cursor control capability consistent with user speed and accuracy requirements
NC	3.3.7.2.9.2.2		Cursor display requirements
NC	3.3.7.2.9.2.2-a		Each movable cursor has distinctive visual attributes that do not obscure other displayed entities
NC	3.3.7.2.9.2.2-b		Displayed cursor includes appropriate point designation feature when fine positioning accuracy required
NC	3.3.7.2.9.2.3		Home position for the cursor consistent across similar display types
NC	3.3.7.2.9.2.4		Wrap-around capabilities
NC	3.3.7.2.9.2.4-a		Cursor wraps around to beginning or ending of option list
NC	3.3.7.2.9.2.4-b		Cursors used for selecting from different fields of data can be moved by the user
NC	3.3.7.2.9.3		Fixed function keys

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.3.7.2.9.3.1		Fixed function keys employed for time-critical, error-critical, or *frequently used control inputs*
NC	3.3.7.2.9.3.2		Fixed function keys common throughout each IMIS segment and between segments
NC	3.3.7.2.9.3.3		Fixed function keys not reassigned to a different function for a given user
NC	3.3.7.2.9.3.4		Fixed function key availability
NC	3.3.7.2.9.3.4-a		Fixed function keys selected to control functions that are continuously available
NC	3.3.7.2.9.3.4-b		Function keys not used for current inputs temporarily disabled
NC	3.3.7.2.9.3.4-c		Mechanical overlays not used
NC	3.3.7.2.9.3.5		Inactive fixed function keys replaced by blank key on the input device
NC	3.3.7.2.9.3.6		Fixed function key groupings
NC	3.3.7.2.9.3.6-a		Logically grouped
NC	3.3.7.2.9.3.6-b		Placed in distinctive locations on the keyboard
NC	3.3.7.2.9.3.7		Fixed function key requires only a single actuation
NC	3.3.7.2.9.3.8		System acknowledgment provided when fixed function key activation result not immediately observable
NC	3.3.7.2.9.3.9		Fixed function key assignments labeled
NC	3.3.7.2.9.3.9-a		Key assignments displayed at all times
NC	3.3.7.2.9.3.9-b		Standardized DOD abbreviations used
NC	3.3.7.2.9.4		Variable function keys used for programmable menu selection and entry of control functions
NC	3.3.7.2.9.4.1		Status of variable function key displayed when its effect varies
NC	3.3.7.2.9.4.2		User warned when labeled default function not currently accessible using that function key
NC	3.3.7.2.9.4.3		Variable function keys easily relabeled
NC	3.3.7.2.9.4.4		Variable function keys do not require depression of shift key
NC	3.3.7.2.9.5		Interaction by menu selection
NC	3.3.7.2.9.5.1		IMIS provides the following menu selection capabilities:
NC	3.3.7.2.9.5.1-a		Menu selection is primary means of user-system interaction
NC	3.3.7.2.9.5.1-b		Menu selection used for tasks involving little or no entry of arbitrary data
NC	3.3.7.2.9.5.1-c		User provided with the option to use menus, even if command language is supported
NC	3.3.7.2.9.5.2		Lightpens, mice, touchscreens, or other pointing devices used for menu selection
NC	3.3.7.2.9.5.2-a		Dual actions required to designate selected option and enter the selection into IMIS

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.3.7.2.9.5.2-b		Standard window provided to key selected option code if pointing devices not used
NC	3.3.7.2.9.5.3		Each display of options has a title clarifying its purpose
NC	3.3.7.2.9.5.4		IMIS user provided with the capability to stack menu selections
NC	3.3.7.2.9.5.5		Menus logically segmented to allow several sequential selections among a few alternatives
NC	3.3.7.2.9.5.6		Only menu selections for actions which are currently available are presented
NC	3.3.7.2.9.5.7		Menus presented in a consistent format throughout IMIS
NC	3.3.7.2.9.5.8		Menu selections listed in a logical order
NC	3.3.7.2.9.5.9		Simple menu used when the number of selections fits in no more than two columns
NC	3.3.7.2.9.5.10		Selection codes and associated descriptors presented on single lines
NC	3.3.7.2.9.5.11		IMIS provides direct function call capability for experienced user
NC	3.3.7.2.9.5.12		Wording and order used for menu selection consistent with command language
NC	3.3.7.2.9.5.13		Codes associated with options included on the display in a consistent manner
NC	3.3.7.2.9.5.14		Keyed codes used for option selection coded by the first several letters of their labels
NC	3.3.7.2.9.5.15		IMIS gives the user some indication of the displayed menu's current position in the overall structure
NC	3.3.7.2.9.5.16		IMIS ensures that the user can return to the next higher level using a single action
NC	3.3.7.2.9.5.17		IMIS provides a function to directly recall the initial top-level menu or display
NC	3.3.7.2.9.6		Data presented by IMIS is in a readily usable and readable form
NC	3.3.7.2.9.7		IMIS presents notes, cautions, and warnings which require user acknowledgment
NC	3.3.7.2.9.8		IMIS supports the following user navigation and movement:
NC	3.3.7.2.9.8-a		Back
NC	3.3.7.2.9.8-b		Forward
NC	3.3.7.2.9.8-c		Return
NC	3.3.7.2.9.8-d		Scroll
NC	3.3.7.2.9.8-e		Zoom
NC	3.3.7.2.9.8-f		Reduce
NC	3.3.7.2.9.8-g		Exit

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NC	3.3.7.2.10		IMIS training includes formal and informal training of IMIS operation
NC	3.3.7.2.10-a		IMIS provides embedded computer-based training to teach IMIS operation
NC	3.3.7.2.10-b		Formal training supports acquisition of operator skills for personnel of varying familiarity with computers
NC	3.3.7.2.10-c		Minimal formal training required
NC	3.3.7.2.11		IMIS supports communication among system users for both real-time and decoupled interaction
NC	3.3.7.2.11.1		IMIS supports coordination of communication and interaction between multiple users in real-time
NC	3.3.7.2.11.1-a		Presentation of materials to multiple team members to allow for work coordination
NC	3.3.7.2.11.1-b		Transmission of messages between system users
NC	3.3.7.2.11.2		IMIS supports communications which do not require immediate action by the receiver
NC	3.3.7.2.12		IMIS performance not degraded by real-world incongruities
NC	3.3.7.2.12-a		User input causing application or operational software to enter an indeterminate state prevented
NC	3.3.7.2.12-b		Terminate data entry or information presentation sequence and notify operator of:
NC	3.3.7.2.12-b.1		Termination of the process
NC	3.3.7.2.12-b.2		Reason for the termination
NC	3.3.7.2.12-b.3		Necessary steps to complete processing
NC	3.3.7.2.13		Buffering capabilities to provide safeguards against data loss during data transfer
NC	3.3.7.2.13-a		Data transferred to external systems will be buffered
NC	3.3.7.2.13-b		Buffering permits IMIS to continue receiving user input while data transfer occurs
NC	3.3.7.2.13-c		Buffering capability designed to accommodate a wide range of outages
NC	3.3.7.2.14		Avoid symbols or figures that can be misinterpreted, misperceived, or not detected
NC	3.3.7.2.15		Use of color in displays
NC	3.3.7.2.15-a		Present information in color
NC	3.3.7.2.15-b		Prevent use of color as either the sole or major dimension for the presentation of information
NC	3.3.7.2.16		IMIS system response times
NC	3.3.7.2.16-a		IMIS response times consistent with operational requirements
NC	3.3.7.2.16-b		Required user response times compatible with required system response time

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.3.7.2.16-c		Required user response times within limits imposed by total user tasking expected
NC	3.3.7.2.16-d		Message given if IMIS response time exceeds 5 seconds
NC	3.3.7.2.16.1		Response time induced input device lockout
NC	3.3.7.2.16.1-a		Input devices locked out until the computer can accept the next transaction
NC	3.3.7.2.16.1-b		Alert is displayed to indicate that lockout has occurred
NC	3.3.7.2.16.2		User notified when IMIS is ready to continue following lockout
NC	3.3.7.2.17		Human engineering activities compliant with MIL-H-46855B tailored to IMIS program
NC	3.3.7.2.17-a		Operator task analysis (gross and critical)
NC	3.3.7.2.17-b		Information flow and processing analysis
NC	3.3.7.2.17-c		Task timeline development
NC	3.3.7.2.17-d		Workload analysis
NC	3.3.7.2.17-e		Rapid prototype development and testing
NC	3.3.7.2.17-f		Development of system test and validation plan, in accordance with AFR 80-14
NC	3.3.7.2.17-g		Participation in system test and validation
NC	3.3.7.2.17-h		Performance of training requirements analyses in accordance with MIL-STD-1379D
NC	3.3.7.3		MIW presents information and allows communication
NC	3.3.7.3.1		I/O devices for MIW provide maximum flexibility
NC	3.3.7.3.1.1		Input devices considered for MIW
NC	3.3.7.3.1.2		Output devices considered for MIW
NC	3.3.7.3.2		User-system interaction methods considered for MIW
NC	3.3.7.3.2-a		Entries to MIW checked for validity and reasonableness
NC	3.3.7.3.2-b		MIW indicates when data requires correction and allows for correction
NC	3.3.7.3.2-c		Data entry input in the form of menu selections, function key input, and alphanumeric input
NC	3.3.7.3.2-d		MIW presents data as text, graphics, forms, or any combination thereof
NC	3.3.7.3.2-e		User profile and password differentiate authorized use and unauthorized attempted use of system
NC	3.3.7.3.2-f		MIW allows modification of security aspects of user profiles by appropriate authorities
NC	3.3.7.3.2-g		Use of MIW does not require familiarity with computers
NC	3.3.7.3.2-h		Text presented by MIW in standard English or accepted abbreviations

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.3.7.3.2-i		Definitions of all abbreviations available through IMIS help functions
NC	3.3.7.3.2-j		Interaction with MIW does not require memorization or looking up codes or commands
NC	3.3.7.3.2-k		Menus and data presented by the MIW reflect a logical organization of the information or functions
NC	3.3.7.3.2.1		MIW data access
NC	3.3.7.3.2.1-a		MIW supports data access through all input devices
NC	3.3.7.3.2.1-b		Screens used for data access reflect multiple methods by which data may be accessed
NC	3.3.7.3.2.1-c		MIW presents a menu as a data access aid
NC	3.3.7.3.2.2		MIW supports data entry through the input device(s) most suited to the data type and function
NC	3.3.7.3.3		MIW data formats
NC	3.3.7.3.3-a		MIW segment supports the following data formats:
NC	3.3.7.3.3-a.1		Text
NC	3.3.7.3.3-a.2		Graphics
NC	3.3.7.3.3-a.3		Forms
NC	3.3.7.3.3-b		Text used to present error messages, instructions, queries, menu selections, header information
NC	3.3.7.3.3-c		Graphics used to support instructions and as icons
NC	3.3.7.3.3-d		Forms used to elicit user input
NC	3.3.7.3.3-e		MIW screen formats designed based on the following:
NC	3.3.7.3.3-e.1		User application
NC	3.3.7.3.3-e.2		User background
NC	3.3.7.3.3-e.3		Human engineering analyses conducted as described in paragraph 3.3.7.2.17
NC	3.3.7.3.3-e.4		Current ergonomic design principles
NC	3.3.7.3.3-f		MIW screen formats partially tailorable by the user
NC	3.3.7.3.4		MIW screens designed in accordance with currently available guidance documents
NC	3.3.7.3.4-a		Screen design reflects availability to the user of the selected input devices
NC	3.3.7.3.4-b		MIW supports three types of screens:
NC	3.3.7.3.4-b.1		Text only, including:
NC	3.3.7.3.4-b.1.a		Textual material presenting data which does not require support of graphics
NC	3.3.7.3.4-b.1.b		Screens devoted to the presentation of a menu
NC	3.3.7.3.4-b.2		Text and graphics, including:
NC	3.3.7.3.4-b.2.a		Text appearing above the graphic

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.3.7.3.4-b.2.b		Text appearing to the left of the graphic
NC	3.3.7.3.4-b.3		Graphic only
NC	3.3.7.3.4-c		Supplementary materials easily accessible and overlaid on display
NC	3.3.7.3.4-d		Screens include method for conveying to the user the data accessed or function performed
NC	3.3.7.3.4-e		Screens include identifying headers or titles
NC	3.3.7.3.4-f		Rules for constructing text in accordance with MIL-M-83495, MIL-M-38784, MIL-M-87920
NC	3.3.7.3.5		MIW use with protective gear
NC	3.3.7.3.5-a		Stationary MIW requires no accommodation for visual and tactile sensory limitations
C	**3.3.7.3.5-b**		**Mobile, ruggedized MIW requires no or visual and tactile sensory limitations**
			Mobile, ruggedized MIW accommodates operation at a level approximating unprotected operation
NC	3.3.7.4		PMA presents information and allows communication
NC	3.3.7.4.1		Field usability of PMA evaluated
NC	3.3.7.4.1-a		Weight no more than six pounds
NC	3.3.7.4.1-b		Grip sizes and locations relative to center of gravity
NC	3.3.7.4.1-c		Usability while held by an operator in one hand for five minutes
NC	3.3.7.4.1-d		Usability while otherwise supported
NC	3.3.7.4.1-e		Constraints imposed by shape
NC	3.3.7.4.1-f		Use of aids for carrying
NC	3.3.7.4.2		I/O devices for PMA provide maximum flexibility
NC	3.3.7.4.2.1		Input devices considered for PMA
NC	3.3.7.4.2.2		Output devices considered for PMA
NC	3.3.7.4.3		User-system interaction methods considered for PMA
NC	3.3.7.4.3-a		PMA designed for minimal hands-on interaction while entering input or receiving data
NC	3.3.7.4.3-b		Entries to PMA checked for validity and reasonableness
NC	3.3.7.4.3-c		PMA indicates when data requires correction and allows for correction
NC	3.3.7.4.3-d		Data entry input in the form of menu selections, function key input, and alphanumeric input
NC	3.3.7.4.3-e		PMA presents data as text, graphics, forms, or any combination thereof
NC	3.3.7.4.3-f		User profile and password differentiate authorized use and unauthorized attempted use of system

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.3.7.4.3-g		Use of PMA does not require familiarity with computers
NC	3.3.7.4.3-h		Text presented by PMA in standard English or accepted abbreviations
NC	3.3.7.4.3-i		Definitions of all abbreviations available through IMIS help functions
NC	3.3.7.4.3-j		Interaction with PMA does not require memorization or looking up codes or commands
NC	3.3.7.4.3-k		Menus and data presented by the PMA reflect a logical organization of the information or functions
NC	3.3.7.4.3.1		PMA data access
NC	3.3.7.4.3.1-a		PMA supports data access through all input devices
NC	3.3.7.4.3.1-b		Screens used for data access *reflect multiple methods* by which data may be accessed
NC	3.3.7.4.3.1-c		PMA presents a menu as a data access aid
NC	3.3.7.4.3.2		PMA supports data entry through the input device(s) most suited to the data type and function
NC	3.3.7.4.4		PMA data formats
NC	3.3.7.4.4-a		PMA segment supports the following data formats:
NC	3.3.7.4.4-a.1		Text
NC	3.3.7.4.4-a.2		Graphics
NC	3.3.7.4.4-a.3		Forms
NC	3.3.7.4.4-b		Text used to present error messages, instructions, queries, menu selections, header information
NC	3.3.7.4.4-c		Graphics used to support instructions and as icons
NC	3.3.7.4.4-d		Forms used to elicit user input
NC	3.3.7.4.4-e		PMA screen formats designed based on the following:
NC	3.3.7.4.4-e.1		User application
NC	3.3.7.4.4-e.2		User background
NC	3.3.7.4.4-e.3		Human engineering analyses conducted as described in paragraph 3.3.7.2.17
NC	3.3.7.4.4-e.4		*Current ergonomic design principles*
NC	3.3.7.4.4-f		PMA screen formats partially tailorable by the user
NC	3.3.7.4.5		PMA screens designed in accordance with currently available guidance documents
NC	3.3.7.4.5-a		Screen design reflects availability to the user of the selected input devices
NC	3.3.7.4.5-b		PMA supports three types of screens:
NC	3.3.7.4.5-b.1		Text only, including:
NC	3.3.7.4.5-b.1.a		Textual material presenting data which does not require support of graphics

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.3.7.4.5-b.1.b		Screens devoted to the presentation of a menu
NC	3.3.7.4.5-b.2		Text and graphic, including:
NC	3.3.7.4.5-b.2.a		Text appearing above the graphic
NC	3.3.7.4.5-b.2.b		Text appearing to the left of the graphic
NC	3.3.7.4.5-b.3		Graphic only
NC	3.3.7.4.5-c		Supplementary materials easily accessible and overlaid on display
NC	3.3.7.4.5-d		Screens include method for conveying to the user the data accessed or function performed
NC	3.3.7.4.5-e		Screens include identifying headers or titles
NC	3.3.7.4.5-f		Rules for constructing text in accordance with MIL-M-83495, MIL-M-38784, MIL-M-87920
NC	3.3.7.4.6		PMA supports use by personnel wearing normal or protective gear
D	**3.3.7.5**		**AIP uploads/downloads data to/from PMA and presents data to maintenance technician**
D	**3.3.7.5.1**		**I/O devices for AIP provide maximum flexibility**
D	**3.3.7.5.1.1**		**Input devices considered for AIP**
D	**3.3.7.5.1.2**		**Output devices considered for AIP**
D	**3.3.7.5.2**		**User-system interaction methods considered for AIP**
D	**3.3.7.5.2-a**		**AIP segment designed for minimal hands-on interaction while entering input or receiving data**
D	**3.3.7.5.2-b**		**Entries to AIP checked for validity and reasonableness**
D	**3.3.7.5.2-c**		**AIP indicates when data requires correction and allows for correction**
D	**3.3.7.5.2-d**		**Data entry input in the form of menu selections, function key input, and alphanumeric input**
D	**3.3.7.5.2-e**		**AIP presents data as text, graphics, forms, or any combination thereof**
D	**3.3.7.5.2-f**		**User profile and password differentiate authorized use and unauthorized attempted use of system**
D	**3.3.7.5.2-g**		***Use of AIP does not require familiarity with computers***
D	**3.3.7.5.2-h**		**Text presented by AIP in standard English or accepted abbreviations**
D	**3.3.7.5.2-i**		**Interaction with AIP does not require memorization or looking up codes or commands**
D	**3.3.7.5.2-j**		**Menus and data presented by the AIP reflect a logical organization of the information or functions**
D	**3.3.7.5.2.1**		**AIP data access**

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ACT	PARAGRAPH	MODE	REQUIREMENT
D	3.3.7.5.2.1-a		**AIP supports data access through all input devices**
D	3.3.7.5.2.1-b		**Screens used for data access reflect multiple methods by which data may be accessed**
D	3.3.7.5.2.1-c		**AIP presents a menu as a data access aid**
D	3.3.7.5.2.2		**AIP supports data entry through the input device(s) most suited to the data type and function**
D	3.3.7.5.3		**AIP data formats**
D	3.3.7.5.3-a		**AIP segment supports the following data formats:**
D	3.3.7.5.3-a.1		**Text**
D	3.3.7.5.3-a.2		**Graphics**
D	3.3.7.5.3-a.3		**Forms**
D	3.3.7.5.3-b		**Text used to present error messages, instructions, queries, menu selections, header information**
D	3.3.7.5.3-c		**Graphics used to support instructions and as icons**
D	3.3.7.5.3-d		**Forms used to elicit user input**
D	3.3.7.5.3-e		**AIP screen formats designed based on the following:**
D	3.3.7.5.3-e.1		**User application**
D	3.3.7.5.3-e.2		**User background**
D	3.3.7.5.3-e.3		**Human engineering analyses conducted as described in paragraph 3.3.7.2.17**
D	3.3.7.5.3-e.4		**Current ergonomic design principles**
D	3.3.7.5.3-f		**AIP screen formats not tailorable by the user**
D	3.3.7.5.4		**AIP screens designed in accordance with currently available guidance documents**
D	3.3.7.5.4-a		**Screen design reflects availability to the user of the selected input devices**
D	3.3.7.5.4-b		**AIP supports three types of screens:**
D	3.3.7.5.4-b.1		**Text only, including:**
D	3.3.7.5.4-b.1.a		**Textual material presenting data which does not require support of graphics**
D	3.3.7.5.4-b.1.b		**Screens devoted to the presentation of a menu**
D	3.3.7.5.4-b.2		**Text and graphic, including:**
D	3.3.7.5.4-b.2.a		**Text appearing above the graphic**
D	3.3.7.5.4-b.2.b		**Text appearing to the left of the graphic**
D	3.3.7.5.4-b.3		**Graphic only**
D	3.3.7.5.4-c		**Supplementary materials easily accessible and overlaid on display**
D	3.3.7.5.4-d		**Screens include method for conveying to the user the data accessed or function performed**

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ACT	PARAGRAPH	MODE	REQUIREMENT
D	**3.3.7.5.4-e**		**Screens include identifying headers or titles**
D	**3.3.7.5.4-f**		**Rules for constructing text in accordance with MIL-M-83495, MIL-M-38784, MIL-M-87920**
D	**3.3.7.5.5**		**AIP supports use by personnel wearing normal or protective gear**
NC	3.3.7.6		Interdevice Connectors
NC	3.3.7.6-a		Mechanical interfaces between segments designed for operator use with normal or protective gear
NC	3.3.7.6-b		Cables and cable connections keyed to prevent misaligning or miscabling
NC	3.3.8		Nuclear Control
NC	3.3.8-a		No nuclear components included
NC	3.3.8-b		Unclassified TO data for upload, download, and function check of nuclear weapons can be presented
NC	3.3.8-c		Classified technical data related to nuclear weapons accessible through IMIS
NC	3.3.9		System Security
NC	3.3.9-a		For unclassified information:
NC	3.3.9-a.1		Provide ease of accessing, displaying, entering unclassified data
NC	3.3.9-a.2		Handling of unclassified information not restricted nor encumbered by security
NC	3.3.9-b		For classified information:
NC	3.3.9-b.1		Capability to provide adequate system security when handling classified data
NC	3.3.9-b.2		IMIS designed, implemented, and certified as an appropriately secure system
NC	3.3.9-b.3		Consider implementation as a Class B2 trusted system
NC	3.3.9-c		Limit data access to authorized users only
NC	3.3.9-c.1		Provide control of data access and data entry
NC	3.3.9-c.2		Control access and data entry by log-on identity code
NC	3.3.9-c.3		Maintain authentication data for verifying user identity and authorizations
NC	3.3.9-c.4		Protect authentication data from access by unauthorized users
NC	3.3.9-d		Protect executable code from external interference or tampering
NC	3.3.9-e		Designed to prevent acceptance or propagation of computer virus
NC	3.3.10		Government-Furnished Property (GFP) usage
NC	3.3.10-a		No GFP included except the AIP

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.3.10-b		Provide computational engine and generic rule set for external data
NC	3.3.10-c		Additions or modifications to external systems do not require IMIS updates
NC	3.3.11		Computer Resource Reserve Capacity
NC	3.3.11-a		Level of reserve capacities proposed for acceptance at PDR
NC	3.3.11-b		Update level of reserve capacities as appropriate
NC	3.4		Documentation adequate to define and control configuration
NC	3.5		Prepare Logistics Support Analysis (LSA) use study
NC	3.5-a		Document responsibilities and procedures for effective ILS program
NC	3.5-b		Prepare study using MIL-STD-1388-1A as guidance
NC	3.6		Personnel and Training
NC	3.6.1		Personnel
NC	3.6.1-a		Determine expected number of operators and support personnel
NC	3.6.1-b		Include all specialties and skill levels comprising Rivet Work Force program
NC	3.6.1-c		Include potential specialties as part of the future IMIS environment
NC	3.6.2		Training
NC	3.6.2-a		IMIS training program implemented using guidance from AFM 50-2 and MIL-STD-1379D
NC	3.6.2-b		Formal training satisfies two basic requirements:
C	**3.6.2-b.1**		**Use of IMIS to support equipment maintenance**
			Use of IMIS to support aircraft maintenance
NC	3.6.2-b.2		Maintenance of IMIS equipment
NC	3.6.2-c		Maintenance training in concert with approved IMIS maintenance concept
NC	3.6.2-d		Structured for full and isolated configuration contingency scenarios
NC	3.6.2.1		Responsibility for Training
NC	3.6.2.1-a		Training concept identified as a result of training analysis
NC	3.6.2.1-b		Training responsibility identified as a result of the training analysis
NC	3.6.2.1-c		Training plan development guided by AFM 50-2

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ACT	PARAGRAPH	MODE	REQUIREMENT
NC	3.6.2.1-d		Training responsibility shared by contractor and USAF Air Education and Training Command (AETC)
NC	3.6.2.1-e		Provide special (Type 1) maintenance training to ATC instructors and technicians
NC	3.6.2.1-f		Minimal follow-on (Type 4) training provided
NC	3.6.2.1-g		Self-training capability consists of on-line tutorials and help
NC	3.6.2.1-h		Support of operations training consists of development of support documentation
NC	3.6.2.1-h.1		Develop support documentation to describe on-line tutorials
NC	3.6.2.1-h.2		Present all steps necessary to:
NC	3.6.2.1-h.2.a		Install IMIS to the point at which on-line tutorials may be accessed
NC	3.6.2.1-h.2.b		Ensure IMIS is functioning properly
NC	3.6.2.1-h.3		Support documentation written clearly and concisely
NC	3.6.2.1-h.4		Deliver documentation with IMIS devices
NC	3.6.2.2		Training Equipment
NC	3.6.2.2-a		Identify training equipment requirements
NC	3.6.2.2-b		Training equipment requirements in accordance with MIL-STD-1379D and DoDD 1430.13
NC	3.6.2.2-c		Operational IMIS satisfies "hands-on" O&M training objectives
NC	3.6.2.2-d		Introduce modules with intentional faults for use during formal maintenance training
NC	3.6.2.3		Training Time and Location
NC	3.6.2.3-a		Identify training time and location requirements
NC	3.6.2.3-b		Training time and location requirements in accordance with MIL-STD-1379D
NC	3.6.2.3-c		Contractor training conducted prior to delivery of first production IMIS
NC	3.6.2.3-d		Ensure no conflict with other production or testing activities
NC	3.6.2.3-e		Additional (Type 1) training classes for maintenance considered as an option
NC	3.6.2.3-f		Optional training conducted at USAF operating bases
NC	3.6.2.4		Source Material and Training Aids
NC	3.6.2.4-a		Identify training source material/training aids requirements
NC	3.6.2.4-b		Training materials and aids in accordance with MIL-STD-1379D
NC	3.6.2.4-c		No special source materials or training aids required for Type 4 training
NC	3.6.2.4-d		Training data specified in CDRL for Type 1 training

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Appendix B: Ground TACS Strawman Model and Questionnaire

IMIS Hardware Requirements

Portable Maintenance Aid

The first group of hardware questions concerns the Portable Maintenance Aid (PMA). The PMA is the small, laptop computer with a radio connection which is issued to individual maintenance work centers. In the aircraft community, crew chiefs use PMAs to perform maintenance on individual aircraft. The following questions apply to in-garrison and deployed use by the 728th ACS. Please circle the answers you feel are most accurate or write in your alternative. You may circle more than one answer.

1. **Considering the possibility of operating without A/C electrical power, how long should PMA battery life be?**
   - **a.** Doesn't matter. We can change the batteries when they die or use A/C power.
   - **b.** 3 hours.
   - **c.** 6 hours.
   - **d.** 48 hours.
   - **e.** Best batteries possible.
   - **f.** _____

2. **How many PMAs does the 728th ACS need to provide to individual work centers?**

   a. Since PMAs will take the place of TOs, provide as many PMAs as we have TO sets.

   b. Provide as many PMAs as we have sets of TOs plus a number of spares depending on their reliability and maintenance turn around times.

   c. _____

3. **How rugged should the Portable Maintenance Aid (PMA) be?**

   a. Don't need PMA to be rugged.

   b. Put PMA in a rugged, protective packing case.

   c. Make PMA able to withstand bumps and jolts.

   d. Make PMA able to withstand a three foot drop.

   e. Make PMA dustproof.

   f. Make PMA rainproof.

   g. Make PMA ruggedness comparable to what flightline needs are.

   h. _____

4. **Could the PMA cause electromagnetic interference that would affect mission equipment?**

   a. Probably not since current laptops and handheld two-way radios don't.

   b. Need an engineer to test it first.

   c. _____

5. **Since PMA would broadcast mission status, its radio link should be encrypted.**

   a. Yes

   b. No

   c. _____

6. **What qualities do you want on the PMA screen?**

   a. Standard backlit LCD screen.
   b. Be able to use in bright sunlight and total darkness.
   c. Touch screen for user interface.
   d. Make port on PMA to connect into full sized screen.
   e. Make screen so you can read it from different angles. This allows more than one person to see the screen at once.
   f. _____

7. **Should the PMA be able to download to disk or printer?**

   a. Yes

   b. No

   c. Don't care

   d. _____

8. **Should the PMA have an internal modem allowing you to connect to a landline?**

   a. Yes

   b. No

   c. Don't care

   d. _____

9. **Knowing that additional capabilities make equipment more expensive and heavier, circle the capabilities the PMA should have:**

   a. Technical Orders

   b. Troubleshooting Expert System

   c. Diagrams

   d. MIL Standards

   e. Interface Control Documents

   f. System status reporting

   g. Other: _____

Maintenance Information Workstation

The Maintenance Information Workstation (MIW) is a desktop computer system with radio links to the PMAs and connections to base computer systems such as CAMS, SBSS, etc. The following questions deal with the MIW in-garrison and deployed.

1. Would the MIW's capability to connect directly to CAMS and SBSS be of use to the 728th ACS?

a. Yes

b. No, what we have now is adequate

c. _____

2. Would the MIW's capability to communicate with the PMAs and report system status to the command post be of use to the 728th ACS?

a. Yes

b. No

c. _____

3. The MIW would be the primary source of maintenance information in the command post on a deployment. Should it be ruggedized or built like a normal desktop computer?

a. Ruggedized to withstand jolts, drops, and sand

b. Ruggedized to withstand dust and sand

c. Not ruggedized, just packed well

d. _____

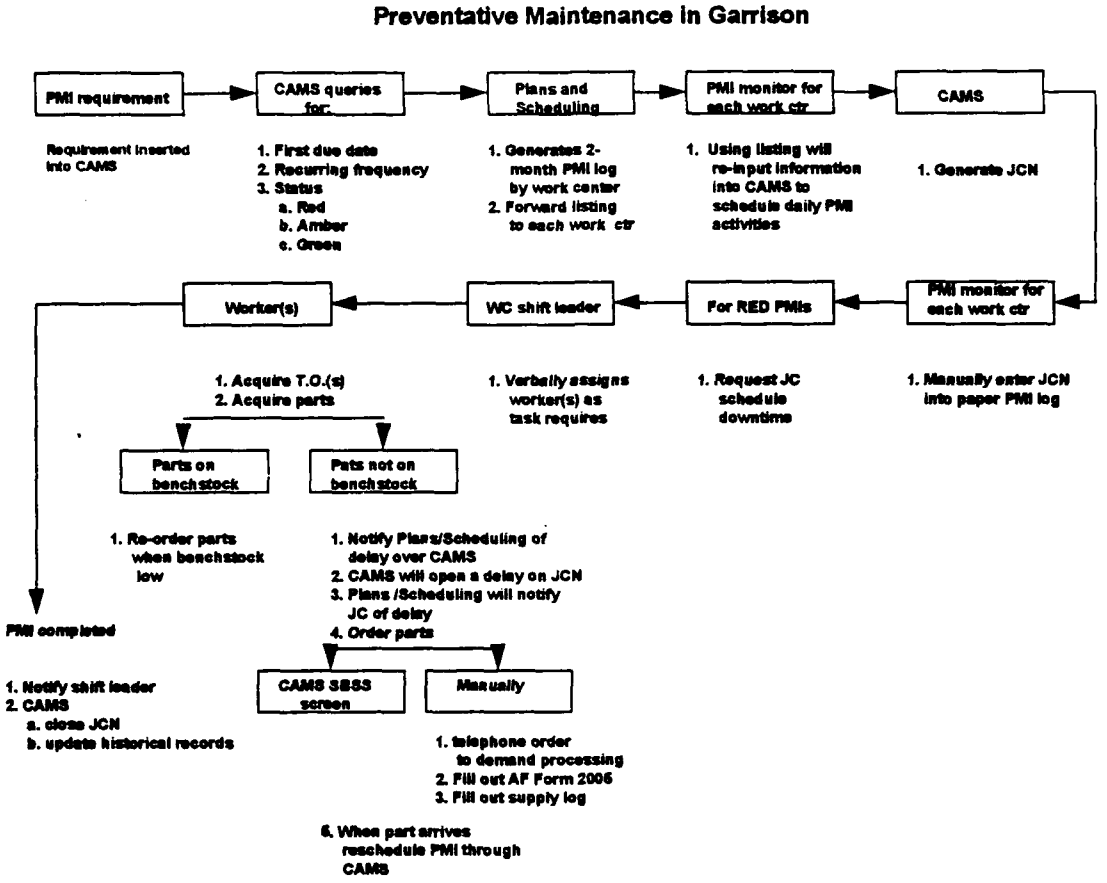

Figure 10. Preventative Maintenance In Garrison

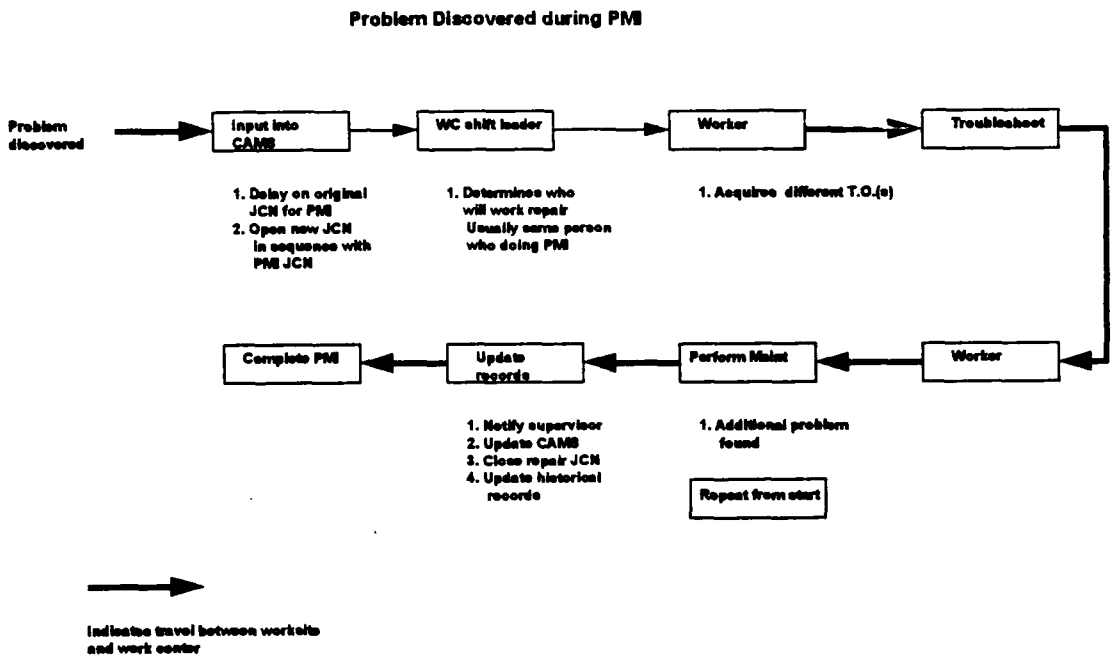

Figure 11. Problem Discovered during PMI

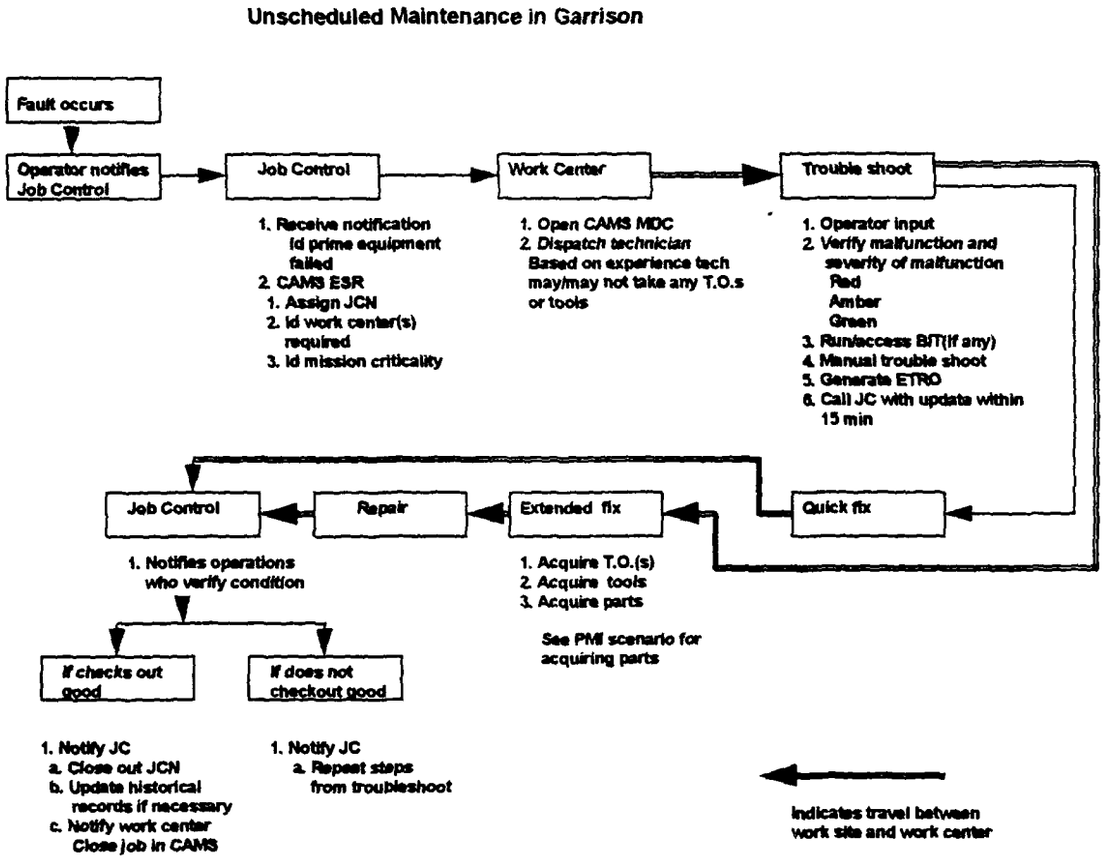

Figure 12. Unscheduled Maintenance in Garrison

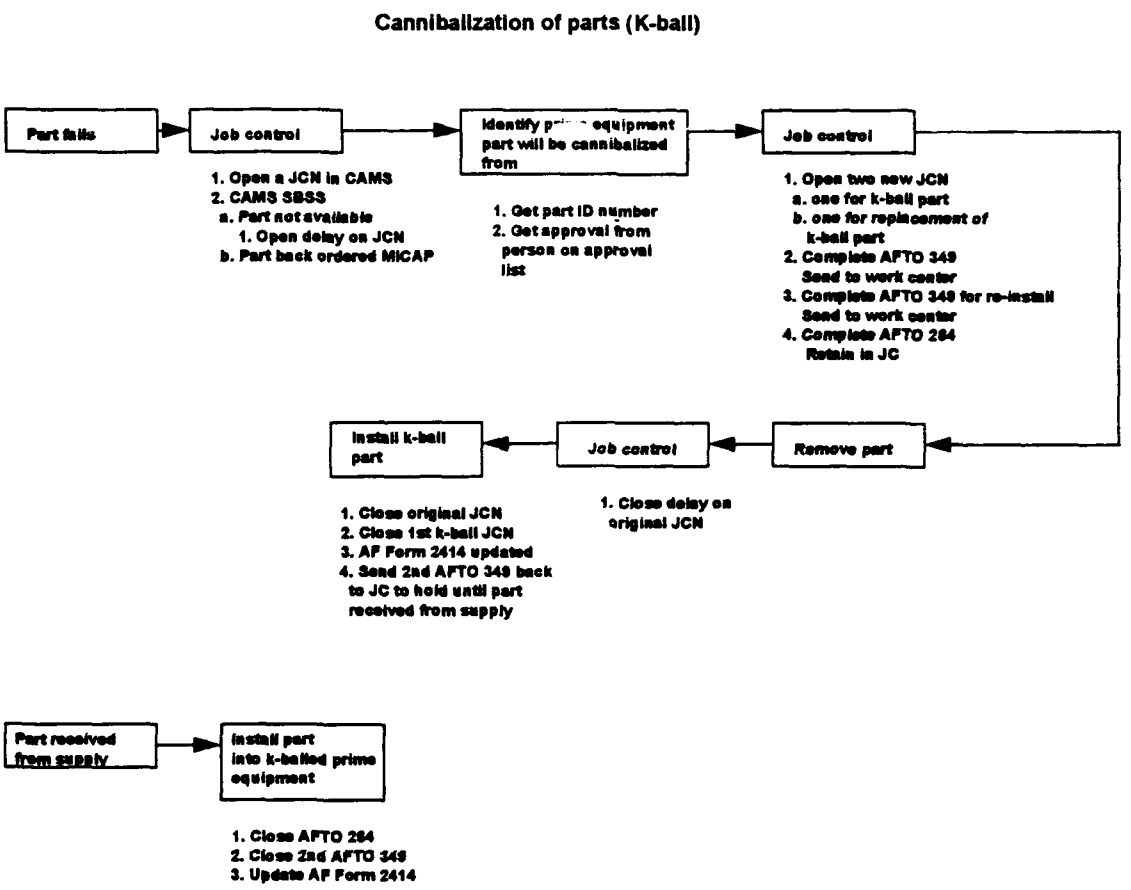

Figure 13. Cannibalization of Parts

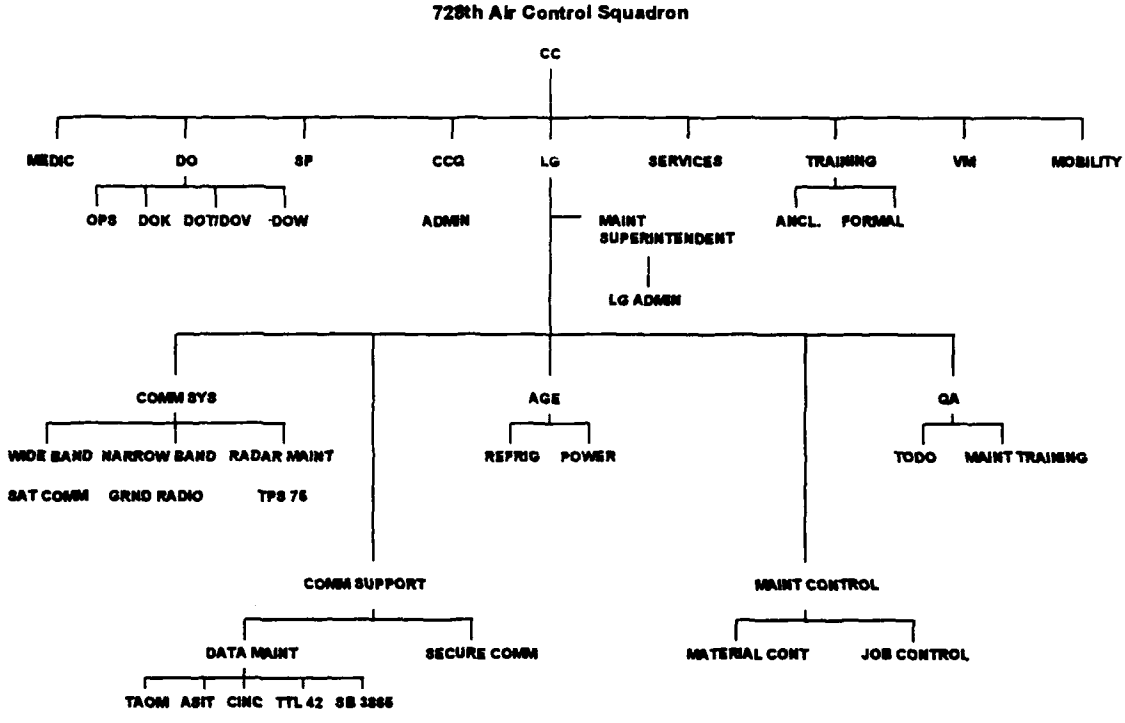

Figure 14. 728 ACS Organizational Diagram

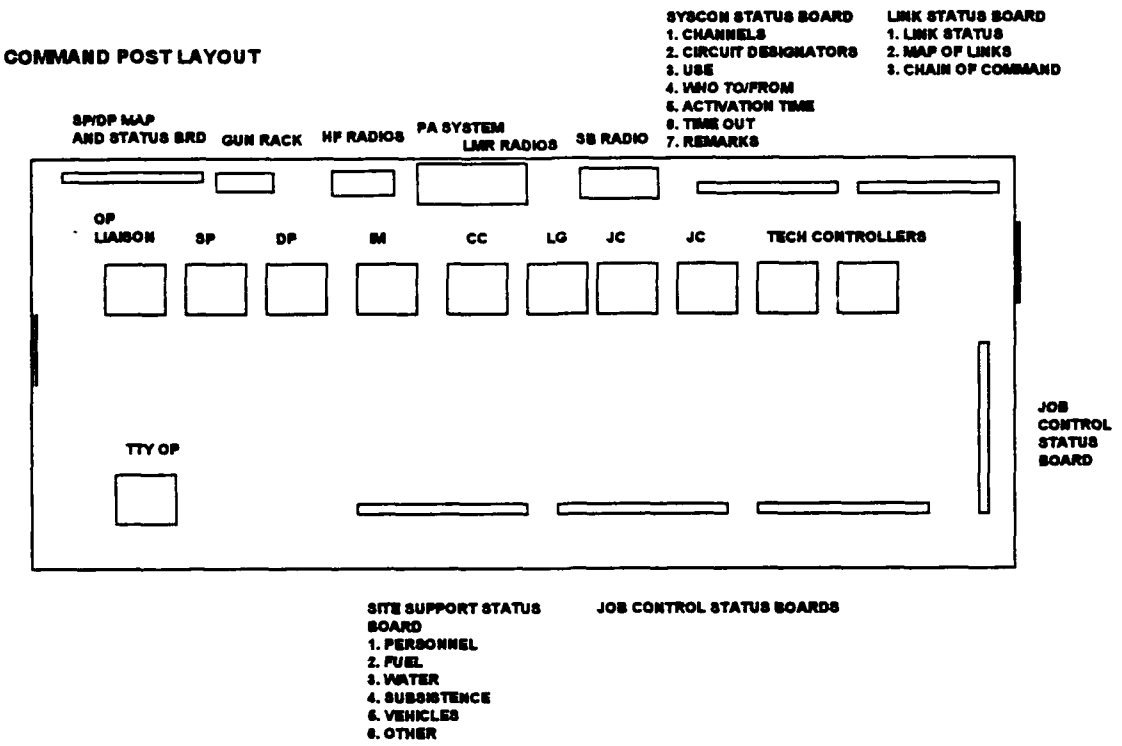

Figure 15. Command Post Layout

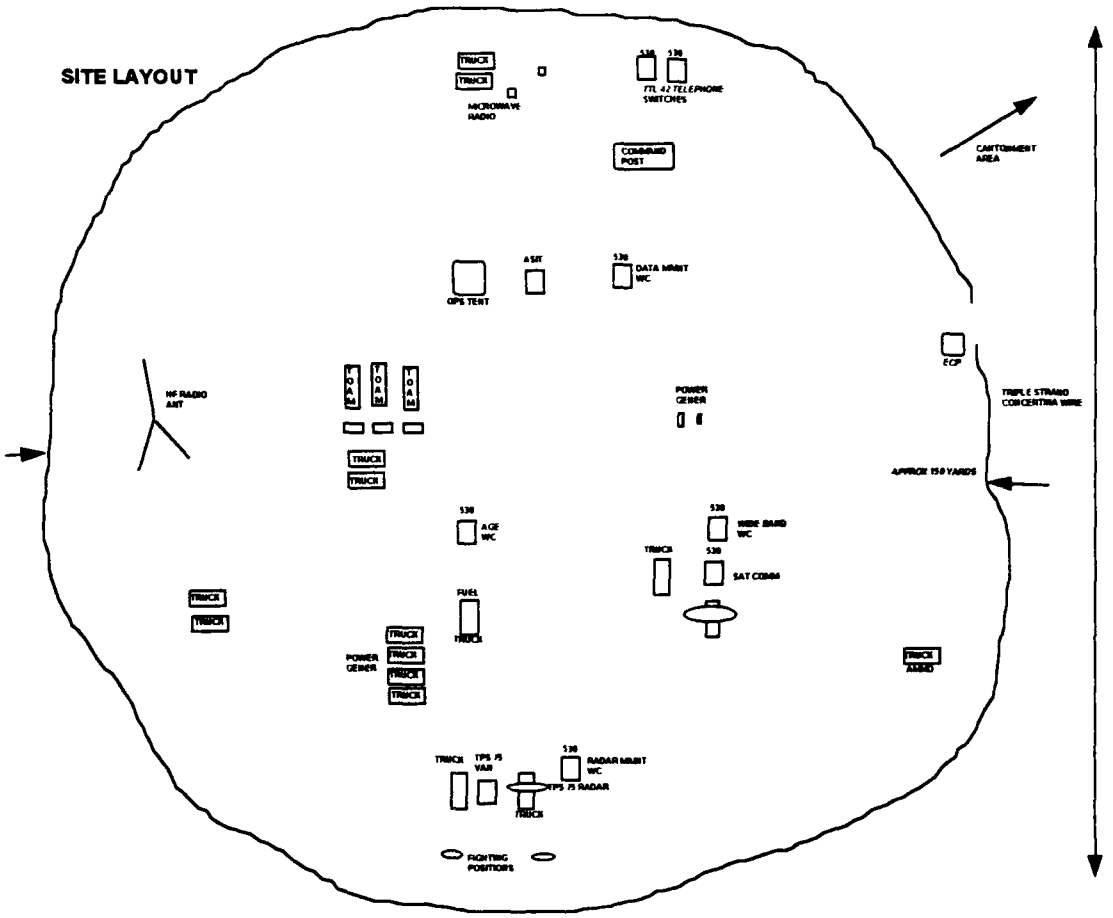

Figure 16. Typical Deployment Site

Appendix C: Acronyms

ACCI - Air Combat Command Instruction

ACS - Air Control Squadron

AFHRL - Air Force Human Resource Laboratory

AFI - Air Force Instruction

AFMC - Air Force Material Command

AIP - Aircraft Interface Panel

AL - Armstrong Laboratory

ALC - Air Logistic Center

AMID - Aviation Maintenance Integrated Diagnostics

ARM - Anti-radiation Missile

ASIT - Adaptable Surface Interface Terminal

ATDPS - Automated Technical Data Presentation System

ATOS - Automated Technical Order System

AWACS - Airborne Warning and Control System

BIT - Built In Test

C2 - Command and Control

CAMS - Core Automated Maintenance System

CCA - Circuit Card Assembly

CEMS - Comprehensive Engine Management System

CIM - Corporate Information Management

CMAS - Computer-base Maintenance Aids System

CND - Can Not Duplicate

COB - Collocated Operating Base

CONUS - Continental United States

CRC - Control and Reporting Center

DoD - Department of Defense

DOL - Dispersed Operating Location

DSS - Deployed Support State

ETIC - Estimated Time In Commission

FACP - Forward Air Control Post

FCS - Full Configuration State

FEBA - Forward Edge of Battle Area

FMC - Full Mission Capable

ICT - Integrated Combat Turn

IETM - Interactive Electronic Technical Manual

IMDS - Integrated Maintenance Data System

IMIS - Integrated Maintenance Information System

IRS - Interface Requirements Specification

JCALS - Joint Computer-Aided Acquisition and Logistics Support System

JSTARS - Joint Surveillance Targeting Attack Radar System

JTIDS - Joint Tactical Information Distribution System

LIMFACS - Limiting Factors

MCE - Modular Control Equipment

MDAS - Maintenance Diagnostic Aiding System

MDC - Maintenance Data Collection

MIW - Maintenance Information Workstation

MNS - Mission Needs Statement

MOB - Main Operating Base

MOC - Maintenance Operations Center

NBC - Nuclear Biological Chemical

NMC - Not Mission Capable

NSN - National Stock Number

OM - Operations Module

PCMAS - Portable Computer-based Maintenance Aiding System

PMA - Portable Maintenance Aid

PMC - Partially Mission Capable

PMD - Program Management Directive

PMI - Preventative Maintenance Inspection

RF - Radio Frequency

SAM - Surface to Air Missile

SBSS - Standard Base Supply System

SORTS - Status of Resources and Training System

SRS - Software Requirements Specification

SSS - System/Segment Specification

TACC - Tactical Air Control Center

TACS - Theater Air Control System

TADIL - Tactical Digital Information Link

TM - Technical Manual

TO - Technical Order

Bibliography

AFTOMS Program Management Office. *Air Force Technical Order System (AFTOMS) Information Packet,* Initial Contractor's Conference Information Packet, 21 March 1989.

Air Combat Command. *ACC Communications-Computer Systems Maintenance Concept for the AN/TYQ-23 (V)2 Modular Control Equipment (MCE) System.* Draft report. Langley AFB VA. 4 June 1993.

Air Combat Command. *Objective Wing Aircraft Maintenance.* ACCI 21-166. Washington:HQ USAF, 2 May 1994.

Anckor, Pam, AFMC/Public Affairs. "Portable Expert," *Leading Edge*, 5-6 (November 1993).

Armstrong Laboratory. *IMIS: Integrated Maintenance Information System,* Information Pamphlet. Undated.

Armstrong Laboratory. *Integrated Maintenance Information System (IMIS).* Briefing slides. Armstrong Laboratory, Logistics Research Division, Wright-Patterson AFB OH. 1994.

Bare, Martin R., Project Manager. *Aviation Maintenance Integrated Diagnostics Demonstration.* Briefing slides. NAVAIR-411, 28 September 1993.

Burright, Burke and others. *Integrated Maintenance Information Systems (IMIS) Initial Estimates of System-Wide Costs and Benefits: An Executive Summary.* Plans and Programs Directorate, Armstrong Laboratory, Brooks AFB TX. May 1993.

Carderock Division. *DoD Specifications for Interactive Electronic Technical Manuals (IETM).* Bethesda:Naval Surface Warfare Center, Brochure, November 1992.

Carney, Lisa A. and Roger A. Quinto. *Evaluation of Access/Navigational Features of a Graphical-User Interface Installed on a Portable Maintenance Aid.* MS thesis, AFIT/GLM/LAL/93S-9. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH. September 1993 (AD-A 275791).

Colmer. *IMDS Briefing Slides.* Provided by Barbara Masquelier of Armstrong Laboratory. Undated

Department of the Air Force. *Maintenance Management Policy.* AFR 66-1. Washington: HQ USAF, 21 April 1983.

Emory, C. William and Donald R.Cooper. *Business Research Methods.* Boston: Irwin, 1990.

General Dynamics, *Systems/Segment Specification for the Integrated Maintenance Information System (IMIS).* General Dynamics. San Diego, 1993.

Grafton, Jeffery. "Two Level Maintenance" Class lecture, LOGM 677, Acquisition Logistics Seminar, School of Systems and Logistics, Air Force Institute of Technology, Wright-Patterson AFB OH. 26 April 1994.

Jaquish, John. Lt Gen, Principle Deputy, Assistant Secretary of the Air Force (Acquisition), Washington DC, Personal Correspondence. 18 February 1993.

Kerr, Susan. "Document Interchange Reigns at DOD," *Datamation, 34*:81-84 23 (15 November 1988).

Link, William R. and others. *Integrated Maintenance Information System (IMIS): A Maintenance Information Delivery Concept.* Air Force Human Resources Laboratory, AFHRL-TP-87-27. Wright-Patterson AFB OH. November 1987.

Masquelier, Barbara L. Human Factors Engineer, Armstrong Laboratory, Wright-Patterson AFB OH. Personal interview and IMIS Briefing, 20 October 1993.

Moore, Len. Maintenance Superintendent, 89th Fighter Squadron, Wright-Patterson AFB OH. Personal interview, 11 July 1994.

Patton, Michael Quinn. *Qualitative Evaluation and Research Methods.* Newbury Park: Sage Publications, 1990.

728 ACS. *Functional Description of the AN/TYQ-23 Equipped Control and Reporting Center and Forward Air Control Post.* Undated brochure provided by maintenance managers of the 728 ACS to the researchers in April 1994.

Thomas, Donald L. and Jeffery D. Clay. *Computer-based Maintenance Aids for Technicians: Project Final Report.* Logistics and Human Factors Division, Wright-Patterson AFB OH. August 1988.

Wilmore, Todd. Deployable Tactical Systems Program Manager, Air Combat Command, Langley AFB VA. Personal Interview, 15 October 1993.

Vita

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REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	September 1994	Master's Thesis

4. TITLE AND SUBTITLE
A REQUIREMENTS ANALYSIS FOR AN INTEGRATED MAINTENANCE INFORMATION SYSTEM APPLICATION INTO THEATER AIR CONTROL SYSTEM MAINTENANCE

5. FUNDING NUMBERS

6. AUTHOR(S)
Morris C. Blumenthal III, Captain, USAF
Stephen W. Starks, Captain, USAF

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Air Force Institute of Technology,
WPAFB OH 45433-6583

8. PERFORMING ORGANIZATION REPORT NUMBER
AFIT/GLM/LAR/94S-3

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
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Operational Logistics Branch, Armstrong Laboratory
Human Systems Center. Wright-Patterson AFB OH 45433-7604

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

This research was to determine to what extent Integrated Maintenance Information System (IMIS) functional requirements could satisfy the maintenance information requirements of the ground-based Theater Air Control System. IMIS is a program sponsored by Armstrong Laboratory at Wright-Patterson Air Force Base, Ohio to automate maintenance information. To date, Armstrong Laboratory has only targeted aircraft maintenance for this automated program. The Theater Air Control System contains powerful military radars connected to a mobile communications and computer network. Theater Air Control System maintenance information requirements were identified through a study of the 728th Air Control Squadron at Eglin Air Force Base, Florida, and the existing aircraft requirements matrix for the Integrated Maintenance Information System was modified to meet Theater Air Control System requirements. The small amount of changes required to modify the aircraft matrix in order to satisfy ground TACS requirements indicate that ground TACS is a prime candidate for IMIS technology.

14. SUBJECT TERMS	15. NUMBER OF PAGES
Information Retrieval, Information Transfer, Maintenance Management, Ground Controlled Interception, Command Control Communications, Management Information Systems	150
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL