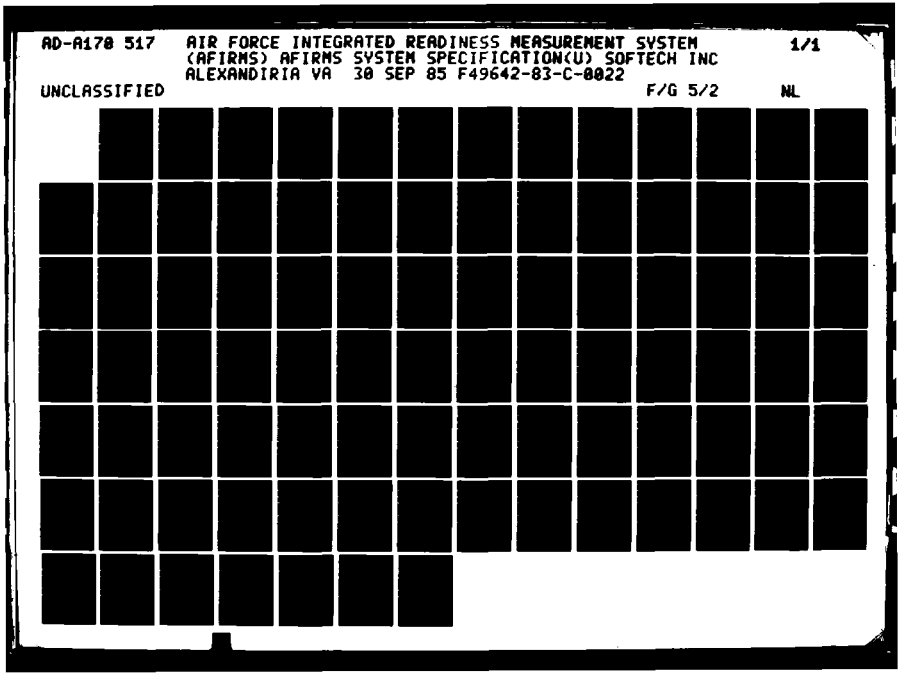
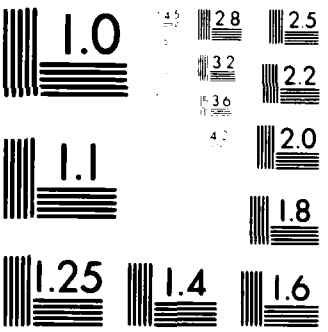

AD-A170 517 AIR FORCE INTEGRATED READINESS MEASUREMENT SYSTEM 1/1
(AFIRMS) AFIRMS SYSTEM SPECIFICATION(U) SOFTECH INC
ALEXANDIRIA VA 30 SEP 85 F49642-83-C-0022
UNCLASSIFIED F/G 5/2 NL



SOFTECH SofTech Inc

AIR FORCE INTEGRATED READINESS MEASUREMENT SYSTEM (AFIRMS)

AFIRMS SYSTEM SPECIFICATION

FINAL

Prepared by

SofTech, Inc.
2000 N. Beauregard Street
Alexandria, VA 23111

31 May 1985
Change 1
30 September 1985

Prepared for

United States Air Force
Readiness Assessment Group

Contract No. F49642-83-C-0022

CDRL 0025

AFIRMS SYSTEM SPECIFICATION

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

LIST OF ILLUSTRATIONS

LIST OF TABLES

SECTION 1. GENERAL

1.1 Purpose of the System Specification. This System Specification for the Air Force Integrated Readiness Measurement System (AFIRMS), Contract No. F49642-83-C-0022, is written to fulfill the following objectives:

a. To provide a detailed definition of the system functions and interrelations of the wing, major command (MAJCOM), and Headquarters United States Air Force (HQ USAF) subsystems.

b. To communicate specification details of the system functional requirements.

c. To define, in detail, the interfaces with other systems and subsystems and the facilities to be utilized for accomplishing the interfaces.

1.2 Introduction To AFIRMS. This section provides a brief introduction to the Air Force Integrated Readiness Measurement System (AFIRMS). A more complete description is provided in the AFIRMS Functional Description.

1.2.1 AFIRMS Synopsis.

1.2.1.1 Key AFIRMS Concepts. AFIRMS is an automated, tasking based, capability assessment system. As such, AFIRMS evaluates unit and force capability to perform tasked missions based on the availability of specific resources.

a. The conceptual requirements for AFIRMS are two-fold:

(1) Assessment of combat capability against specific tasking. The user can assess unit/force combat capability against any planned or ad hoc tasking, e.g., War Mobilization Plan (WMP), Operation Plan (OPlan), Fragmentary Order, Air Tasking Order (ATO), Contingency Plan, etc.

(2) Assessment of combat capability based on budget appropriations. AFIRMS provides a tool for computing long-term readiness and sustainability trends, spanning two to six fiscal years. This tool permits comparison of readiness and sustainability by fiscal year and can therefore highlight the impact of appropriation changes. Thus, changes in funding are related to changes in force readiness and sustainability. Also, senior Air Force decision makers are supported during budget deliberations and Air Force budget allocations.

b. AFIRMS implementation has two key concepts:

(1) Integrated approach to tasking based capability assessments. AFIRMS has two integrative dimensions. First, all applicable resources and their usage interactions are considered. For example, in sortie capability assessment, AFIRMS evaluates capability in terms of all four essential resource types (aircrew, aircraft, munitions, fuel), their interdependencies, and their generative components (such as spares for aircraft, training qualifications for aircrew, load crews for munitions, and hot pits for fuel). Second, other automated systems (such as the Combat Supplies Management System (CSMS), Combat Fuels Management System (CFMS), Weapon System Management Information System (WSMIS), etc.) outputs are integrated into capability assessment calculations through system interfaces between those systems and AFIRMS.

(2) Data Quality Assurance. Capability assessment is no better than the data upon which it is based. Therefore, AFIRMS emphasizes a user orientation toward quality assurance of source data. Unit and other data input level users are provided effective tools to accomplish their daily activities and therefore develop a vested interest in AFIRMS data currency and validity. Capability assessment data can then be extracted for use by higher or parallel users with maximum confidence in its validity.

1.2.1.2 AFIRMS Functions. Four basic AFIRMS functions combine to assess readiness capability:

a. Translate Tasking. As a tasking based capability assessment system, tasking must be converted into a standard format recognized by AFIRMS. Tasking is defined in AFIRMS to the unit level and may consist of actual tasking, hypothetical (standard) tasking, or contingency tasking. Any of these taskings can be defined within specified WMP or OPlan constraints, at the option of the user. Likewise, the tasking may be defined by the user for present, historic or future requirements.

b. Define Resources. The resource definition function of AFIRMS ensures that information about inventory status is available and accurate. Wherever possible, this data is obtained by interface with other functional systems. As with tasking, resource information can be defined for actual, hypothetical, or contingency situations, either present, historic, or future.

c. Determine Ability to Perform. Determining the force's ability to perform is the essential function of AFIRMS. The tasking and resource data are processed to determine how much of the specified tasking can be accomplished with the resources available. Ability to perform is evaluated in terms of the task metric (sorties,etc.) and the cost metric (dollars) to provide readiness/sustainability and dollars to readiness assessments.

d. Aggregate, Analyze and Present Data. Aggregation, analysis and presentation ensure the proper grouping and display of information to provide useful information at the unit, major command and HQ USAF. Aggregation refers to the creation of a composite understanding of capability for several units.

1.2.2 AFIRMS Documentation. A set of nine types of documents describe AFIRMS. A list of these AFIRMS documents is provided below along with a short description of the particular aspects of AFIRMS which are addressed by each document.

a. Functional Description (FD). The FD provides the description of AFIRMS concepts in user terms. It is the baseline document which ties the AFIRMS documents together.

b. Economic Analysis (EA). The EA states AFIRMS estimated costs. It explains the cost factors of AFIRMS implementation alternatives and states the recommended alternative.

c. Management Plan. The Management Plan provides the top-level integrative frame of reference for the AFIRMS Program. The plan focuses on the processes which provide technical and administrative control of AFIRMS. Key annexes to the Management Plan are the Evolutionary Implementation Plan, the Configuration Management Support Plan, and the systems Interface Support Plan.

d. System Specification. The AFIRMS System Specification adds the design requirements to the functional concepts in the FD. It divides the system into subsystems (HQ USAF, HQ USAFE (MAJCOM), and Wing (unit)) and assigns functions required within each subsystem. The system specification details the overall architecture, intersite interface gateways, processing logic flows and the communications network specifications.

e. Subsystem Specifications. There are three AFIRMS subsystem specifications: HQ USAF, HQ USAFE (MAJCOM/numbered Air Force), and the Wing (unit/squadron). Subsystem specifications detail the specific design and/or performance requirements of the system at that level. Design details cover the architecture, required functions, the functional users, intrasite interface gateways, and applicable processing logic flows.

f. Database Specifications. There are three AFIRMS database specifications: HQ USAF, HQ USAFE (MAJCOM/numbered Air Force), and Wing (unit/squadron). These specifications describe the database architecture, size and content, as well as logical data relationships for the functions performed at each of the AFIRMS levels.

g. Data Requirements Document (DRD). The DRD identifies, categorizes, and groups the generic types of data used in AFIRMS. It also defines each type of AFIRMS data element (attribute class).

h. Product Descriptions (PDs). The PDs visually portray the products which implement the AFIRMS functions as input and output tools.

i. Transform and Model Descriptions. The Transform and Model Descriptions Document defines how AFIRMS calculates the output data from the input data. Specific algorithmic calculations are provided. Logical groups of algorithms forming AFIRMS models and transforms are described.

1.3 Project References. Accurate assessment of force readiness and sustainability has been a constant concern of Air Force commanders and their staffs. This concern has been supported by an intensified DoD-wide interest in capability. In response to this Air Force concern, the Directorate of Operations and Readiness initiated the AFIRMS Program. AFIRMS has been under development through a learning prototype and is being designed to provide Air Force commanders with a complete, timely, and accurate assessment of their operational readiness and sustainability. In performing this function, AFIRMS provides combat capability assessments to Air Force leaders at HQ USAF, MAJCOM and wing levels of command to aid them in making total force readiness decisions. AFIRMS also supports day-to-day operations and crisis management as well as planning and programming activities at all command levels.

The Program Management Office (PMO) responsible for contract management of the AFIRMS Learning Prototype Phase (LPP) and this document is the Data Systems Design Office (DSDO/XO), Gunter Air Force Station (AFS), Alabama; the Office of Primary Responsibility (OPR) is the United States Air Force Readiness Assessment Group (AF/XOOIM). Three operational centers have been in use as LPP testbed sites: The Pentagon, Washington, D.C.; Headquarters United States Air Forces Europe (HQ USAFE), Ramstein Air Base (AB), Germany; and the 52nd Tactical Fighter Wing (TFW), Spangdahlem AB, Germany.

References which are applicable to the history and development of the AFIRMS Program are listed below along with references concerning programming and documentation standards.

a. AFIRMS Data Requirements Document, Final, SofTech, Contract No. F49642-83-C-0022, 31 May 1985. (Unclassified)

b. AFIRMS Economic Analysis, Final, SofTech, Contract No. F49642-83-C-0022, 31 May 1985. (Unclassified)

c. AFIRMS Management Plan, Annex B, Evolutionary Implementation Plan, Final, SofTech, Contract No. F49642-83-C-0022, 31 May 1985. (Unclassified)

d. AFIRMS Functional Description, Final, SofTech, Contract No. F49642-83-C-0022, 31 May 1985. (Unclassified)

e. AFIRMS HQ USAF Database Specification, Final, SofTech, Contract No. F49642-83-C-0022, 31 May 1985. (Unclassified)

f. AFIRMS HQ USAF Subsystem Specification, Final, SofTech, Contract No. F49642-83-C-0022, 31 May 1985. (Unclassified)

g. AFIRMS HQ USAFE Database Specification, Final, SofTech, Contract No. F49642-83-C-0022, 31 May 1985. (Unclassified)

h. AFIRMS HQ USAFE Subsystem Specification, Final, SofTech, Contract No. F49642-83-C-0022, 31 May 1985. (Unclassified)

i. AFIRMS Product Descriptions, Final, SofTech, Contract No. F49642-83-C-0022, 31 May 1985. (Unclassified)

j. AFIRMS System Specification, Final, SofTech, Contract No. F49642-83-C-0022, 31 May 1985. (Unclassified)

k. AFIRMS Transform and Model Descriptions, Final, SofTech, Contract No. F49642-83-C-0022, 31 May 1985. (Unclassified)

l. AFIRMS Wing Database Specification, Final, SofTech, Contract No. F49642-83-C-0022, 31 May 1985. (Unclassified)

m. AFIRMS Wing Subsystem Specification, Final, SofTech, Contract No. F49642-83-C-0022, 31 May 1985. (Unclassified)

n. System Interface Design for the AFIRMS LPP and the Combat Fuels Management System (CFMS), SofTech, Contract No. F49642-83-C-0022, 28 February 1985. (Unclassified)

o. AFR 700-5, Information System Requirements Board, 9 November 1984. (Unclassified)

p. System Interface Design for the AFIRMS LPP and the Air Force Operations Resource Management System (AFORMS), SofTech, Contract No. F49642-83-C-0022, 2 November 1984. (Unclassified)

q. AFR 700-2, Information Systems Planning, 26 October 1984. (Unclassified)

r. Automated Data Processing (ADP) Security Policy, Procedures, and Responsibilities, AFR 205-16, 1 August 1984. (Unclassified)

s. AFR 300-4, Vol. 4, Air Force Data Dictionary, 1 May 1984. (FOUO)

t. Automated Data Systems (ADS) Documentation Standards, DoD-STD-7935.1, 24 April 1984. (Unclassified)

u. Department of Defense Dictionary of Military and Associated Terms, JCS Pub 1, 24 April 1984. (Unclassified)

v. AFR 700-1, Managing Air Force Information Systems, 2 March 1984. (Unclassified)

w. AFIRMS LPP ADP Security Plan, SofTech, Contract No. F49642-83-C-0022, 16 September 1983 (Updated 11 January 1985). (FOUO)

x. AFR 300-4, Vol. 3, Air Force Data Dictionary, 15 August 1983. (FOUO)

y. Sustainability Assessment Model (formerly CAC) Functional Description, Contract No. F33700-83-G-002005701, 8 April 1983. (Unclassified)

z. AFR 700-3, Information Systems Requirements Processing, 30 November 1984. (Unclassified)

aa. MIL-STD-480 Configuration Control-Engineering Changes, Deviations, and Waivers.

bb. MIL-STD-483 Configuration Management Practices for Systems, Equipment, Munitions, and Computer Programs.

cc. USAF Operational Major Command Functional Area Requirement (FAR), SofTech, Contract No. F49642-82-C-0045, 15 December 1982. (Unclassified)

dd. Unit Combat Readiness Reporting (C-Ratings) (Unit Status and Identity Report (UNITREP), RCS:HAF-XOO(AR)7112(DD)), AFR 55-15, 22 November 1982. (Unclassified)

ee. USAFE Annex to USAF FAR, SofTech, Contract No. F49642-82-C-0045, 20 August 1982. (Unclassified)

ff. AFIRMS FAR, SofTech, Contract No. MDA-903-76-C-0396, 14 March 1980. (Unclassified)

gg. AFIRMS Data Analysis, SofTech, 15 February 1979. (Unclassified)

hh. User's View of AFIRMS, SofTech, 1 November 1978. (Unclassified)

ii. AFR 700-9, Information Systems Standards, 15 March 1985. (Unclassified)

jj. U.S. Air Force Glossary of Standardized Terms, AFM 11-1, Vol. 1, 2 January 1976. (Unclassified)

kk. AFIRMS Data Automation Requirement (DAR), Final, SofTech, Contract No. MDA-903-76-C-0396, 14 March 1980. (Unclassified)

ll. JCS Memorandum of Policy 172, 1 June 1982. (Unclassified)

mm. Military Airlift Command (MAC) AFIRMS Requirements Analysis, SofTech, Contract No. F49642-83-C-0022, 30 September 1985. (Unclassified)

nn. Analysis of Military Airlift Command (MAC) Capability Assessment Metrics, SofTech, Contract No. F49642-83-C-0022, 30 September 1985. (Unclassified)

oo. Strategic Air Command (SAC) AFIRMS Requirements Analysis, SofTech, Contract No. F49642-83-C-0022, 30 September 1985. (Unclassified)

pp. Analysis of Strategic Air Command (SAC) Capability Assessment Metrics, SofTech, Contract No. F49642-83-C-0022, 30 September 1985. (Unclassified)

1.4 Abbreviations and Acronyms.

AAC	-	Alaskan Air Command
AB	-	Air Base
ADP	-	Automated Data Processing
ADPS	-	Automated Data Processing System
ADS	-	Automated Data Systems
AF	-	Air Force
AFIRMS	-	Air Force Integrated Readiness Measurement System
AFLC	-	Air Force Logistics Command
AFLOC	-	Air Force Logistics Operations Center
AFORMS	-	Air Force Operations Resource Management System
AFRES	-	Air Force Reserve
AFS	-	Air Force Station
ALC	-	Air Logistics Center
ANG	-	Air National Guard
ATO	-	Air Tasking Order
ATOC	-	Allied Tactical Operations Center or Air Tactical Operations Center
BPI	-	Bits Per Inch
BPS	-	Bits Per Second
CAMS	-	Core Automated Maintenance System
CAS	-	Combat Ammunition System
CFMS	-	Combat Fuels Management System
CMDS	-	Command Manpower Data System
COMPES	-	Contingency Operation/Mobility Planning and Execution System
CONPLAN	-	Concept Plan
CONUS	-	Continental United States
CPI	-	Characters Per Inch
CPL	-	Characters Per Line
CPS	-	Characters Per Second
CPU	-	Central Processing Unit
CRC	-	Cyclical Redundancy Checking
CRT	-	Cathode Ray Tube
CSG	-	Combat Support Group
CSMS	-	Combat Supplies Management System
DAR	-	Data Automation Requirement

DBMS	-	Database Management System
DES	-	Data Encryption Standards
DDN	-	Defense Data Network
DoD	-	Department of Defense
DSDO	-	Data Systems Design Office
EDS	-	European Distribution System
EIFEL	-	NATO Command and Control System
EMSEC	-	Emanations Security
FAR	-	Functional Area Requirement
FMIS	-	Force Management Information System
FTP	-	File Transfer Protocol
HQ	-	Headquarters
HQ USAF	-	Headquarters, United States Air Force
HQ USAFE	-	Headquarters, United States Air Forces Europe
IAW	-	In Accordance With
IP	-	Internet Protocol
IPS	-	Inches Per Second
LCMS	-	Logistics Capability Measurement System
LPI	-	Lines Per Inch
LPM	-	Lines Per Minute
LPP	-	Learning Prototype Phase
MAC	-	Military Airlift Command
MAJCOM	-	Major Command
MDS	-	Mission, Design, Series
MOB	-	Main Operating Base
NBS	-	National Bureau of Standards
NSA	-	National Security Agency
OPlan	-	Operation Plan
OPORD	-	Operation Order
OPR	-	Office of Primary Responsibility
PACAF	-	Pacific Air Forces
PMO	-	Program Management Office
POL	-	Petroleum, Oil and Lubricants
POM	-	Program Objectives Memorandum
PPL	-	Preferred Products List
RM	-	Deputy Commander for Resources

SAC	-	Strategic Air Command
SMTP	-	Simple Mail Transfer Protocol
TAC	-	Tactical Air Command
TACNET	-	Tactical Air Command Network
TAF	-	Tactical Air Force
TBD	-	To Be Determined
TCP	-	Transmission Control Protocol
TFW	-	Tactical Fighter Wing
USAFE	-	United States Air Forces Europe
WIN	-	WWMCCS Intercomputer Network
WIS	-	WWMCCS Information System
WMP	-	War Mobilization Plan
WOC	-	Wing Operations Center
WSMIS	-	Weapon System Management Information System
WWMCCS	-	World Wide Military Command and Control System

SECTION 2. SUMMARY OF REQUIREMENTS

This summary provides the basic characteristics and requirements of a worldwide operational AFIRMS.

2.1 System Description. AFIRMS is a tasking based capability assessment system that assesses readiness and sustainability by applying specific tasking against selected unit and theatre resources through the use of automated readiness models. It is a decision support tool which provides Air Force commanders at all levels, unit through the Air Staff, with the ability to assess unit readiness and capability to meet a tasking. This on-line, interactive system provides the capability to assess readiness to accomplish tasking in concrete terms and use these assessments to support "what if" and/or "trade-off" studies, including:

a. Assess capability against any tasking. The operator of the system can select a tasking against which to make assessments, i.e., War Mobilization Plan (WMP), Operation Plan (OPlan), what-if Plan, and Air Tasking Order (ATO). AFIRMS then provides a capability assessment against that scenario in a unit of measure appropriate for the tasked mission. For example, for the tactical air forces the number of sorties that can be flown; for the Military Airlift Command (MAC), the number of ton-miles or the number of flying hours that can be flown.

b. Correlate dollars and readiness. AFIRMS provides a tool for computing long-term readiness and sustainability trends, spanning two to five fiscal years, which compare readiness and sustainability by fiscal year and relate the impacts of appropriations by fiscal year.

The worldwide operational AFIRMS is a hierarchically distributed system which can be visualized as a pyramid of distinct operational sites. (See Figure 2-1) Each operational site performs a set of functions which are distinct, although similar, from other sites. This information is transmitted upward to a parent site. There are three basic levels within the AFIRMS pyramid, each level being considered as an AFIRMS subsystem. The highest level subsystem, the apex of the pyramid, is the HQ USAF subsystem. The second level of the pyramid consists of the MAJCOM subsystems. The base of the pyramid is composed of a set of wing subsystems.

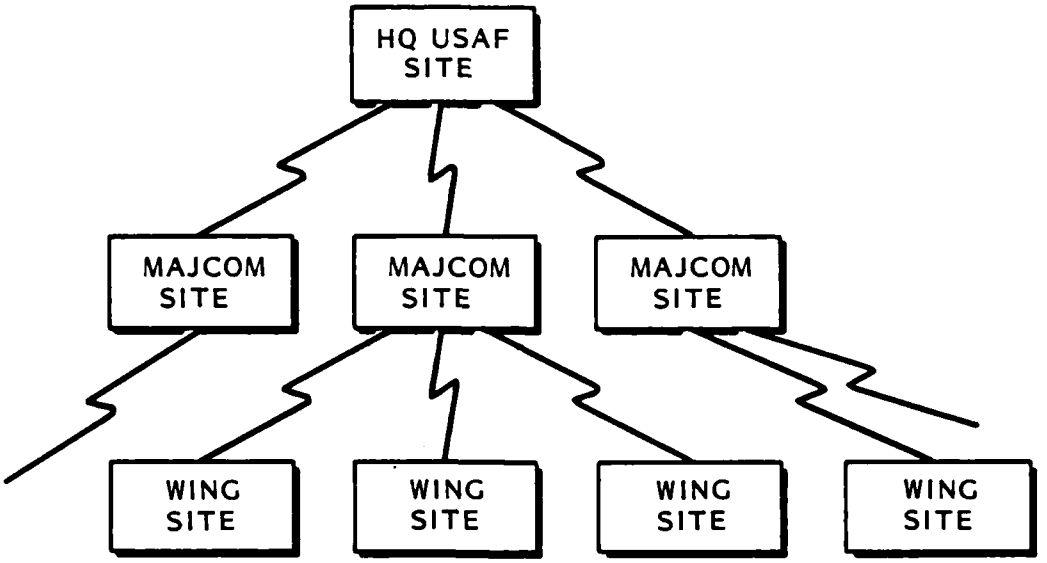


Figure 2-1. AFIRMS Structure

The AFIRMS capability provides the Air Force with a system which:

a. Assesses readiness of a unit or force to perform a specific tasking.

b. Projects the sustainability of a force or unit against a specific tasking.

c. Relates cost to a specific current, future, or historic tasking.

d. Projects readiness to perform a specific tasking forward in time.

e. Traces readiness to perform a specific tasking historically.

f. Provides responses to hypothetical situations (what-if).

g. Provides responses to ad hoc queries.

2.1.2 AFIRMS Subsystems. AFIRMS will consist of three subsystems that interrelate and communicate to provide the AFIRMS capability. The subsystems, named in accordance with the command levels they are to serve, are the HQ USAF, MAJCOM and wing subsystems.

Each subsystem provides certain functionality to the users in order to support the primary AFIRMS functions. The following functions are provided, to some degree, to users at each subsystem level:

a. Provide for entering/retrieving data into/from an AFIRMS database.

b. Display information concerning readiness and/or budget analysis via graphic displays in both color and black-and-white.

c. Provide hardcopy outputs of displayed data on request.

d. Provide capability to conduct what-if or trade-off exercises related to readiness and/or budgetary questions.

e. Provide capability to execute adhoc queries against the database at the local site within the constraints of access control and security requirements.

2.1.2.1 HQ USAF Subsystem. The HQ USAF subsystem supports Air Staff day-to-day, as well as exercise and crisis decision making. The HQ USAF subsystem assists Air Staff management in:

a. Analyzing resource needs and expenditures.

b. Preparing, defending, and administering the U.S. Air Force budget.

c. Obtaining, controlling, and allocating the resources of manpower, money, and material needed for support of the combat forces.

d. Supporting crisis and exercise decision making.

e. Relating changes in funding to changes in force readiness and sustainability.

f. Assessing combat capability reflective of aggregate theatre resources and shortfalls (from a worldwide perspective).

g. Depicting trends in resource needs forward and backwards in time.

2.1.2.2 MAJCOM Subsystem. The MAJCOM subsystem provides readiness assessment information that assists MAJCOM personnel/management in:

a. Assessing planning and tasking resource requirements.

b. Evaluating the appropriateness of tasking.

c. Distributing/allocating resources.

d. Supporting POM deliberations.

e. Supporting crisis and exercise decision making.

f. Assessing combat capability reflective of aggregated unit resources and shortfalls (from a theatre-wide perspective).

g. Assessing alternative proposals for allocation of resources or assignment of tasking(s).

2.1.2.3 Wing Subsystem. The AFIRMS wing subsystem provides readiness assessment information that assists wing level management in:

a. Evaluating their ability to accomplish tasking directed by higher levels of command.

b. Evaluating tasking execution alternatives.

c. Identifying and reporting shortfalls related to tasking.

d. Reporting readiness up the chain of command.

e. Projecting readiness capability.

AFIRMS wing products present a look at wing resources from operations, maintenance, and support squadron functional wing areas, and provide an integrated assessment of readiness and sustainability using these wing resources.

2.2 System Functions. The AFIRMS functions are distributed among the three subsystems. Some functions are unique to a subsystem and some functions are repeated across subsystems. Functions repeated across subsystems provide more global, unified views of readiness capability. Three levels of functions are of interest in this system specification. They are: Basic AFIRMS Functions, Support Functions, and System Functions.

a. Basic AFIRMS Functions. The building block functions which are specific to AFIRMS and which are used (in different forms and combinations) to support the user with various types of data/information. The Basic AFIRMS Functions include:

(1) Translate Tasking. Translates tasking so that it can be used in measuring ability to perform, i.e., converts tasking to quantities of aircraft, crews, munitions, Petroleum, Oil, and Lubricants (POL), etc. required to accomplish that tasking. The Translate Tasking function assists in task assignment.

(2). Define Resources. Provides inventory status and availability of resources (such as fuels, munitions, aircraft and crews) for use in capability assessments. The Define Resources function assists in allocation of resources (physical and fiscal) and forecast results of trial or final allocations.

(3) Determine Ability to Perform. Given current and forecast readiness factors, AFIRMS transforms WMPs, ATOs, OPlans, and what-if exercises into measurable tasking; computes current readiness to perform the task, projects readiness into the future, calculates resources consumed by performing the task, and prepares schedules for performing the task. This function provides users with the capability to measure (and aggregate) readiness and sustainability vs. standard or one-time tasking, and measure (and aggregate) readiness or sustainability vs. revised standards, and/or revised standard tasking using historic data.

(4) Aggregate, Analyze and Present Data. This function deals with the task of properly grouping data from various wings to provide meaningful and useful data at MAJCOM and HQ USAF levels. It also develops trend and variance data to facilitate exception reporting on unusual developments in day-to-day data. Aggregation refers to the creation of a composite understanding of the readiness and sustainability of a number of units. Thus, a MAJCOM with many reporting wings, each with its own deficiencies and strengths, can assess the readiness (and sustainability) of all units taken as a whole.

b. Support Functions. In order to carry out the basic AFIRMS functions, AFIRMS maintains and verifies data via a variety of associated support capabilities which are not directly related to readiness assessment, such as:

(1) Display resource inventories and status.

(2) Report reduction of resources below thresholds or exceeding upper limits.

(3) Display tasking.

(4) Display information on an evolving schedule.

(5) Perform local ad hoc queries.

(6) Perform ad hoc calculations.

c. System Functions. The standard building block functions such as graphics or data management which might occur in any system, and which, together with specially written subfunctions, are used to support the Basic AFIRMS functions. The generic System Functions employed by AFIRMS include:

(1) Produce graphic and tabular displays.

(2) Store and retrieve data.

(3) Collect trends and averages for use in computations.

(4) Edit input data - check reasonableness.

(5) Provide user interface to AFIRMS services.

(6) Maintain security.

(7) Provide intersite and local communications.

(8) Interface to other systems.

(9) Provide for transmission of data, on a periodic basis and an exception basis, from the lower level sites to the higher level sites.

(10) Provide for storage and retrieval of current data at all sites.

(11) Provide for storage and retrieval of historical data at all sites.

(12) Provide for security of classified data both from a system access standpoint and from a data communications standpoint.

2.2.1 Accuracy and Validity. The accuracy of the AFIRMS database is essential for the generation of accurate measurements. There are two categories of accuracy and validity that must be addressed. The first is related to electronic manipulation, storage, and transmission of data in the AFIRMS system. The second is related to the interface between the user and the AFIRMS system.

a. Electronic Manipulation/Storage/Transmission.

(1) The nature of the models/displays created with AFIRMS does not require precision beyond that achievable with off-the-shelf standard micro or minicomputers that support hardware or software floating point computations.

(2) Errors in data transmissions will not exceed 1 in 10^9. (Parity checking and Cyclical Redundancy Checking (CRC) ensure that the data actually used internal to the AFIRMS sites has an error probability well below this figure by correcting all 1-bit errors. Double-bit errors are detected but not corrected.)

b. User Interfaces to AFIRMS. The user interfaces of interest here are those interfaces that introduce new information into AFIRMS. The concern is that the information destined to enter the database be valid. Valid here means that:

(1) The individual entering the information is authorized to do so (i.e., only fuels personnel may be authorized to update fuels information).

(2) The information is as "error free as possible." This suggests that input data must, in general, be entered through well-engineered interfaces that prompt the user and check field contents.

(3) Certain information passed into the database has sufficient criticality to require that verification beyond that identified in (2) above, occur prior to database updates. This verification occurs via supervisory review.

Under this method, the data is entered by an authorized individual. However, the information cannot be updated in the database or be transmitted to higher headquarters by the individual who entered it until a supervisor authorizes the AFIRMS system to accept the data. The method of authorization might require that the supervisor logon to the AFIRMS system and enter an "unlocking" command that allows the data to be entered, the database updated, or the data transmitted.

c. System Interfaces to AFIRMS. Data obtained by interface with other data systems is subject to the same data accuracy and validity criteria as for user interface data.

2.2.1.1 Data Accuracy. AFIRMS uses five main approaches to ensure the accuracy and currency of data. These are to:

a. Provide benefits to the organizations which input readiness data. If the organization which inputs data receives benefits from the system in its day to day operations, then motivation is provided to ensure that data entered is current and accurate.

b. Simplify data input by using simple devices and by grouping inputs. For example, a lookup reference table is a device for entering identification number (such as an aircraft tail number) that might be subject to error if entered via keyboard.

c. Use automated edit checks as well as checks for the reasonableness of input data against stored parametric values. That is, all inputs are programmatically edited to further ensure the accuracy and integrity of the database. The system validates length, format and legal values of all formatted alphanumeric input data.

d. All data entry information is checked for consistency against other related information.

e. Obtain, edit, and incorporate data and/or assessments from other automated systems.

2.2.2 Timing.

a. User Response Time. AFIRMS is an information processing system which is user intensive; that is, in general, users enter data through a data capture device and request readiness status to an output display. Thus, AFIRMS interactive CRT terminal response times to user requests are minimized. Response time as it applies to user terminals, consists of two parts: command acceptance and command execution.

(1) Command Acceptance. Command acceptance is the time between the user's initiating transmission of a command or transaction to the system (such as by depression of the ENTER key or entry of the last character of a menu response) and the appearance of the first line of the acknowledgement from the system on the user's terminal that the message has been received, an error condition exists, or processing has been completed. AFIRMS, under loaded conditions (not less than 85% of terminals in use) supports a command acceptance time of less than 2.5 seconds 90% of the time. At no time will command acceptance time exceed six seconds.

(2) Command Execution. Command execution is the elapsed time between the command or transaction entry, and the appearance of the first line of executed results of that entry on the user's display terminal (excluding graphics).

(a) For functions such as command entry, text editing or message writing applications, the appearance of a keyed character on the screen will be immediate in the perception of the user.

(b) Queries

a Simple. Response time 1-3 seconds.

b Moderately Complex. Response time 4-10 seconds.

c Complex. Response time 11 seconds or greater.

b. Database Updates. The user performs screen updates to the AFIRMS database(s) in one of two ways. The user has the option of updating the database automatically upon exiting an input screen, or the user can request an update at any point in time after data has been entered and/or changed. AFIRMS database update frequency is as specified in the subsystem specifications for the individual functional areas.

2.3 Flexibility. AFIRMS provides a skeleton structure (system architecture) that matches the specific requirements of each installation to an AFIRMS site with compatible hardware/software capability. Additionally, this system architecture has the capability to grow, i.e., add/change system capabilities as time passes. Capabilities which are incorporated for adapting the subsystems to changing requirements include the following:

a. AFIRMS sites are constructed/configured from modular hardware and software components. The modular applications software is written in host independent high order languages for ease of transportability between different hardware configurations.

b. This hardware/software building block approach, coupled with transportable software, assures that operational AFIRMS expansion in the future can follow a systematic pattern with an optimum amount of standardization among sites.

c. Utilization of DoD standardized data communications protocols and external user interfaces. AFIRMS implements DoD standard protocols for network and distributed system data communications and terminal interfaces. (Ref. Section 3.2.1.3) Utilization of the DoD standard protocols provides for interoperability among different vendor equipments, existing and developmental Air Force ADP systems, and is in accordance with Air Force policy and guidance.

d. Ability to interface an AFIRMS site to other Air Force or MAJCOM-unique ADP systems after the AFIRMS site has been designed and installed. The central idea is that the AFIRMS software be structured so as to provide for new system integration to the greatest extent possible. This is facilitated by maintaining distinct layers of software, as in the International Standards Organization (ISO) 7-layer Reference Model.

e. Ability to support different communication protocols within the AFIRMS superstructure. Primary interfaces are defined as those communication transactions between neighboring AFIRMS entities (e.g. HQ USAF --- MAJCOM, MAJCOM --- WING [See Figure 2-1]) and between subsystem central nodes and their associated functional areas [See Figure 4-2]. By standardizing a set of strict interface formats for each primary interface, AFIRMS provides the flexibility to utilize different protocols; changing the envelope has no effect on its contents. This allows the optimal and cost-effective utilization of available hardware and software.

f. Ability to support secondary (or backup) interfaces, by which an intermediate AFIRMS site may be bypassed when the need arises. For example:

- The ability of a functional area, in place or deployed, to communicate directly with a MAJCOM

or

- The ability of a WING, in place or deployed, to bypass the MAJCOM and communicate directly with HQ USAF.

SECTION 3. ENVIRONMENT

3.1 Equipment Environment. Equipment is provided to each AFIRMS site on an "as needed" basis. It is the intent of AFIRMS to use existing facilities and equipments wherever possible. However, at a minimum, each AFIRMS site contains the equipment required for the Central Node and one Functional Area workstation. The Central Node contains the AFIRMS database for that site as well as the communications support for site to site communications.

AFIRMS utilizes standard Air Force equipment sources such as the Air Force Standard Multiuser Small Computer Initiative by the Air Force Computer Acquisition Center, TEMPEST, and Phase IV Program equipment sources. AFIRMS is designed to allow for the integration of different computers, peripherals, and communication standards (Ref. 2.3, 3.1.4, 3.2.1.3) throughout the system. This provides for a faster and more cost-efficient AFIRMS development, and a higher degree of operational flexibility.

3.1.1 Central Node Equipment. Each AFIRMS site will contain a Central Node consisting of the following equipment:

a. One or more processors, each capable of handling four or more functional areas. Each processor is a 32-bit machine with at least a 24-bit address structure. Each processor has several high bandwidth full duplex communications paths to the other processors, if any, in the central node. Each processor has the ability to connect three or more terminals.

b. One or more direct access, high speed storage devices capable of containing the centralized data base and capable of being accessed by multiple processors. Each high speed storage device has at least one high bandwidth full duplex communications path to each of the processors in the central node.

c. One direct access, high speed storage device capable of containing all software and system files for each processor in the Central Node.

d. A mass storage device, i.e. 9-track tape or optical storage device, capable of being accessed by multiple processors.

e. A communications controller capable of handling all external communications lines and capable of being accessed by multiple local processors.

f. Encryption devices for each physical line that may pass classified data. The encryption device is able to operate in a synchronous or asynchronous mode and to operate at the speeds required by the communications lines.

g. Power conditioning and failure protection mechanisms are required. All "wall power" must be filtered to protect equipments against power surges. Power failsafe backup provisions are provided to preserve memory in the event of power failure. Backup power terminates during normal shutdown.

h. A CRT terminal and line printer for development and maintenance purposes.

i. Main Memory. An initial user memory capacity of a minimum of four megabytes of user memory is required. This user memory is expandable (in minimum 512K byte increments) up to at least 10 megabytes. All memory specifications are made in 8 bit bytes. The physical organization of the main memory is modular so that a failure in one module (except the module containing the operating system) does not deprive the system of the remaining memory.

   (1) Error Detection. As a minimum, memory error detection and correction features are provided that detect double bit errors and correct all single bit errors for each byte of memory.

   (2) Memory Protection. The capability to inhibit any attempt by an applications program to write into or read from memory areas not allocated to that program is provided.

3.1.2 Functional Area Equipment. Each functional area which needs to access, enter, or modify AFIRMS data is provided with a functional area workstation to communicate with the Central Node. Each functional area workstation contains the following equipment:

a. One processor capable of handling one or more users depending on the needs of the functional area. The processor is at least a 16-bit machine.

b. One direct access, high speed storage device capable of containing the local data base and the software/system files.

c. A mass storage device, i.e. disk drive.

d. A communications controller capable of handling all external asynchronous/synchronous communications between the functional area workstation and the central node.

e. Several miscellaneous input/output devices. The number of each type of device depends on the requirements of the functional area, and will be determined during the analysis phase that precedes implementation at each site.

f. An encryption device for communicating with the Central Node if the workstation is to handle classified data. The encryption device is able to operate either in a synchronous or asynchronous mode, and to operate at the speeds required by the communications lines.

g. Power conditioning and failure protection mechanisms are required. All "wall power" must be filtered to protect equipments against power surges. Power failsafe backup provisions are provided to preserve memory in the event of power failure. Backup power must terminate during normal shutdown.

h. Main Memory. An initial user memory capacity of a minimum of two megabytes of user memory is provided. This user memory is expandable (in minimum 512K byte increments) up to at least 8 megabytes. All memory specifications are made in 8 bit bytes. The physical organization of the main memory is modular so that a failure in one module (except the module containing the operating system nucleus) shall not deprive the system of the remaining memory.

(1) Error Detection. As a minimum, a memory error detection and correction feature is provided that detects double bit errors and corrects all single bit errors for each byte of memory.

(2) Memory Protection. The capability to inhibit any attempt by an applications program to write into or read from memory areas not allocated to that program is provided.

3.1.3 Input/Output Devices. The device requirements of each AFIRMS site for CRT terminals, printers, disk drives, and magnetic tape drives is determined during the analysis phase that precedes implementation at that site.

a. CRTs must possess the following characteristics:

(1) Monochrome Terminals: Alphanumeric keyboard and video display; interface via standard RS-232-C port; be able to function as a system console; and when the ASCII "BEL" character or its equivalent is received, an audible tone or "BEEP" must be sounded.

(a) Keyboard:

1 Must be capable of generating the ASCII 128-character subset in accordance with (IAW) FIPS PUB 1.

2 At a minimum, must conform to the ANSI standard X4.14-1971.

3 Must have a repeat function for all printable ASCII characters, cursor controls, and spacing functions.

4 Must have separate keys for carriage return, control, escape, and spacing functions.

5 Must have a minimum of 16 programmable function keys usable as AFIRMS bezel keys.

6 Must have a numeric keypad to the right of the character keys and allow numeric entries from either the regular character key or the numeric keypad.

7 Have at least four cursor movement keys separate from function keys.

8 Have a detachable keyboard.

9 Have a (screen) hardcopy function.

(b) Video Display must possess the following characteristics:

1 Must display a minimum of 24 lines of 132 characters each.

2 Characters displayed must consist of the ASCII 95-character subset IAW FIPS PUB 15, Section 1.

3 If the dot matrix character generation technique is used, the *matrix must be at least 7x9.*

4 Full descenders will be used on the lower case such as "g, j, p, q, y" and appropriate special characters.

5 Must implement a visible cursor denoting the next character position in such a manner that its location is obvious to the operator and does not obscure any information (excluding underline) which may be displayed at that position.

6 The cursor must be addressable and the capability must be provided for the applications program to clear the display and to position the cursor at any location on the screen.

7 Must have a non-glare viewing surface.

8 Must provide reverse video, bold, blink, and underscore video capabilities under application program control.

9 Brightness must be externally adjustable by the terminal operator.

10 The display must be green or amber.

11 Must have selectable terminal transmission rates of 1200, 2400, 4800, 9600 and 19,200 bps.

12 Must have a minimum 11-inch screen measured diagonally.

13 Must have smooth scrolling capability.

14 Must support shading and marking patterns (preprogrammed and programmable).

(c) Other Required CRT Terminal Characteristics:

1 Local memory.

2 Built-in diagnostics and testing.

3 TEMPEST certification - for terminals which display classified information.

4 Screen print function.

(2) Color Graphics Terminals must possess the following characteristics:

(a) Minimum of 16 special function (programmable) keys. Please refer to Table 3-1 for some of the required key features.

(b) 10% of the terminals will have a video interface board for use with video projectors.

(c) Screen definition of not less than 720x484 individually addressable and color definable pixels (i.e., medium resolution).

(d) Minimum 11" CRT screen.

(e) TEMPEST certified - for terminals which display classified information.

(f) Support 9600 baud rate.

(g) Display a minimum of 16 colors.

b. Printers must possess the following characteristics:

(1) Letter Quality Printers:

(a) Print at least 55 characters per second.

(b) Print at least 132 characters per line.

(c) Have a pressure-feed mechanism, interchangeable tractor feed and an automatic single sheet feeder.

(d) Print the complete 95 character ASCII subset IAW FIPS PUB 15, Section 1.

(e) Have operator selectable print spacing of 10 pitch, 12 pitch, and proportional spacing.

(f) Accept forms from 4 1/2 to at least 14 7/8 inches in width.

(g) Print clearly up to 3 part paper.

(h) Interface via RS-232-C serial port or parallel port.

(i) Provide at least one font which is OCR readable.

(j) Provide clearly marked vertical and horizontal forms alignment that indicates the standard first print position.

(k) Have operator controls for power online/offline, advance to top of form and manual adjustment of vertical and horizontal paper alignment.

(l) Be TEMPEST certified, when used for classified information printout.

(2) Dot Matrix Printers must possess the following characteristics:

(a) Print at least 200 CPS at 132 characters per line at 10 characters per inch.

(b) Have dot addressable graphics with a minimum resolution of 70 dots per inch vertical and horizontal.

(c) Provide correspondence quality print capability of at least 40 CPS at 10 CPI.

(d) Use an operator adjustable pin feed tractor for positive form registration movement.

(e) Print the complete 95 character ASCII subset IAW FIPS PUB 15, Section 1.

(f) Accept forms ranging from 4 1/2 to 14 7/8 inches in width.

(g) Print full descenders used on the lower case characters "g, j, p, q, y" and appropriate special characters.

(h) Print 6 and 8 lines per inch, operator selectable.

(i) Print clearly up to 3 part paper.

(j) Have controls for power, online/offline, advance to top of form and manual adjustment of vertical and horizontal paper alignment.

(k) Provide clearly marked vertical and horizontal forms alignment that indicates the standard first print position.

(l) Under program control, line feed, and form feed.

(m) Interface via RS-232-C serial port or parallel port.

(n) Be TEMPEST certified.

(3) High Speed (Line) Printers must possess the following characteristics:

(a) Print at least 500 LPM (at 132 CPL) using the character set in (b).

(b) Print the complete 95 character ASCII subset IAW FIPS PUB 15, Section 1.

(c) Support horizontal spacing of 10 or 12 CPI.

(d) Have vertical spacing of 6 or 8 LPI switch or programmer selectable.

(e) Print at least 132 characters per line.

(f) Print clearly up to 3 part paper.

(g) Have vertical format control via programmer or printer.

(h) Be TEMPEST certified.

(i) Have a diagnostic LED indicator for status.

(j) Interface via standard RS-232-C ports and parallel port.

(4) Color Graphics Printers must possess the following characteristics:

(a) Plot the displayed graph in no more than 90 seconds.

(b) Provide minimum resolution of 100x85 horizontal to vertical dots per inch.

(c) Print at least eight colors.

(d) Print on Bond paper and transparency (developing not acceptable).

(e) Interface via standard RS-232-C ports and a parallel port.

(f) Accept a minimum paper size of 8.5x11 inches.

(g) Be TEMPEST certified.

c. Floppy/Microfloppy Disk Drives must possess the following characteristics:

(1) Minimum of two read/write heads to provide access to double-sided disks.

(2) Provide a formatted storage capacity for one diskette of at least 1.5 megabytes.

(3) Use a minimum of a 5.25 inch double sided/double density diskette for floppy disk drives and 3.5 inch diskette for microfloppy disk drives.

(4) Be compatible with functional area workstation hardware selection.

d. Magnetic Tape Drives must possess the following characteristics:

(1) Are nine (9) track.

(2) Support a 10.5 inch reel of .5 inch by 2400 foot standard reel tape.

(3) Support speed read/write operations at a minimum of 75 IPS, streaming at a minimum of 200 IPS.

(4) Perform error checking on all read operations.

(5) On all write operations, be capable of performing a read after write with error checking.

(6) Have write protection and beginning and end of tape sensor.

(7) Have a minimum of dual-density (1600/6250 BPI capability).

3.1.4 Communications Equipment. Communications equipment is provided to supply both a primary and a secondary secure communications path to all higher and lower level sites. Requirements for specific types and quantities of communications hardware will be determined during the analysis phase that precedes implementation at each site.

3.1.4.1 Primary Intersite Communications. Primary communications equipment between subsystems must provide the following capabilities:

a. Encryption of both classified and unclassified data transmitted to and from subsystems.

b. A transmission rate of 9600 baud or greater using either asynchronous or synchronous equipment.

c. A 24-hour-a-day dedicated line between subsystems.

d. Conditioning to a bit error rate of 1 in 10^9.

3.1.4.2 Secondary Intersite Communications. Secondary (Backup) communications equipment must provide the following capabilities:

a. Encryption of data transmitted between sites.

b. A transmission rate of 300 baud or greater using either asynchronous or synchronous equipment.

c. Multiple physical paths for a single logical path (e.g., rerouting).

d. Availability, as required, in the event primary communications fail. Over a given 24-hour period, secondary media will be accessible at least 80% of the time.

3.1.4.3 Communications Hardware.

a. Modems:

(1) Limited Distance Modems. For on-base use, limited distance modems are required. The modems must be capable of operating over standard non-conditioned voice grade telephone lines at distances of at least 6 miles. The following characteristics are provided:

(a) Switchable and capable of transmitting and receiving data at 9600 bits per second (bps) up to 6 miles and 19,200 bps up to 3 miles.

(b) The limited distance modem shall meet EIA Standard EIA-RS-232-C/CCITT Recommendation V.24 for interfacing with external equipment.

(2) Long Distance Modems. Modems used outside the United States (Europe, Asia) on non-conditioned commercial telephone lines. The modem is a CODEX/V.29 data modem model 21962 and must be homologated (PTT option) to the country where the system is installed. The CODEX Universal PTT option, Product code 22120, is provided when required.

b. Line Drivers. Line drivers are required to boost the electronic signal for communications between modems and CRTs over long distances (i.e., 75 feet or more).

c. Encryption Devices. NSA-endorsed Data Encryption Standard (DES) devices are required. (Functionality may be combined for encryption devices and long or limited distance modems.)

3.1.5 Environment and Physical Facilities. AFIRMS equipment must operate throughout the ranges of electrical power and environmental tolerances stated below.

3.1.5.1 Space.

(1) Site Locations. Systems are installed at various Air Force installations worldwide. The central node location space ranges from a maximum 20 square feet for the smallest configuration to a maximum of 200 square feet for the largest configuration.

(2) Flooring. Equipment does not require raised flooring. The flooring may be carpeted. There are no special static control facilities.

(3) Ceiling Height. The distance from the floor surface to the unobstructed ceiling is at least 8 feet.

(4) Access Route. Equipment is installed in office buildings with access being the size of a normal office doorway. Some facilities are established computer facilities with a double door access route.

3.1.5.2 Electrical Power. All equipment must be capable of operating within the requirements of MIL-E-4158 and is further defined by the following:

(1)	Voltage regulation steady state	+10% to -15%
(2)	Voltage disturbances Momentary undervoltage	30% for less than 0.5 seconds -100% acceptable to 20 milliseconds
	Transient overvoltage	200% for less than 0.2 milliseconds
	Surges	IAW IEEE 587-1980

(3)	Voltage harmonic distortion	+3% -5% (with linear load)
(4)	Frequency variation	50/60Hz plus or minus 1Hz
(5)	Frequency variation rate of change	1 Hz/second
(6)	Power factor	0.8

(7) 220/240 Volts +or-10% single phase, 2 wire

(8) 105 Volts +or-10% single phase, 2 wire (Japan)

In addition to characteristics 1-8 above, it is desirable that deployable equipment operate using an Air Force 25KVA generator and that the equipment be ruggedized (for handling, ground transportation, and air transport) in accordance with MIL-STD-810. An electrical power fault detection device is required to prevent equipment failure (e.g., disk head crash).

3.1.5.3 Air Conditioning. The ambient temperature is maintained by the U.S. government between 60 and 90 degrees F with a relative humidity of between 20 and 90 percent, non-condensing. No special dust, static electricity control, or chilled water facilities are available. The computer is integrated with the A/C system to provide automatic thermal shutdown to prevent equipment failure during high or low temperature situations.

3.1.5.4 Remote Locations. Remote equipment is installed in various environments within U.S. Air Force organizations. Terminals, office printers, and modems fit on normal table tops or desk surfaces.

3.1.5.5 TEMPEST Requirement. All equipment, connectors, and cabling that convey classified information must meet the limits specified in NACSIM 5100A. All equipment must be on the Preferred Products List (PPL) or approved by AFCSC/EPV San Antonio, TX 78243.

3.2 Support Software Environment. AFIRMS software is broken up into two general categories: Applications Software and Support Software. Applications Software is that software which applies specified algorithms to a given data set, and/or stores/retrieves/formats/analyzes/displays a given set of data. Applications software programs/algorithms are enumerated and defined in the AFIRMS Transforms and Models Document, and in each of the AFIRMS Subsystem Specifications. This section enumerates and defines the elements of support software required to create the environment necessary to support AFIRMS' general functionality and the AFIRMS Applications Software.

3.2.1 Central Node Support Software. Each AFIRMS Central Node requires the support software listed in this section.

3.2.1.1 Operating System. A general purpose operating system is required to provide file access, program control, and data communications' interfaces. In addition, operating system operation (e.g., device I/O) does not impact the timing and flexibility (Ref. section 2.3) of AFIRMS operational software. The operating system must be able to:

a. Concurrently process a combination of interactive and local batch processing.

b. Support a multi-programming and virtual memory environment.

c. Support both file and record level locking protection capability.

d. Provide control over all hardware and software.

e. Support logical as well as physical mode access to all system peripheral devices including terminals.

f. Be capable of detecting and marking bad blocks while formatting system and data disks as well as during normal operation.

g. Support up to 8 concurrent interactive users in a minimum configuration and up to 20 concurrent interactive users in a maximum configuration.

h. Detect and automatically LOGOFF terminals which have been inactive for a user definable period of time. This time shall be determined and set by the system monitor.

i. Provide access to a calendar clock which provides the calendar date and time with a resolution of one microsecond (for purposes of statistical performance analysis data collection) showing hours, minutes, and seconds for time; and day, month, and year for date. This calendar clock shall be accessible to all programming languages.

j. Detect and terminate attempts to read or write outside of any programs allocated memory and detect and terminate attempts by any applications program to execute privileged and undefined instructions.

k. Provide High Order Language (HOL) Run-Time support for I/O, scheduling, and inter-process/intersite communication and coordination.

l. Provide memory fault detection and recovery capabilities.

m. Support high level control of interrupt detection, definition, and processing activities.

n. Provide the capability to perform dynamic load analysis and reporting.

o. Provide host language interfaces (system directives) to system functions.

3.2.1.2 Utility Routines. The following utility routines are required:

a. File Management System

b. Sort and Merge Utility

c. Translation Utility (character code conversion, e.g. ASCII to EBCDIC and vice-versa)

d. Save and Restore Utility (to and from tape)

e. Security Utility (Error surveillance and alerts, to recognize, record and indicate misuse, and attempted misuse, of the system)

f. Logging/Accounting Utility (An automated audit trail will show: access made to files; how, and from where the access was initiated; the identity of the person or process that initiated the access; and all unauthorized attempts.)

g. Diagnostic Software

h. Mail Utility.

3.2.1.3 Communications Software. The specific requirements for communications software will be determined during the analysis phase that precedes implementation at each site. However, at a minimum, a host interface to the Defense Data Network (DDN) is required for each AFIRMS site. This interface implements the full DDN protocol suite, and supports site-to-site communications over the DDN, and provides the standard DDN services of terminal-to-host communications, file transfer, and electronic mail to users of the AFIRMS system. Connection to the DDN is via the ARPANET network access protocols or X.25. Host-to-host communication is via the Transmission Control Protocol (TCP), MIL-STD 1778, and Internet Protocol (IP), MIL-STD 1777. The services which are supported are TELNET, File Transfer Protocol (FTP), and the Simple Mail Transfer Protocol (SMTP).

It is recognized that normal DDN encryption services are limited to SECRET security classifications. However, with the acquisition of TOP SECRET security classification encryption devices, the DDN can be accessed for transmission of TOP SECRET information.

3.2.1.4 Database Management System (DBMS) Requirement. The AFIRMS DBMS performs functions such as opening and closing the database, transaction flow, handling of the DBMS Command Language requests, transaction parsing, and automatic editing on input. The DBMS performs the action of retrieving a record from a file, writing a record to a file, and deleting and creating records in a file. In addition, the DBMS allows for host language interfaces; save/restoration of full/partial database images; restart/recovery capability with multi-user/multi-thread concurrency controls; and some level of distributed data management synchronization/concurrency controls. The specific level of distributed data synchronization control required will be determined during the analysis phase that precedes implementation at each site.

For detailed required AFIRMS DBMS capabilities, please reference the AFIRMS Database Specification.

In addition to the software that comprises the AFIRMS DBMS, there is a requirement for a software package to serve/support the DBMS in the following manner:

a. Controls entry to/exit from DBMS functions.

b. Provides a link/connection between the communications software and the DBMS.

c. Handles data retrieval and data update transactions.

d. Generates a waiting queue for transaction handling by transaction priority.

e. Performs update notifications to other sites for data changes (deletions, additions or modifications) in intersite data sets.

f. Determines whether data retrieval and update transactions are to be directed/routed to the local (functional area) database or the central database.

g. Provides a link between parameter screen software and the DBMS in order to verify the validity of parameter selections.

3.2.2 Functional Area Support Software. Each AFIRMS functional area requires the support software enumerated in this section.

3.2.2.1 Operating System. A general purpose operating system is required to provide file access, program control, and data communications' interfaces. The operating system must operate independent of the existence of another operating system. In addition, operating system operation (i.e., device I/O) does not impact the timing and flexibility of AFIRMS operational software. The operating system must be able to:

a. Concurrently process a combination of interactive and local batch processing.

b. Support a multi-tasking environment.

c. Support both record level and file locking protection capability.

d. Provide control over all hardware and software.

e. Support logical as well as physical mode access to all system peripheral devices including terminals.

f. Support interactive processing.

g. Be capable of detecting and marking bad blocks while formatting system and data disks.

h. Support 1 concurrent interactive user in a minimum configuration and up to 3 concurrent interactive users in a maximum configuration.

i. Detect and automatically LOGOFF terminals which have been inactive for a user definable period of time. This time shall be determined and set by the system monitor.

j. Provide access to a calendar clock which provides the calendar date and time with a resolution of one microsecond (for purposes of statistical performance analysis data collection) showing hours, minutes, and seconds for time; and day, month, and year for date. This calendar clock shall be accessible to all programming languages.

k. Detect and terminate attempts to read or write outside of any programs allocated memory and detect and terminate attempts by any applications program to execute privileged and undefined instructions.

3.2.2.2 Utility Routines. The following utility routines are required:

a. File Management System

b. Sort and Merge Utility

c. Translation Utility (character code conversion, e.g. ASCII to EBCDIC and vice-versa)

d. Save and Restore Utility

e. Security Utility (Error surveillance and alerts, to recognize, record and indicate misuse of the system)

f. Logging/Accounting Utility (An automated audit trail will show: access made to files; how, and from where the access was initiated; the identity of the person or process that initiated the access; and all unauthorized attempts.)

g. Diagnostic Software

h. Mail Utility.

3.2.2.3 Communications Software. The specific requirements for communications software will be determined during the analysis phase that precedes implementation at each site. Communications between the CNM and the intelligent FA terminals must be accommodated via some communications protocol supported on both processors. The volume and frequency of the various information gateways are presented by functional area in the AFIRMS HQ USAFE Database Specification.

3.2.2.4 Database Management System (DBMS) Requirement. The AFIRMS DBMS performs functions such as opening and closing the database, transaction flow, handling of the DBMS Command Language requests, transaction parsing, and automatic editing on input. The DBMS performs the action of getting/retrieving a record from a file, writing a record to a file, and deleting and creating records in a file. In addition, the DBMS allows for host language interfaces; save/restoration of full/partial database images; restart/recovery capability with multi-user/multi-thread concurrency controls; and some level of distributed data management/synchronization/concurrency controls. The specific level of distributed data synchronization control required will be determined during the analysis phase that precedes implementation at each site.

For detailed required AFIRMS DBMS capabilities, please reference the AFIRMS USAFE Database Specification.

In addition to the software that comprises the AFIRMS DBMS, there is a requirement for a software package to serve/support the DBMS in the following manner:

a. Controls entry to/exit from DBMS functions.

b. Provides a link/connection between the communications software and the DBMS.

c. Handles data retrieval and data update transactions.

d. Generates a waiting queue for transaction handling by transaction priority.

e. Performs update notifications to other sites for data changes (deletions, additions or modifications) in a DBMS file.

f. Determines whether data retrieval and update transactions are to be directed/routed to the local (functional area) database or the central database.

g. Provides a link between parameter screen software and the DBMS in order to verify the validity of parameter selections.

3.2.2.5 Display/Graphics Software. AFIRMS display screens are categorized by their method of display: graphic, tabular, and integrated graphic and tabular. The tabular screens actually show the data value and are listed in table format, i.e., rows and columns. The tabular screens may use color to segregate the data into like types to assist the user in assimilating the information. The tabular screens use colors to highlight a line and/or field as a screen place marker for the user.

The graphic screens are also of standard types: bar graph, line graph, and pictoral (i.e., maps). Typically, these are output screens only (they cannot be updated through the screen). The bar graph screens also have a data value on top of a bar graph.

The display screen generation software must have routines to generate these screens. In summary, the generalized routines and particular features are:

a. Tabular Screen Generator:

(1) Right justified numeric data.

(2) Left justified alphanumeric data.

(3) Line highlighter that can be toggled on and off.

(4) Field highlighter that can be toggled on and off.

(5) Screen editor (for extensive data input and editing capability).

(6) Linkable to a special (nonstandard) display area on the screen.

(7) Variable legends.

(8) Blanking of repeating column data (switchable on or off).

(9) Capability to identify (e.g., via blinking, changed color, or some other indicator) a row or column of data that has changed from an original or previous data set. The means by which this "data change indicator" is activated will be defined during the analysis phase that precedes implementation.

(10) Field and row coloring depending on value of data field (selectable).

(11) Column headings programmable separately from body of table.

(12) Non-sequential vertical paging (up/reverse, down/forward) as well as horizontal paging (i.e., virtual screen) capability.

(13) Scrolling (left, right, up, down) to augment the paging feature.

(14) Capability to generate a hard copy from a screen display without using a system printer.

(15) Data error checking and validation capabilities to include checking of input data for proper legal values, length and format, as well as upper and lower case and special character recognition.

(16) Grid generation.

(17) Title, subtitle, and heading generation.

(18) Dynamic horizontal/vertical field count/sum.

b. Graphic Screen Generator:

(1) Standard Line Graph with dynamic or variable legend

(a) Variable legends.

(b) Automatic X- and Y-axis scaling.

(c) Y-axis rescaling after screen display.

(d) Capability to identify (e.g., via blinking, changed color, or some other indicator) data that has changed from an original or previous data set. The means by which this "data change indicator" is activated will be defined during the analysis phase that precedes implementation.

(e) Field coloring depending on value of data field (selectable).

(f) Capability to generate a hard copy from a screen display.

(2) Standard Bar Graph:

(a) Variable legends.

(b) Automatic Y-axis scaling (Bar graph).

(c) Automatic X-axis scaling (Bar graph).

(d) Y-axis rescaling after screen display.

(e) Capability to identify (e.g., via blinking, changed color, or some other indicator) data that has changed from an original or previous data set. The means by which this "data change indicator" is activated will be defined during the analysis phase that precedes implementation.

(f) Field coloring depending on value of data field (selectable).

(g) Capability to generate a hard copy from a screen display.

(3) . Standard Map Maker with:

(a) Linkable to a special (nonstandard) area on the screen to display remarks or other data relevant to the display. This requires the routine to know where the cursor is on the display in order to call up the correct information.

(b) Coordinate system so air bases can be inserted, labeled, and deleted by a nontechnical user using latitude and longitude or GEOREF map coordinates (the positioning will be reasonably accurate with relation to one another).

(c) Base position is colored according to a dynamic database value (color indicates a condition or status).

(d) Change indication for positions whose values have changed.

(e) Continuously variable software zoom (if not a hardware capability).

(f) The capability to generate and display special symbols.

c. Display Screen Parameter Software as follows:

(1) The parameter software interacts with the AFIRMS database, when necessary, to determine, self-generate, and list the appropriate parameter choices for the database set requested. For example, if ATO 3 (the specified database set) does not have CBU-52 munitions (a parameter selection) tasked, then the list of choices for a munition type (the parameter) will not include CBU-52.

(2) The parameter software must be interpretive, so as to:

(a) Ensure a consistent and well defined interface to the database transaction software

(b) Provide a flexible and friendly mechanism for user input.

(3) The parameter software also permits write-in choices where appropriate. In some instances, it isn't possible or practical to list all appropriate parameter selections.

d. Function Keys. AFIRMS is operated by the user using a system of menus and function keys. Some of the product screen keys can be seen at the bottom of the display screens described in the AFIRMS Product Description annexes. The number of available keys is less than the number of keys needed; arrays of keys are utilized to overcome that problem.

The first array contains the basic key functions needed for every display screen. Except for the Base Status Map, the graphic displays require only the first array. The tabular input screens require key functions to add, delete and change/edit data. A paging and/or scrolling capability is needed. Because some records have sub-records (e.g., a wing with several munitions as the Wing Resource Summary product, a mission with two MDSs and/or aircraft SCLs as

the Tasking Information product, or a unit at multiple locations or with multiple MDSs as the Unit Status product), the system must know when it is editing records or sub-records. Therefore, the second array is reserved for editing records and the third array is reserved for editing sub-records. Switching between arrays is done with two special function keys. An arrow on either or both ends (if on the 2nd of 3 arrays) tells the user which array is in use. The required functions of these keys are outlined in Table 3-1.

3.3 Interfaces. AFIRMS consists of a set of subsystem sites requiring data transfer between them. In addition, AFIRMS will interface with selected existing or future systems. This section describes the three basic kinds of AFIRMS system interface requirements, i.e. intersite, intrasite, and external interfaces.

3.3.1 AFIRMS Intersite Interfaces. The AFIRMS intersite interfaces include all those required for transmission and receipt of data between two or more AFIRMS sites.

3.3.1.1 Intersite Transaction Header. Each transaction sent between AFIRMS sites has a common transaction header. This header is composed of:

a. Transaction ID
b. Transaction Type
c. Origination Address
d. Destination Address
e. Total Length of Transaction
f. Priority Transmission Indicator

The specification for this header is defined in Appendix A.

3.3.1.2 Intersite Transaction Data. AFIRMS uses consistent format for transmission of data between sites. Each transmission consists of the AFIRMS header mentioned above and the transaction data format. The transaction types supported by AFIRMS are:

a. Base Status Transmission Request
b. Unit Transmission Request
c. Resource Summary Transmission Request

Table 3-1

PRODUCT DISPLAY SCREEN FUNCTION KEY DESCRIPTION

Key No.	Key Label	Key Function Description
1st Array:		
1	DISPLAY PARAM SELECT	Takes the user back to the parameter selection screen. The parameter choices the user made to display the product are redisplayed.
2	LINE HIGHLIGHT TOGGLE	Changes the state of the Line Highlighter toggle. If it is turned/toggled OFF, the state is changed to ON and the Line Highlighter appears. If it is toggled ON, the state is changed to OFF and the Line Highlighter is removed from the tabular display. The key is not active when a graphic screen is displayed.
3	HARD COPY	Spawns a batch process to print a color copy of the display. This key is on the 1st array only if the product has a single screen display. For multiscreen displays, the key is on the 2nd array with the paging keys.
4	TOP MENU	Returns the user to the first/top menu.
5	PREVIOUS MENU	Returns the user to the menu from which the product was selected.
6	HELP	Interrupts the product display and takes the user to the HELP screen. When finished with the HELP screen, the user returns to this display.
7	UPDATE SCREEN	Causes the system to refresh or update the product display using the current parameter choices. Normally used with a resource status product when the system notifies the user that the status data has been updated.
8	Not used.	

Table 3-1

PRODUCT DISPLAY SCREEN FUNCTION KEY DESCRIPTION (Cont.)

Key No.	Key Label	Key Function Description
2nd array:		
9	PAGE REVERSE	Page the product in reverse order. It pages a full or half page at a time, depending on the paging option selected. It is active only when a tabular product is displayed and is longer than one page of display.
10	FULL PG HALF PG	Changes the paging state to FULL or HALF paging, depending on the current state. The current paging state is always highlighted or colored.
11	PAGE FORWARD	Causes the system to page the product forward in sequential order. It pages a full or half page at a time, depending on the paging option selected. It is active only as described in PAGE REVERSE above.
12	CHANGE XXXXXX DATA	Permits editing of the screen data. The 'XXXXXX' is changed to the appropriate term (such as aircraft or aircrew) when the product is designed. Used only for tabular products. Pressing the key a second time de-activates the CHANGE mode.
13	ADD XXXXXX DATA	Permits the addition of a record to the database. Used only for tabular products. Pressing the key a second time de-activates the ADD mode.
14	DELETE XXXXXX DATA	Permits the deletion of a record from the database. Used only for tabular products. Pressing the key a second time de-activates the DELETE mode.
15	HARD COPY	Same as 3 above.
16	ENTER	Updates the data base as directed by keys 12, 13, and 14 above. The ENTER key acts as a confirmation step for the CHANGE/ADD/DELETE keys.

Table 3-1

PRODUCT DISPLAY SCREEN FUNCTION KEY DESCRIPTION (Cont.)

Key No.	Key Label	Key Function Description
17	INTERROGATE BASE	Interrogates the cursor position and displays a box containing data corresponding to the base displayed under the cursor (see Base Status Map). It occupies one of the 9-16 key positions.
18	DELETE DATA BOX	Deletes the box containing the base data. It occupies one of the 9-16 key positions.
19	SCALE UP	Increases the y-axis scale of the bar graph by approximately 100% after the screen is displayed. It occupies one of the 9-16 key positions. Used with bar graphs only.
20	SCALE DOWN	Decreases the y-axis scale of the bar graph by approximately 50% after the screen is displayed. It replaces one of the 9-16 key positions. Used with bar graphs only.
3rd array:		
21	PAGE REVERSE	Same as 9 above.
22	FULL PG HALF PG	Same as 10 above.
23	PAGE FORWARD	Same as 11 above.
24	CHANGE XXXXXX DATA	Same as 12 above except only sub-record data is changed. The system prevents changes to record keys/data.
25	ADD XXXXXX DATA	Same as 13 above except able to add sub-records only.
26	DELETE XXXXXX DATA	Same as 14 above except able to delete sub-records only.
27	Not used.	
28	ENTER	Same as 16 above.

d. Base Status Transmission

e. Unit Status Transmission

f. Resource Summary Transmission

g. Transaction Cancellation Request

h. Transmission Restart Request

Specifications for Base Status, Unit Status and Resource Summary Transmissions are defined in Appendix A.

3.3.2 AFIRMS Intrasite Interfaces. The transactions that occur within a particular site are defined in the various subsystem specifications. However, since each site, even within a particular subsystem, may be configured in a significantly different manner, this section identifies the intrasite interfaces required.

3.3.3 External System Interfaces. It is the goal/intent of AFIRMS to avoid data collection redundancy where possible. AFIRMS accomplishes this by interfacing with current or projected systems that contain the accurate data required. AFIRMS takes advantage of other functional systems that address capability assessments for a subset of the resources which AFIRMS uses to provide its integrated capability assessments. In order to handle interfaces with future developing systems, AFIRMS is designed using generic interfaces. This allows for the inclusion of interfaces with future systems over time with minimal modification to the AFIRMS system.

3.3.3.1 General Interface Specifications. AFIRMS must interface with systems that will be implemented in the future. To facilitate future interfaces, AFIRMS employs generalized interface formats. Refer to section 2.3 of this document for a more in-depth discussion of the generalized interface specifications for AFIRMS. These intersite interface specifications are made up of primary and secondary information flows. They provide enhanced system flexibility, availability and capability to assimilate information from heterogeneous hardware within the AFIRMS system and from external systems.

3.3.3.2 Specific External System Interfaces. The following systems are the top candidates for interfacing with AFIRMS for the purpose of receiving and/or sending common data:

a. Air Force Operations Resource Management System (AFORMS)

b. Core Automated Maintenance System (CAMS)

c. Combat Ammunition System (CAS)

d. Combat Fuels Management System (CFMS)

e. Combat Supplies Management System (CSMS)

f. Contingency Operation/Mobility Planning and Execution System (COMPES)

g. Logistics Capability Measurement System (LCMS)

h. War Mobilization Plan Updating System Weapon System Management Information System (WSMIS)

i. Combat Supply Systems (CSS)

j. Vehicle Integrated Management System (VIMS)

k. Airlift Implementation and Monitoring System (AIMS); MAC-unique system

l. Military Air Integrated Reporting System (MAIRS); MAC-unique system

m. Information Processing system (IPS); MAC-unique system

n. Flow Generator, Version 3 (FLOGEN III); MAC-unique system

o. Airlift Deployment Analysis System (ADANS); MAC-unique system

p. Theatre Airlift Management System (TAMS); MAC-unique system

q. Force Management Information System (FMIS); SAC-unique system

3.4 Security. The AFIRMS ADPS handles data up to and including TOP SECRET classification level. It handles sensitive unclassified data. Due to the various environments and processing requirements at the wing, MAJCOM and HQ USAF levels of operations, the security modes of operations differ as follows: HQ USAF operates in the TOP SECRET System High Security mode; MAJCOMs operate

in the TOP SECRET System High Security Mode; and WINGs operate in the Controlled Security mode at levels of classification from unclassified through SECRET.

Security protection is provided for these environments by utilizing a combination of the following security measures in accordance with AFR 205-16.

a. Personnel Security. A personnel security program is implemented for the AFIRMS program in accordance with the provisions of DOD Regulation 5200.1/AFR 205-32 USAF Personnel Security Program. Personnel access control is maintained for the central computer facilities and remote terminal areas.

(1) Central Computer Facility. Strict personnel access control ensures that access is only to personnel who require it, and who possess a security clearance at least equal to the highest classification of information being processed or openly stored at the facility.

(2) Remote Terminal Area(s). Authorization for access to and use of remote terminals devices, is based on an individual's duties, his/her need to use the terminal, and possession of a security clearance of the required level.

b. Physical Security. Measures are taken to ensure external protection for AFIRMS against unauthorized access to the central computer facility, to the system from remote terminals and to data storage media.

(1) Central Computer Facility. Central computer facility physical security is established in accordance with the requirements for the highest classification and data sensitivity that are associated with the ADPs or openly stored data.

(2) Remote Terminal Area. Physical security measures at remote sites fulfill the minimum requirements for the highest classification of information accessed from or stored at the site.

c. Hardware Security. AFIRMS system hardware meets all of the provisions recommended in DoD 5200.28M, ADP Security Manual for hardware security features.

d. Software Security. The operating systems selected for use conform to general software security requirements stated in DoD 5200.28M. In addition to the security protection features contained in the operating systems, a combination of system and application software protection features are utilized to provide the following security protection to comply with applicable DoD and Air Force security policies.

(1) Access Control, to prevent unauthorized entry to systems, files and programs.

(2) Error Surveillance and Alerts, to recognize, record and indicate misuse and attempted misuse of the system.

(3) File Security to prevent unauthorized access or alterations to files. An automated audit trail shows: accesses made to files; how, and from where the access was initiated; the identity of the person or process that initiated the access; and all unauthorized attempts.

e. System Stability. All AFIRMS components operate so that one can automatically or administratively detect and report system hardware and software malfunctions in time to prevent unauthorized disclosure.

f. Data Integrity. Each database, file, and data set/element is identified with an origin, use, and an explicitly defined set of access controls. These access controls are based on classification, sensitivity, user clearance, and established need-to-know.

g. National Bureau of Standards (NBS) or National Security Agency (NSA) approved data encryption devices may be required for transmission of sensitive unclassified data depending on nature of the data.

h. Emanations Security (EMSEC). ADP and communications equipment utilized to process classified material at AFIRMS sites will be TEMPEST approved. All devices that are not TEMPEST approved will be tested and approved for placement in the ADP facilities in such a manner as to control compromising emanations. All equipment will be installed IAW the guidelines stated in NACSIM 5203.

i. Procedural Security. Security operating procedures meet the requirements of AFR 205-1 and 205-16 and include the following:

(1) System Access Controls

(2) File Access Controls

(3) Personnel Access Controls

(4) Security Markings

(5) Protecting Classified Output

(6) Physical Security

(7) Protection of Residual Information

3.5 Controls. The AFIRMS system provides integrated control functions which operate at system levels independent of stated AFIRMS operational functionality. These functions are implemented and utilized in such a way as to minimize their impact on AFIRMS execution. In each case, control functions are logically apportioned amongst the three AFIRMS subsystem levels, with some features available only to users of systems operating in System High Security mode.

Control functions are logically separated into two functional categories: System/Operations Management Controls, and Intersite Access and Data Flow Controls. Additional controls will be implemented at the subsystem level, and are further discussed in the AFIRMS Subsystem Specifications documents (e.g., Intrasite Access Controls.)

3.5.1 System/Operations Management Controls. These incorporate the following functions:

a. The application of software monitoring and diagnostic utilities.

b. The application of hardware monitoring and diagnostic utilities.

c. The ability of start, stop, and restart AFIRMS system and communication processes, including upper level control of network performance.

d. The ability to alter AFIRMS system runtime parameters dynamically (e.g., process priorities, operating system parameters, etc.)

3.5.2 Intersite Access and Data Flow Controls. Functions of this nature address control requirements imposed by security issues. Additionally, these functions will assist in supporting downgraded operational modes. These include:

a. Dynamic subtraction/addition of AFIRMS sites from the worldwide AFIRMS configuration.

b. Dynamic imposition of limitations/new priorities on intersite data communication to and/or from specific sites.

SECTION 4. DESIGN DETAILS

4.1 General Operating Procedures. The AFIRMS general operating procedures with respect to the load, start, stop, recovery, and restart of a particular node and/or sub-system are described in the AFIRMS Subsystem Specifications. AFIRMS system level operating procedures are functions which relate to the initialization, termination, maintenance, and security of the AFIRMS system as a whole. Many of these are enumerated in Section 3.5 (Controls). Additional procedures are:

a. Archiving of system diagnostic information, and regular analysis and time-comparisons thereof.

b. Periodic modification of system level passwords (i.e., System Manager's), and dissemination throughout AFIRMS' security files.

c. Archiving of AFIRMS' network configurations for diagnostic and recovery purposes.

d. Introduction/deletion of AFIRMS nodes.

e. Initialization, termination, and diagnostic maintenance of inter-site communication processes (e.g., DECNET).

f. Dissemination of AFIRMS' software/data/format modifications, and specifications relating to each.

g. Transmission and throughput analysis of test data messages throughout the AFIRMS System on a daily basis.

4.2 System Logical Flow. The proposed AFIRMS information flow is shown in Figures 4-1 and 4-2. Squadrons are linked hierarchically to a wing which may be linked hierarchically to an Air Division (SAC) or Airlift Division (MAC), which may be linked hierarchically to a NAF (MAC and SAC), but which ultimately is linked hierarchically to a MAJCOM, which in turn is linked to HQ USAF.

The aforementioned data flows are one-way, thereby making the system a push reporting system where data is pushed up the hierarchy. This push approach is designed to minimize communication requirements and simplify the

data synchronization problem. Note, however, that the push approach does not prevent requests for standard data "pushes" on an exception basis in addition to the standard periodic pushes of data. Additionally, before information is passed to the MAJCOM, a wing OPR can check the data for accuracy. Certain controls or filters are needed to prevent communications overloads.

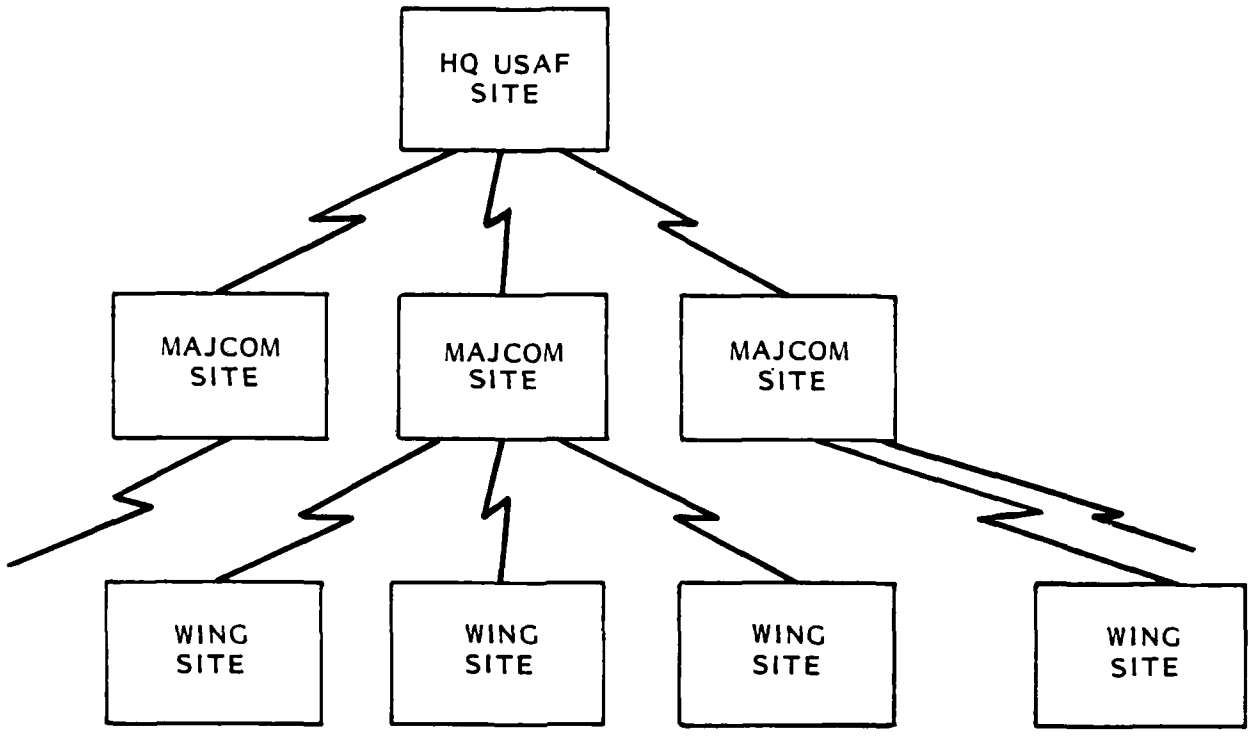


Figure 4-1. AFIRMS Logical Flow

4.3 System Data.

System data storage requirements are specified in the Database Specifications for each subsystem. Data falls into one of two categories: inputs and outputs.

4.3.1 Inputs. Input data consists of data either stored in the AFIRMS database or transmitted from one process to another. These two data categories are presented in detail in the following documents:

a. Input Records. Input record nomenclature, source, expected volume, frequency, priority, degree of sensitivity and requirement for timeliness are described in the AFIRMS Data Requirements Document and Database Specifications.

THIS PAGE INTENTIONALLY LEFT BLANK

b. Input Data Elements. Data elements definitions are provided in AFIRMS Data Requirements Document and Database Specifications.

c. Data request/update interface specifications are detailed in the Subsystem Specifications.

4.3.2 Outputs. The information in this section is a summary of the information in the same section in the three Subsystem Specifications. It is presented here to provide an overview of total system functionality. Operational AFIRMS outputs include reports and graphic readiness measurement displays as follows:

a. Output Reports. 'FIRMS report/display outputs are fully described in the AFIRMS Product Descriptions series. The output reports are graphically displayed. These are enumerated in Table 4-1. Table 4-1 provides a listing of the AFIRMS output reports developed for the fighter mission. MAJCOMs will require different types of products to support their specific missions. For example, MAC users will require output reports that support the strategic and tactical airlift missions; SAC users will need output reports that support the bombardment, tanker, and missile missions.

b. Output data interface specifications are detailed in the Subsystem Specifications.

c. Output Data Elements. Output data elements are described in the AFIRMS Data Requirements Document.

d. Output Report Functional Area Users. AFIRMS report/display outputs are enumerated with respect to primary and supporting users of each AFIRMS Subsystem Specification.

TABLE 4-1

AFIRMS OUTPUT REPORT LISTING

Screen Title	Format	Est. Daily Volume & Freq.	Complexity Classification	Security
Aircraft & Mission Tasking Details	Tabular	1 pg @5/AF 1 pg @12/MAJ 1 pg @5/Wg	Medium	U-TS*
Aircraft Spares Support Capability	Graphic	1 pg @16/AF 1 pg @20/MAJ 1 pg @6/Wg	Complex	U-TS*
Aircraft Tasking	Graphic	1 pg @5/AF 1 pg @12/MAJ 1 pg @5/Wg	Medium	U-TS*
Attrition Trends	Graphic	1 pg @8/AF 1 pg @8/MAJ	Simple	Secret
Base Fuels Capability	Graphic	1 pg @16/AF 1 pg @20/MAJ 1 pg @6/Wg	Medium	U-TS*
Base Status (Input)	Tabular	16 pg @8/AF 8 pg @16/MAJ	Simple	U-S
Base Status (Output)	Graphic	16 pg @8/AF 8 pg @16/MAJ	Simple	U-S
Capability Perspective	Graphic	1 pg @2/AF 1 pg @2/MAJ	Complex	Secret
Communications Support Status	Graphic	16 pg @16/AF 8 pg @24/MAJ	Simple	U-S
Fuels Capability	Graphic	1 pg @16/AF 1 pg @20/MAJ	Medium	U-TS*
Dollars to Readiness - Comparisons	Graphic	1 pg @4/AF 1 pg @4/MAJ	Complex	Secret
Dollars to Readiness - Resource Perspective	Graphic	1 pg @4/AF 1 pg @4/MAJ	Complex	Secret
Dollars to Readiness Associations	Tabular	2 pg @8/AF 1 pg @8/MAJ	Simple	Unclas

TABLE 4-1

AFIRMS OUTPUT REPORT LISTING (Continued)

Screen Title	Format	Est. Daily Volume & Freq.	Complexity Classification	Security
Individual Resource Capability	Graphic	1 pg @8/AF 1 pg @12/MAJ 1 pg @9/Wg	Complex	U-TS*
Integrated Capability	Graphic	1 pg @8/AF 1 pg @12/MAJ 1 pg @6/Wg	Complex	U-TS*
Mission Area Tasking	Graphic	1 pg @4/AF 1 pg @4/MAJ	Medium	Secret
Mission Profile Definition	Tabular	8 pg @8/AF 8 pg @16/MAJ 3 pg @3/Wg	Simple	U-S
Mission Tasking	Graphic	1 pg @5/AF 1 pg @12/MAJ 1 pg @5/Wg	Medium	U-TS*
Munitions Capability	Graphic	1 pg @16/AF 1 pg @20/MAJ 1 pg @6/Wg	Medium	U-TS*
Munitions Substitution Sortie Capability	Graphic	1 pg @4/AF 1 pg @4/MAJ	Complex	Secret
Munitions Substitution Sortie Requirement	Graphic	1 pg @4/AF 1 pg @4/MAJ	Complex	Secret
Munitions Status	Tabular	20 pg @8/AF 8 pg @48/MAJ	Medium	U-S
OPlan/OPORD Associations	Tabular	3 pg @8/AF 3 pg @8/MAJ 1 pg @1/Wg	Simple	Unclas
Order Assignments	Tabular	8 pg @8/AF 8 pg @8/MAJ 1 pg @1/Wg	Simple	U-S

TABLE 4-1

AFIRMS OUTPUT REPORT LISTING (Continued)

Screen Title	Format	Est. Daily Volume & Freq.	Complexity Classification	Security
Process Status	Tabular	3 pg @20/AF 3 pg @20/MAJ 1 pg @6/Wg	Simple	Unclas
Resource Reallocation	Graphic	1 pg @16/AF 1 pg @8/MAJ	Simple	Secret
Resource Unit Price	Tabular	3 pg @4/AF 3 pg @4/MAJ	Simple	Unclas
Status Map	Graphic	8 pg @16/AF 3 pg @20/MAJ	Simple	U-S
Unit Status (Input)	Tabular	16 pg @8/AF 8 pg @16/MAJ	Medium	U-S
Unit Status (Output)	Tabular	16 pg @8/AF 8 pg @16/MAJ 1 pg @65/Wg	Medium	U-S
Wing Flying Day	Tabular	3 pg @4/AF 3 pg @4/MAJ 1 pg @2/Wg	Simple	U-S
Wing Operations Rates	Tabular	3 pg @4/AF 3 pg @4/MAJ 1 pg @2/Wg	Simple	U-S
Wing Resource Summary	Tabular	20 pg @8/AF 20 pg @8/MAJ 2 pg @2/Wg	Medium	U-S
Resupply Schedule	Tabular	20 pg @4/AF 20 pg @4/MAJ 4 pg @2/Wg	Simple	U-S

TABLE 4-1

AFIRMS OUTPUT REPORT LISTING (Continued)

Screen Title	Format	Est. Daily Volume & Freq.	Complexity Classification	Security
MAJCOM Only				
Attrition Statistics	Tabular	2 pg @16/MAJ	Simple	Secret
MICAP Forecast	Tabular	8 pg @16/MAJ	Medium	Unclas
Wing Only				
AGE Availability Status	Tabular	2 pg @ 12	Simple	Unclas
AGE Support Capability	Graphic	1 pg @ 6	Medium	Secret
Aircraft Availability	Graphic	1 pg @12.5	Medium	Conf
Aircraft Capability	Graphic	1 pg @ 12	Medium	Secret
Aircraft Status	Tabular	6 pg @ 481	Medium	Unclas
Aircrew Availability	Tabular	1 pg @ 31	Medium	Conf
Aircrew Capability	Graphic	1 pg @ 12	Complex	Secret
Aircrew Generation	Graphic	1 pg @ 31	Medium	Unclas
Aircrew Status	Tabular	2 pg @ 63	Simple	Unclas
Airfield Status	Graphic	1 pg @ 48	Simple	Unclas
Base Status Map	Graphic	1 pg @ 48	Simple	Unclas
Base Status	Tabular	3 pg @ 48	Simple	Unclas
Flying Schedule (Maintenance)	Tabular	6 pg @ 458	Medium	Unclas
Flying Schedule (Operations)	Tabular	6 pg @ 528	Medium	Unclas
Maintenance Support Capability	Graphic	1 pg @ 6	Medium	Secret
Mass Load Generation Schedule	Tabular	6 pg @ 120	Simple	Secret**
Mission Flow	Graphic	1 pg @ 24	Medium	Secret
Munition Flow	Graphic	1 pg @ 24	Medium	Secret
Munitions A & D Availability	Tabular	2 pg @ 6	Simple	Unclas
Munitions Assembly Capability	Graphic	1 pg @ 6	Medium	Secret
Munitions Availability Forecast	Graphic	1 pg @ 9	Simple	Unclas
Munitions Capability	Graphic	1 pg @ 6	Medium	Secret
Munitions Distribution Capability	Graphic	1 pg @ 6	Medium	Secret
Munitions Load Capability	Graphic	1 pg @ 6	Medium	Secret
Munitions Load Crew Available	Tabular	6 pg @ 12	Simple	Unclas

TABLE 4-1

AFIRMS OUTPUT REPORT LISTING (Continued)

Screen Title	Format	Est. Daily Volume & Freq.	Complexity Classification	Security
Munitions Load Crew Flow	Graphic	1 pg @ 12	Medium	Unclas
Munitions Status	Tabular	3 pg @ 9	Simple	Secret
Fuels Capability	Graphic	1 pg @ 6	Medium	Secret
Fuels Status	Tabular	1 pg @ 60	Simple	Unclas
Fuels Status Map	Graphic	1 pg @ 48	Simple	Unclas
Refueling Capability	Graphic	1 pg @ 12	Medium	Secret
Refueling Truck Flow	Graphic	1 pg @ 12	Medium	Unclas
Single Aircraft Summary	Graphic	1 pg @ 500	Simple	Unclas
Supply MICAP Status	Tabular	1 pg @ 48	Simple	Unclas
Task Capability	Graphic	1 pg @ 12	Medium	Secret
Tasked Missions	Graphic	1 pg @ 8	Simple	Secret
Tasked Munitions	Graphic	1 pg @ 23	Simple	Secret
Tasking Information	Tabular	2 pg @ 120	Simple	Secret

NOTE: Depending on input parameters, some times will increase/decrease depending on the amount of data retrieved. For example, requesting Munitions Capability for 60 days will double the amount of data and time over a 30 day parameter input.

* NOTE: Some classifications will have a range, i.e., U-TS, meaning Unclassified to Top Secret. That range is usually caused by the tasking classification being a variable, e.g., some tasks are Unclassified, some are Confidential, some are Secret, etc.

** This means it is SECRET when it is filled in with actual completion times.

ABBREVIATIONS/ACRONYMS

AMU - Aircraft Maintenance Unit

FUELS CTL - Fuels Control

MOC - Maintenance Control or Job Control

MUN CTL - Munitions Control

OPS - Wing & Squadron Scheduling/Training, Squadron Operations, Wing HQ

WOC - Wing Operations Center (LRC, PRC, SRC, Sr. Battlestaff, Mission Director, Frag Shop)

TABLE 4-2A

AFIRMS OUTPUT REPORT AND FUNCTIONAL AREA USERS [WING]

Screen Title	Primary User(s)	Supporting User(s)
Aircraft Availability (Pie)	WOC	OPS, AMU, MOC
Aircraft Availability (Bar)	WOC	OPS, AMU, MOC
Aircraft Capability	WOC	OPS, MOC
Aircraft Status	MOC, WOC, AMU	OPS, FUELS CTL, MUN CTL, SUPPLY
Aircraft Tasking	WOC	OPS
Aircrew Availability	WOC	OPS
Aircrew Capability	WOC	OPS
Aircrew Generation	WOC	OPS
Aircrew Status	OPS	WOC
Airfield Status	WOC	OPS, MOC, AMU
Base Fuels Capability	FUELS CTL,	WOC
Base Status (I/O)	WOC	FUELS CTL, MUN CTL OPS, SUPPLY, MOC, AMU
Base Status Report (Rollup)	WOC	

TABLE 4-2A

AFIRMS OUTPUT REPORT AND FUNCTIONAL AREA USERS [WING] (Continued)

Screen Title	Primary User(s)	Supporting User(s)
Flying Schedule (Ops Seg 1)	WOC, OPS	AMU
Flying Schedule (Maint Seg 2)	MOC	OPS, FUELS CTL, AMU MUN CTL, WOC
Flying Schedule Header File	MOC, WOC, OPS	
Individual Resource Capability	WOC	OPS
Integrated Capability	WOC	OPS
Order Assignments	WOC	OPS
Munitions Status	MUN CTL	WOC, OPS
Munitions Availability Forecast	WOC	MUN CTL, OPS
Munitions Capability	MUN CTL, WOC	OPS
Mission Flow	MOC, WOC	OPS, AMU, FUELS
Mission Profile Definition	WOC	OPS
OPLAN/OPORD Associations	WOC	OPS
Fuels Status	FUELS CTL	SUPPLY, WOC
Process Status	WOC	OPS
Resupply Schedule	WOC	FUELS CTL, MUN CTL
Supply MICAP Status	WOC, MOC	SUPPLY
Tasked Missions	WOC	OPS, MOC
Tasked Munitions	WOC, MUN CTL	OPS, MOC
Tasking Information	WOC	OPS, MUN CTL, MOC
Tasking Information File	WOC	OPS, MUN CTL, MOC
Unit Status (I/O)	WOC	OPS
Wing Flying Day	WOC	OPS

TABLE 4-2A

AFIRMS OUTPUT REPORT AND FUNCTIONAL AREA USERS [WING] (Continued)

Screen Title	Primary User(s)	Supporting User(s)
Wing Operations Rates	WOC	MOC, OPS
Wing Resource Summary (O)	WOC	FUELS CTL, MUN CTL
Wing Resource Summary (I/O)	WOC	FUELS CTL, MUN CTL
Base/Unit Status Rollup	WOC	
Resource Rollup	WOC	OPS
Run SGM	WOC	OPS
Transmit Base Status	WOC	
Transmit Unit Status	WOC	
Transmit Resource Status	WOC	
AGE Availability	MOC	AMU, MUN CTL, WOC
AGE Support Capability	MOC, WOC	
Airfield Status	MOC, WOC, OPS	
Base Status Map	WOC, OPS	
Fuels Capability	WOC, FUELS CTL	OPS
Fuels Capability (Bar)	WOC, FUELS CTL	OPS
Maintenance Support Capability	MOC, WOC, AMU	OPS
Mass Load Generation Schedule	MOC, WOC	AMU, OPS, FUELS CTL, MUN CTL
Munition Flow	MUN CTL, WOC	AMU, MOC
Munitions A & D Availability	MUN CTL	MOC, WOC
Munitions Assembly Capability	MUN CTL	WOC
Munitions Capability (Bar)	WOC	AMU, MUN CTL
Munitions Distribution Cap.	MUN CTL, WOC	MOC

TABLE 4-2A

AFIRMS OUTPUT REPORT AND FUNCTIONAL AREA USERS [WING] (Continued)

Screen Title	Primary User(s)	Supporting User(s)
Munitions Load Crew Flow	AMU	WOC, MOC
Munitions Load Crew Status	AMU	WOC, MOC
Munitions Loading Capability	WOC, AMU	MUN CTL
Fuels Status Map	FUELS CTL, WOC	
Refueling Capability	WOC, FUELS CTL	
Refueling Truck Flow	FUELS CTL	WOC, MOC
Single Aircraft Summary	MOC, AMU	WOC, OPS, FUELS CTL, MUN CTL
Task Capability	WOC	OPS, MOC, MUN CTL, FUELS CTL, AMU

ABBREVIATIONS/ACRONYMS/AIR FORCE CODES

ALCC	-	Airlift Control Center
BS	-	Battle Staff
COMM	-	Communications
DOCR	-	Command and Control Reports Division
DOJN	-	Combat Employment Capability Division
DOX	-	Operations Plans (Contingency/Exercise/Special Plans)
ESRC	-	Engineering and Services Readiness Center
LGSF	-	Energy Management
LGSS	-	Supply Management
LGWR	-	Munitions Requirements Division
LGX	-	Logistics Plans
LRC	-	Logistics Readiness Center
PRC	-	Personnel Readiness Center
XPX	-	Operations Plans

TABLE 4-2B

AFIRMS OUTPUT REPORT AND FUNCTIONAL AREA USERS [MAJCOM]

Screen Title (Unimplemented)	Primary User(s)	Supporting User(s)
Aircraft Tasking	BS, LRC	DOJN, DOX, XPX
Base Fuels Capability	LRC	LGSF
Base Status Map	Reports Cell	BS, LRC
Base Status (I/O)	Reports Cell	BS, ESRC, COMM, LRC
Base Status (Output)	ALCC, BS, LRC,	ESRC, COMM
Capability Perspective	DOCR	
Dollars to Readiness FYxx	XPX	DOJN, LGSF, LGSS, LGWR
Dollars to Readiness FYxx-FYzz	XPX	DOJN, LGSF, LGSS, LGWR
Dollars to Readiness-Fuels	LGSF	XPX

TABLE 4-2B

AFIRMS OUTPUT REPORT AND FUNCTIONAL AREA USERS [MAJCOM] (Continued)

Screen Title (Unimplemented)	Primary User(s)	Supporting User(s)
Dollars to Read. Associations	XPX	LGSF, LGSS, LGWR
Fuels Capability	LRC	LGSF
Individual Resource Capability	BS, LRC	XPX, DOX, DOJN
Integrated Capability	BS, LRC	XPX, DOX, DOJN
Munitions Capability	LRC	XPX, DOJN
Munitions Status	LRC	BS
MICAP Forecast	LGSS, LRC	
Mission Profile Definition	DOX, DOJN	XPX
OPLAN/OPORD Associations	BS, XPX, DOX	DOJN
Order Assignments	BS, DOJN	XPX
Process Status	BS, LRC, XPX	
Resource Reallocation	LRC	
Resource Unit Price	XPX	LGSF, LGSS, LGWR
Resupply Schedule	LRC, LGX, BS	XPX
Unit Status (Output)	BS, LRC, ALCC	
Unit Status (I/O)	Reports Cell	BS, LRC, ALCC, ESRC, COMM
Wing Flying Day	BS, DOJN,	DOX, XPX
Wing Operations Rates	BS, LRC	DOX, LGX
Wing Resource Summary (O)	LRC	
Wing Resource Summary (I/O)	LRC	
Base/Unit Status Rollup	DOCR	
Resource Rollup	DOCR	
Run $-Readiness	XPX	

TABLE 4-2B

AFIRMS OUTPUT REPORT AND FUNCTIONAL AREA USERS [MAJCOM] (Continued)

Screen Title (Unimplemented)	Primary User(s)	Supporting User(s)
Run SGM	BS, XPX, DOX,	DOJN, LRC
Transmit Base Status	,DOCR	
Transmit Unit Status	DOCR	
Transmit Resource Status	DOCR	
Aircraft Spares Support Cap.	LRC	LGSS
Attrition Statistics	PRC	BS
Attrition Trends	PRC	BS
Communications Support Status	COMM	Reports Cell
Fuel Status Map	LRC	ALCC, BS
Fuels FYDP Procurement Program	LGSF	XPX
Individual Resource Capability	XPX,LGSF, LGSS,	LGWR
MICAP Forecast	LRC	LGSS
Mission Area Tasking	DOJN, XPX	
Mission & Aircraft Tasking Detail Summary	DOJN, DOX, XPX	BS, LRC
Mission Tasking	DOX, XPX, DOJN	BS
Munitions Procurement Program	LRC	
Munitions Readiness & Sustainability	LRC	
Munitions Substitution Sortie Capability	XPX, DOJN	LRC
Munitions Substitution Sortie Requirement	XPX, DOJN	LRC
Munitions Sustainability	LRC	BS
Preferred Munitions Objectives	DOJN, XPX	LRC

ABBREVIATIONS/ACRONYMS/AIR FORCE CODES

CSS	-	Contingency Support Staff
LEXX	-	Logistics Plans Division
LEXY	-	Logistics Concepts Division
LEYS	-	Supply Policy and Energy Management Division
LEYW	-	Munitions and Missiles Division
LRC	-	Logistics Readiness Center
PRC	-	Personnel Readiness Center
PRPF/R	-	Programs & Evaluation Directorate (Staff, Programs & Resources)
XOOOA/XOOOE	-	Air Force Operations Center/Contingency Support & Exercise Branch
XOOIM	-	Readiness Assessment Group
XOOIR/LERX	-	CHECKMATE Group
XOXFM	-	Munitions Planning Division
XOXIC	-	War & Mobilization Planning Division
XOXIM	-	Capability Assessment Divisions
XOXP	-	Assistant Director for Special Plans
XPX	-	Operations Plans

TABLE 4-2C

AFIRMS OUTPUT REPORT AND FUNCTIONAL AREA USERS [HQ USAF]

Screen Title (Unimplemented)	Primary User(s)	Supporting User(s)
Aircraft Tasking	CSS, XOXIC	XOXFM, XOOIR
Base Fuels Capability	LRC, LEYS	CSS
Base Status Map	CSS	LRC
Base Status (I/O)	LRC, CSS, XOOIM, PRC	XOOOA/XOOOE
Base Status (Output)	LRC, CSS, XOOIM, PRC	XOOOA/XOOOE
Capability Perspective	XOOIM	

TABLE 4-2C

AFIRMS OUTPUT REPORT AND FUNCTIONAL AREA USERS [HQ USAF] (Continued)

Screen Title (Unimplemented)	Primary User(s)	Supporting User(s)
Dollars to Readiness Comparisons	PRP	LEXX, LEXY LEYS
Dollars to Readiness - Resource Perspective	PRP	LEXX, LEXY LEYS
Dollars to Readiness Ass.	PRP	LEXX, LEXY LEYS
Fuels Capability	LRC, CSS	LEYS
Individual Resource Cap.	LRC, CSS	LEYS, LEXY, LEXX, XOXIC, XOOIM
Integrated Capability	LRC, CSS	XOOIM, XOXIC
Order Assignments	CSS	XOXIC
Munitions Status	LRC	LEYW
Munitions Capability	LRC	XOXIM, CSS, XOXFM, LEYW
Mission Profile Definition	XOXIC, CSS	
OPLAN/OPORD Associations	LEXX, LRC, LEYS, LEXY, XOOIM, CSS	
Process Status	LEXX, LRC, LEYS, LEXY, XOOIM, CSS, PRP	
Resource Reallocation	LRC	
Resource Unit Price	PRP	LEYS, LEYW
Resupply Schedule	LEXX, LEYS, LEYW, LRC	
Unit Status (Output)	CSS, LRC, XOOIM	
Unit Status (I/O)	CSS, LRC, XOOIM	
Wing Flying Day	CSS	XOOOA/XOOOE, XOXP, XOXIC, XOOIM

TABLE 4-2C

AFIRMS OUTPUT REPORT AND FUNCTIONAL AREA USERS [HQ USAF] (Continued)

Screen Title (Unimplemented)	Primary User(s)	Supporting User(s)
Wing Operations Rates	CSS	XOOOA/XOOOE, XOXP, LRC, XOXIC, XOOIM
Wing Resource Summary (O)	LRC	LEYW, LEYS
Wing Resource Summary (I/O)	LRC	LEYW, LEYS
Resource Rollup	LRC, XOOIM	XOOOA/XOOOE
Run $-Readiness	PRP	
Run SGM	XOOIM, LRC, LEYS, LEXY, LEXX	
Aircraft Spares Support Cap.	LEXY, LEYS	LRC
Attrition Trends	PRC, CSS	
Communications Support Status	XOOOA/XOOOE, CSS	
Fuel Status Map	LRC	CSS
Fuels FYDP Procurement Program	LEYS,	PRP
Individual Resource Capability	LEYS, LEYW	PRP
Mission Area Tasking	PRPF, XOXIC	
Mission & Aircraft Tasking Detail Summary	XOXIC	PRPF
Mission Tasking	XOXIC	PRPF
Munitions Procurement Program	XOXFM, LEYW	PRP
Munitions Readiness & Sustainability	XOXFM, XOOIM, XOXIC	LEYW

TABLE 4-2C

AFIRMS OUTPUT REPORT AND FUNCTIONAL AREA USERS [HQ USAF] (Continued)

Screen Title (Unimplemented)	Primary User(s)	Supporting User(s)
Munitions Substitution Sortie Capability	XOXFM	LEYW, PRP
Munitions Substitution Sortie Requirement	XOXFM	LEYW, PRP
Preferred Munitions Objectives	XOXFM	LEYW, PRP

*NOTE: Some classifications will have a range, i.e., U-TS, meaning Unclassified to Top Secret. That range is usually caused by the tasking classification being a variable, e.g., some tasks are Unclassified, some are Confidential, some are Secret, etc.

4.3.3 Database Description. For additional AFIRMS database requirements by subsystem, please reference the corresponding AFIRMS Database Specification.

a. Database Identification. AFIRMS maintains databases as follows:
   (1) Real: This database contains peacetime and crisis tasking and other day-to-day operational data.

   (2) What if: This physical database is comprised of 3 types of logical databases:

   - Exercise - Contains data which provides a simulation of an actual crisis or exercise.
   - Ad-hoc what if- Contains data which provides a simulation of a hypothetical crisis and/or situation.
   - Historical - Contains data which provides a historical view of the real, exercise, and/or ad-hoc what if databases.

b. Storage. The master file(s) containing the HQ USAF, MAJCOM, and WING databases is stored on-line on mass-storage disk devices, and off-line on magnetic tape and formatted floppy/microfloppy disk.

c. Database Query Capabilities. The design of the AFIRMS database supports the requirements for a real-time query capability accessing current and/or what-if data for the above-named databases. Historical data resides primarily on off-line media and is copied to on-line media on an "as-needed" basis.

   (1) Ad Hoc Querying. Users may execute ad hoc queries against any on-line databases to which they are permitted access. The ad hoc query mode is entered from the AFIRMS executive. The user has the ability to interactively query the database via an "English-like" query language.

   (2) What-if Querying. A what-if capability exists to enable users to input hypothetical quantities for resources in order to better predict future readiness capability. The data will be entered into and accessed from the local database only through the highly-structured AFIRMS environment.

d. Database Backup and Restoration. Backup of the database to off-line media occurs on a regular basis and backups are maintained as follows:

Backup	Maintained
Daily	5 Working Days
Weekly	5 Weeks
Monthly	12 Months
Yearly	5 Years

Restoration will occur in the event that data in the database has been lost or damaged. Whenever a transaction occurs in the local database, it will be logged to a journal file for use in the event restoration is needed. Restoration consists of reloading the latest backup copy of the database from off-line media, if necessary, and applying the journal log file to update the backup copy.

e. Database Elements. AFIRMS database elements are described in the AFIRMS Data Requirements Document. The Database Specifications list by name the functional areas where the data elements are to be stored.

APPENDIX A

A1. Inter-site Transaction Header

Field name	Field Description
TRANS_ID	a. Transaction identifier. b. Each terminal shall have its own ID. c. The legal values are 1-->65535. After 65535, it should rollover back to 1.
TRANS_MSG_LEN	a. Transaction message length. b. The length shall be the sum of the transaction header plus data length. c. The legal values are 85-->8192.
REQ_REP_FLAG	a. Request/Reply flag. b. User interactive display software should always send requests. The host shall always send replies in response to the request as long as the transaction was not submitted as a batch job. The host will occasionally send unsolicited requests to the workstations (i.e., update messages. It does not expect a reply. c. The legal values are "Q" for request and "P" for reply.
JOB_TYPE	a. Interactive/Batch/Network flag. b. All jobs must run interactively if they expect a product screen display. Otherwise, they can be run as batch. Note: batch jobs never send back replies. Their status can be monitored through the batch monitor screen. c. The legal values are "I" for interactive, "B" for batch, and "N" for network.
SRC_NODE_ID	a. Source node ID. b. This is the node ID of the requestor.

Field name	Field Description
SRC_TERM_ID	a. Source terminal ID. b. This is the terminal ID of the requestor. c. The legal values are local site dependent. Note: the value 1111 is reserved for host generated transactions (i.e., unsolicated update msgs)
SRC_USER_NAME	a. Source username. b. This is the username of the requestor. c. The legal values are site dependent. They must match the username used for logging into the host.
DST_NODE_ID	a. Destination node ID. b. This field is filled in by a transaction router. It shall be the same as the SRC_NODE_ID for the local requests that require a reply. In general, it shall always be the node ID of where the transaction is destined. It shall differ from the SRC_NODE_ID only for network messages.
DST_TERM_ID	a. Destination terminal ID. b. This field is filled in by a transaction router. It shall be the same as the SRC_TERM_ID for the requests that require a reply. In general, it shall always be the terminal ID of where the transaction is destined. It shall differ only for network messages. c. The legal values are remote site dependent.
DST_USER_NAME	a. Destination username. b. This field is filled in by a transaction router. It shall be the same as the SRC_USER_NAME for the requests that require a reply. In general, it shall always be username of where the transaction is destined. c. The legal values are site dependent. They must match the username used for logging into the host for local transactions. For network, transactions, the username "*ROLLUP*" is reserved.

Field name	Field Description
EXP_DAT_TIM	a. Transaction expiration date/time. b. There are four subfields: 1. Expiration year b. The legal values are 0 --> 99. 2. Expiration day b. The legal values are 1 --> 366. Note: 366 is only valid for leap years. 3. Expiration hour b. The legal values are 0 --> 23. 4. Expiration min b. The legal values are 0 --> 59.
MOD_REQ_ID	a. Module request ID. b. This field is looked at only by the transaction routing mechanism to determine whether the transaction is destined for the database server or somewhere else. c. The legal values are 1 --> 2. Their meanings are as follows: 1 = forward transaction to the database routing 2 = AFIRMS service request
FUNC_REQ_ID	a. Function request ID. b. This field is looked at by the transaction routing mechanism only when MOD_REQ_ID = 2. It signifies what AFIRMS service to perform. Currently, the only service is to log off the user. c. The legal values are 1 --> 10. Their meanings (when MOD_REQ_ID=1) are as follows: 1 = organize records (send transaction #2) 2 = update record 3 = insert record 4 = delete record 5 = logoff Database 6 = Edit info (send transaction #1) 7 = insert continuation record 8 = delete continuation record 9 = log invalid batch job 10 = transmit rollup status

Field name	Field Description
MSG_PRIO	a. Message priority. b. This field is used by the process controller to put each transaction it receives into the appropriate priority mailbox (i.e., queue). (1) Transaction router uses it as a consistency check to make sure the transaction is sent to the right mailbox, and (2) to set the priority of the Database server that will be processing that transaction, and (3) Database server uses it to determine which priority mailbox to forward replies to. c. The legal values are 1 for low priority, 5 for medium priority, and 9 for high priority.
MSG_STAT	a. Message status. b. This field is used for returning the status of a user's request. c. The legal values are any 32-bit number. Note: MSG_STAT must be initially set to 0 in the original request.
MSG_SEG_CUR	a. Message number current. b. This field is the current message segment number. It is always 1 unless there is a multi-part transaction (i.e., one that must split because it is too large for a single buffer). c. The legal values are 1 -- 255.
MSG_SEG_TOT	a. Message number total. b. The legal values are 1 -- 255.

DATA

A.2 Inter-site Transaction Specifications

NOTE:

DTG = Date Time Group
ETIC = Estimated Time In Commission

A.2.1 Interface Specification - Base Status ROLLUP Date: 31-May-1985

The buffer layout for the Base Status ROLLUP is as follows:

Screen ID	# of Parameters	# of base reports included

Repeats # of base reports included times*

length of base ID	base ID	base status ROLLUP DTG	ETIC length	ETIC	
status length	status #1	status length	status #2	status length	status #3
status length #4	status #4	status length #5	status #5	status length #6	status #6
status length #7	status #7	status length #8	status #8	status length #9	status #9

SOFTECH

Field name	Field Length
Screen ID	2
# of Parameters	2
# of base reports	3
length of base ID	2
base ID	?
base status ROLLUP DTG	14
ETIC length	2
ETIC	?
status length #1	2
status #1 (overall)	?
status length #2	2
status #2 (communications)	?
status length #3	2
status #3 (fuel)	?
status length #4	2
status #4 (maint. support)	?
status length #5	2
status #5 (munitions)	?
status length #6	2
status #6 (NBC)	?
status length #7	2
status #7 (runway)	?
status length #8	2
status #8 (supply)	?
status length #9	2
status #9 (transportation)	?

NOTE: (*) each field whose length is "?", represents a variable length field. Only these fields shall be preceded by a 2-byte length descripter field.

A.2.2 Interface Specification Unit ROLLUP

Date: 31-May-1985

The buffer layout for Unit ROLLUP is as follows:

Screen ID	# of Parameters	# of wings reported

Repeated # of wings reported times*

# of squadrons for this wing	length of wing ID	wing ID	ROLLUP DTG

Repeated # of squadrons for this wing times*

length of squadron	squadron ID	length of MDS	MDS	# of PAA	# of locations

Repeated # of locations times*

base short name	number possessed	number MC ACFT	number MR ACRW

Field name	Field Length
Screen ID	2
# of Parameters	2
# of wings reported	3
# of squadrons for this wing	2
length of wing ID	2
wing ID	?
ROLLUP DTG	14
length of squadron	2
squadron ID	?
length of MDS	2
MDS	?
# of PAA	3
# of locations	2
base short name	4
number possessed	3
number MC ACFT	3
number MR ACRW	3

NOTE: (*) each field whose length is "?", represents a variable length field. Only these fields shall be preceded by a 2-byte length descripter field.

SOFTECH

A.2.3 Interface Specification - Resource ROLLUP

Date: 31-May-1985

The buffer layout for Resource ROLLUP is as follows:

Screen ID	# of Parameters	# of wings reported

Repeated # of wings reported times*

length of Wing ID	Wing ID	Resource ROLLUP DTG	# of PAA ACFT	# of MC ACFT	# of MR ACRW	# of locations per Wing

Repeats # of locations per Wing times*

length of location	location	# of records per location

Repeats # of records per locations times*

length of resource type	resource type	length of amount	amount

Field name	Field Length
Screen ID	2
Number of parameters	2
Number of wings reported	3
Length of wing ID	2
Wing ID	2
Resource ROLLUP DTG	14
Number PAA ACFT	3
Number MC ACFT	3
Number MR ACRW	3
Number of locations per wing	2
Length of location	2
Location	?
Number of records per location	3
Length of resource type	2
Resource type	?
Length of amount	2
Amount	?

NOTE: (*) each field whose length is "?", represents a variable length field. Only these fields shall be preceded by a 2-byte length descripter field.

Change 1
CDRL 0025
September 1985

AIR FORCE INTEGRATED READINESS MEASUREMENT SYSTEM (AFIRMS)

AFIRMS SYSTEM SPECIFICATION

FINAL

Page Insert Changes:

REMOVE	DATE	INSERT
1-3	31 May 1985	1-3/CHG1
1-4	31 May 1985	1-4/CHG1
1-6	31 May 1985	1-6/CHG1
2-9	31 May 1985	2-9/CHG1
3-26	31 May 1985	3-26/CHG1, 3-26.1/CHG1
4-1	31 May 1985	4-1/CHG1
4-3	31 May 1985	-
4-4	31 May 1985	4-4/CHG1

SOFTECH

END

DTIC

8—86