AD-A170 515 AIR FORCE INTEGRATED READINESS MEASUREMENT SYSTEM (AFIRMS) WING DATABASE SPECIFICATION(U) SOFTECH INC ALEXANDRIA VA 30 SEP 85 F49642-83-C-0022 1/1

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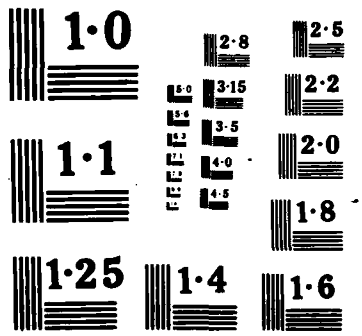
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AIR FORCE INTEGRATED READINESS MEASUREMENT SYSTEM (AFIRMS)

WING DATABASE SPECIFICATION

FINAL

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2000 N. Beauregard Street
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PREFACE

This database specification applies primarily to USAFE wings and only broadly addresses the other MAJCOMs. Each MAJCOM's requirements will be thoroughly specified during the in-depth analysis that will precede its implementation.

In addition, some paragraphs and subtitles have been added to or deleted from the standards specified in DoD STD 7935.1, 24 April 1984, as a result of their perceived applicability to the AFIRMS database located at the wing level.

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SECTION 1. GENERAL

1.1 Purpose of the Wing Database Specification. The objectives of this Wing Database Specification for the Air Force Integrated Readiness Measurement System (AFIRMS), under Contract No. F49642-83-C-0022, are to describe the storage allocation and database organization and to provide the basic design data necessary for the construction of the system files, tables, dictionaries, and directories.

There are vast differences between a database design in the classical sense where a DBMS is chosen and a schema (or logical design) is developed, and the design of the AFIRMS databases. AFIRMS can accommodate many different DBMSs and schemas. Complexities arise because AFIRMS resides at three different levels of the command structure. Standard database issues such as security, ad hoc query capability, and data communications become very complicated when the ability to receive and transmit data between sites is considered the basis of the system. In the Analysis Phase of the initial block of each segment, the database designer must be aware of these problems and realize that the design of the database at each level is highly dependent upon the other levels.

1.2 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.

The Program Management Office (PMO) responsible for contract management of the AFIRMS Learning Prototype Phase (LPP) and this Database Specification 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 applicable to the history and development of the AFIRMS Program are listed below, along with references concerning documentation and programming standards.

Project References

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 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 Systems 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, 13 February 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 Configuraton 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)

1.3 Terms and Abbreviations.

1.3.1 Abbreviations and Acronyms.

AAC	-	Alaskan Air Command
AB	-	Air Base
A/C	-	Aircraft
AD	-	Air Division
ADP	-	Automated Data Processing
ADS	-	Automated Data Systems
ADTAC	-	Tactical Air Command - Air Defense
AF	-	Air Force
AFB	-	Air Force Base
AFCC	-	Air Force Communications Command
AFESC	-	Air Force Engineering and Services Center
AFIRMS	-	Air Force Integrated Readiness Measurement System
AFLC	-	Air Force Logistics Command
AFM	-	Air Force Manual
AFMPC	-	Air Force Manpower and Personnel Center
AFORMS	-	Air Force Operations Resource Management System
AFOSP	-	Air Force Office of Security Police
AFR	-	Air Force Regulation
AFRES	-	Air Force Reserve
AFS	-	Air Force Station
ALC	-	Air Logistics Center
ANG	-	Air National Guard
ARF	-	Air Reserve Forces
ARMS	-	Ammunition Reporting Management System (DO78)

ATC	-	Air Training Command
ATO	-	Air Tasking Order
ATOC	-	Allied Tactical Operations Center (NATO)
BLSS	-	Base Level Self-Sufficiency Spares
CAFMS	-	Computer Aided Force Management System
CAI	-	Computer-Aided Instruction
CAP Report	-	Capability Report
CAS	-	Combat Ammunition System
CBPO	-	Consolidated Base Personnel Office
CFMS	-	Combat Fuels Management System
CINC	-	Commander in Chief
COB	-	Collocated Operating Base
COMPES	-	Contingency Operations/Mobility Planning and Execution System
COMSEC	-	Communications Security
CONUS	-	Continental United States
CRT	-	Cathode Ray Tube
CSG	-	Combat Support Group
CSMS	-	Combat Supplies Management System
DAR	-	Data Automation Requirement
DBMS	-	Database Management System
DBS	-	Database Specification
DO	-	Deputy Commander for Operations
DO78	-	ARMS (Ammunition Reporting Management System)
DOC	-	Designed Operational Capability
DoD	-	Department of Defense
DRD	-	Data Requirements Document
DSDO	-	Data Systems Design Office
EIP	-	Evolutionary Implementation Plan
EMSEC	-	Emanations Security
FAR	-	Functional Area Requirement
FD	-	Functional Description
FEO	-	For Exposition Only
FMIS	-	Force Management Information System
FOCAS	-	Force Capability Assessment System
FORSCAP	-	Force Capabilities System
FRAG	-	Fragmentary Order

GLCM	-	Ground Launched Cruise Missile
HOL	-	High Order Language
HQ USAF	-	Headquarters, United States Air Force
HQ USAFE	-	Headquarters, United States Air Forces Europe
HTACC	-	Hardened Tactical Air Control Center (PACAF)
IDS	-	Interface Design Specification
IOC	-	Initial Operational Capability
IG	-	Inspector General
ICAM	-	Integrated Computer-Aided Manufacturing
IDEF-1	-	ICAM Definition Method One
IRB	-	Is Referenced By
JCS	-	Joint Chiefs of Staff
JCS MOP 172	-	Joint Chiefs of Staff Memorandum of Policy No. 172, "Military Capability Reporting," 1 June 1982
JOPES	-	Joint Operations Planning and Execution System
JOPS	-	Joint Operations Planning System
JRS	-	Joint Reporting System
LAN	-	Local Area Network
LCMS	-	Logistics Capability Measurement System
LIMFAC	-	Limiting Factor
LMC	-	Logistics Management Center
LOGFAC	-	Logistics Feasibility Analysis Capability
LOGMOD	-	Logistics Module
LPP	-	Learning Prototype Phase
MA	-	Deputy Commander for Maintenance
MAC	-	Military Airlift Command
MAJCOM	-	Major Command
MDS	-	Mission Design Series
MEI	-	Management Effectiveness Inspection
MOB	-	Main Operating Base
MTBF	-	Mean Time Between Failure
NAF	-	Numbered Air Force
NCO	-	Non-Commissioned Officer
OPlan	-	Operation Plan
OPR	-	Office of Primary Responsibility
OPSTAT	-	Operations Status Report

ORI	-	Operational Readiness Inspection
OSD	-	Office of the Secretary of Defense
OWRM	-	Other War Reserve Materiel
PACAF	-	Pacific Air Forces
PCS	-	Permanent Change of Station
PMO	-	Program Management Office
POE	-	Port of Embarkation
POL	-	Petroleum, Oil and Lubricants
POM	-	Program Objective Memorandum
POS	-	Peacetime Operating Stock
RCS	-	Reports Control Symbol
RM	-	Deputy Commander for Resources
SAC	-	Strategic Air Command
SADT	-	Structured Analysis Design Technique
SAM	-	Sustainability Assessment Module (Part of WSMIS formerly known as CAC)
SECDEF	-	Secretary of Defense
SITREP	-	Situation Report
SQ	-	Squadron
SOA	-	Separate Operating Agency
SS	-	System Specification
TAC	-	Tactical Air Command
TACNET	-	Tactical Air Command Network
TAF	-	Tactical Air Forces
TBD	-	To Be Determined
TFS	-	Tactical Fighter Squadron
TFW	-	Tactical Fighter Wing
UNITREP	-	Unit Status and Identity Report
USAF	-	United States Air Force
USAFE	-	United States Air Forces Europe
WIN	-	WWMCCS Intercomputer Network
WIS	-	WWMCCS Information System
WMP	-	War Mobilization Plan
WOC	-	Wing Operations Center
WSAM	-	Weapon System Assessment Model
WSMIS	-	Weapon System Management Information System
WWMCCS	-	World Wide Military Command and Control System

1.3.2 Terms and Definitions.

Autonomous Operation	-	(CENTO, NATO) One mode of operation of a unit in which the unit commander assumes full responsibility for control of weapons and engagement of hostile targets. This mode may be either directed by higher authority or result from a loss of all means of communication. (JCS Pub 1)
Autonomous Operation	-	(DoD, IADB) In air defense, the mode of operation assumed by a unit after it has lost all communications with higher echelon. The unit commander assumes full responsibility for control of weapons and engagement of hostile targets. (JCS Pub 1)
Combat Capability	-	The readiness status of a unit to perform its tasked combat mission and its ability to sustain a required level of tasking for a specified number of days. The terms "Combat Capability" and "Readiness and Sustainability" are used interchangeably throughout the AFIRMS documents.
Data	-	(DoD) A representation of facts, concepts, or instructions in a formalized manner suitable for communication, interpretation or processing by humans or by automatic means. Any representation such as characters or analog quantities to which meaning is or might be assigned. (JCS Pub 1)
Decision	-	(CENTO, DoD, IADB, NATO) In an estimate of the situation, a clear and concise statement of the line of action intended to be followed by the commander as the one most favorable to the successful accomplishment of his mission. (JCS Pub 1)
Deployment	-	(CENTO, DoD, IADB, NATO) In a strategic sense, the relocation of forces to desired areas of operation. (JCS Pub 1)
Employment	-	The tactical usage of aircraft in a desired area of operation. (AFM 11-1)
Military Capability	-	The ability to achieve a specified wartime objective (win a war or battle, destroy a target set). It includes four major components: force structure, modernization, readiness, and sustainability. (JCS MOP 172, 1 June 1982)

a. Force Structure - Numbers, size, and composition of the units that comprise our defense forces, e.g., divisions, ships, airwings.

b. Modernization - Technical sophistication of forces, units, weapon systems, and equipments.

c. Readiness - The ability of forces, units, weapon systems, or equipments to deliver the outputs for which they were designed (includes the ability to deploy and employ without unacceptable delays).

d. Sustainability - The "staying power" of our forces, units, weapon systems, and equipments, often measured in numbers of days. (Note: This is the part 2. definition of sustainability, which is published alphabetically.)

Mission - (CENTO, NATO) The task together with its purpose, thereby clearly indicating the action to be taken and the reason therefore. The dispatching of one or more aircraft to accomplish one particular task. (JCS Pub 1)

Shortfall - The absence of forces, equipment, personnel, materiel, or capability -- identified as a plan requirement -- that would adversely affect the command's ability to accomplish its mission. (Joint Deployment Agency's Joint Deployment System Procedures Manual, 1 January 82)

Sortie (air) - (CENTO, NATO) An operational flight by one aircraft. (JCS Pub 1)

Tasking - (NATO) The process of translating the allocation into orders, and passing these orders to the units involved. Each order normally contains sufficient detailed instructions to enable the executing agency to accomplish the mission successfully. (JCS Pub 1)

Turnaround (Turn) - (DoD, IADB, NATO) The length of time between arriving at a point and being ready to depart from that point. It is used in this sense for the loading, unloading, refueling and rearming, where appropriate, of vehicles, aircraft, and ships. (JCS Pub 1)

1.4 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.

1.4.1 AFIRMS Synopsis.

1.4.1.1 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 access 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.

1.4.1.2 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, hypothetical, standard, 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, standard, 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 data 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.

1.4.2 AFIRMS Documentation. A set of nine types of documents describes 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.

SECTION 2. DATABASE IDENTIFICATION AND DESCRIPTION

This section discusses the information necessary for identifying and describing the wing level subsystem database. It also contains information on the recommended organization of the wing database which is essential for proper utilization of the database. This section is intended primarily to acquaint the AFIRMS database designer with the overall issues concerning data redundancy between and within sites, speed, and software development required to manage AFIRMS data.

2.1 Database Identification.

The label by which the wing level database is uniquely identified includes the wing number, the wing mission type, and "DB" as a suffix (e.g., 52TFWDB for 52nd Tactical Fighter Wing database).

2.1.1 System Using the Database.

The system, of which the wing level database is part, is the Air Force Integrated Readiness Measurement System (AFIRMS).

2.1.2 Storage Requirements.

A method for estimating the database storage requirements for the wing level site of AFIRMS is discussed in this section.

Shown below is an example of information that is collected for each Appearance Class listed in the DRD, stored at the wing, and used to calculate an appropriate sizing estimate. This example is an excerpt from the list given in Appendix A.

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
11B	AIRCRAFT SERIAL NUMBER	8	80	3840
12A	AIRMAN LAST NAME	16	216	20736

From left to right are listed the appearance number of each item in question, its name, and other information pertaining to its storage in the central database. Some appearance class names have a brief description included to identify the assumptions behind the quantity.

Aircraft Serial Number describes an individual aircraft. The next column, size, indicates maximum length in bytes of the appearance. For alpha or alphanumeric data types, size equals the maximum length possible for that appearance. Use of the maximum length results in worst-case database sizing estimates. An alternative method or estimating that size employs an average length of AFIRMS character data. Another approach is to assume that all character data is stored with the use of a compression algorithm. These alternatives are evaluated during the Analysis Phase of the initial block of each segment before the final database sizing estimate is given. In the case of numeric data, i.e., real or integer values, size is set equal to 4 bytes. Quantity, the next column, indicates how many instances of the appearance exist in the site's central database.

In the sample table above, if there were 80 aircraft, to be monitored and stored in the site's central database, then the aircraft serial number is stored 80 times. Similarly, if there were 216 airmen at a base, 216 airman last names would be stored in the central database. The final column, total space, reflects the total space necessary to store that appearance class in the site's central database. This figure is derived from the maximum length multiplied by the quantity. This result is then multiplied by a factor of 6. The multiplication factor of 6 represents the actual storage for the appearance plus storage space for a combination of 5 historical or "what-if" copies of the appearance. The sum of the total space needed over the entire Appendix A listing yields total space required for the central database.

In Appendix B, the sizing process is accomplished for each functional area for the wing participating in AFIRMS. Note that the estimates in Appendix B must also be refined depending on the degree of data redundancy required by the data management software selected for implementation. Both software selection and final sizing occur during the analysis phase of the initial block of each segment. Table 2-1 contains the numbers actually used to compute the database sizings for an operational AFIRMS at the Wing level.

The database sizing estimates presented in the HQ USAFE Database Specification are based on the assumption that the MAJCOM's Fighter/Reconnaissance resources are augmented during crises situations by numerous CONUS units. As a result, the database sizing estimates were increased for the worst-case scenario.

Table 2-1

WING OPERATIONAL DATABASE SIZING FACTORS

	(1)	(2)	(3)	(4)	(5)
OPS	30	9	30	123	232
WOC	40	22	55	141	267
MOC	12	14	117	188	355
AMU	6	11	183	237	448
MUN CTL	11	10	91	168	318
FUELS CTL	9	8	89	167	316
SUPPLY	4	0	0	100	189
TOTAL WING	40	22	55	144	266

LEGEND:

Col-1 represents the total number of screens used by a specific functional area during the LPP.

Col-2 represents the total number of new screens used by a specific functional area during operational AFIRMS.

Col-3 represents the percentage increase of new screens over those used during the LPP (i.e., Col-2 divided by Col-1 times 100).

Col-4 represents the original database size (as a percentage) plus the percentage increase of the database size due to the new operational screens. It is assumed that all new screens will use 25% of the data already existing in the database. The remaining 75% of data used by the new screens is estimated to be new. Note that the 75% new data must be applied to the percentage of new screens (Col-3) to obtain the actual percentage increase in size of the database (i.e., multiply Col-3 by 0.75 by 100).

Col-5 represents the percentage increase in the size of the database when the five additional factors shown below are accounted for in addition to Col-4:

a. 0.75 - compression/encoding,
b. 1.01 - time stamping at the record level,
c. 1.01 - editing/validition data,
d. 1.65 - typical DBMS miscellaneous data overhead requirement,
e. 1.50 - key propagation required for a relational DBMS implementation.

The first factor tends to decrease database size; though the others all increase database size. When these factors are multiplied together, a combined factor of 1.89 is generated. That is an 89% increase in database size. To determine the actual percentage increase, we must multiply Col-4 by 1.89 by 100. This percentage increase is applied to all database size estimates mentioned on subsequent pages to determine the estimated operational database size for each functional area and the central database.

The wing database sizing requirements should also be increased based on this assumption. The basic question is "How much should the wing database sizing be increased?" While the worst-case sizing estimates for HQ USAFE are determinable and justifiable without specific wing bed-down plans, any wing database sizing which does not consider worst-case senario is invalid.

It is reasonable to assume that, during crises, what-if versions of the central and functional area databases are off-loaded to provide sufficient space to accommodate augmentation. However, the best solution is to first determine the worst-case augmentation plan, and subsequently use that plan to determine the actual database size for various wings in the MAJCOM. This requirements analysis and sizing determination is an integral part of the Analysis Phase of initial blocks for each segment.

Each AFIRMS site has a parameter accessible by a system manager that controls the number of copies of what-if databases by functional area. As use of the system increases, this parameter can be used as a tuning mechanism to increase or decrease the number of on-line copies of what-if databases by functional area in order to manage available disk space. The value of this parameter is set to 5 for the database sizing estimates of this document.

The growth of the Wing level database is estimated as approximately 10% per year. This estimate is less than the other command levels because the number of additional users possible is not as great. The capability for on-line storage of one copy of real data along with five copies of what-if data is required at the wing level to accommodate readiness assessment. The five copies maintained on-line support the following estimated requirements for copies of data.

Exercises (1 beginning copy, 1 end copy)
Ad-hoc what-ifs (5 copies)
DOC what-ifs (3 copies).

Copies of what-if data in excess of the five permitted on-line at any one time are maintained off-line.

Sizing estimates conform to the assumption that the AFIRMS database architecture at the wing level is one of attribute segmentation which yields "worst-case" estimates at the functional areas. In this architecture, each functional area is responsible for its own data. A copy of all functional area data resides in a centralized database, probably the Wing Operations Center (WOC), duplicating data for the functional areas. Data that is normally used by a given functional area resides at that functional area with updates transmitted to and from the central database. If data that is not resident at a given functional area is required at that functional area, then that data is downloaded to that location along with software needed to access it. The degree of redundancy necessary must be determined before final sizing estimation. Following the determination of a functional area's sizing estimate, the number of what-if databases to be maintained on-line is specified. Finally, the actual data and its redundancy within a site for real and what-if purposes is determined. These issues are addressed by the database designer in the Analysis Phase of the initial block of each segment for accurate sizing estimates. Estimates given in Appendices A and B are provided for planning purposes.

Until the actual DBMS is chosen, the estimates shown in Appendices A and B, with some refinement, suffice as a starting point in most economic considerations as well as high-level design decisions. It can also be used as a tool in the comparison of different DBMSs. When an actual DBMS is chosen, those factors indigenous to the data model and the particular DBMS are used for calculating a more refined space requirement estimate. After final data requirements are determined during the Analysis Phase of each segment, sizing requirements will probably be lower for the functional areas than estimated in Appendix B.

2.1.3 Physical Description of the Database Files. The master file(s) containing the wing level database are stored on-line on non-volatile random access mass storage media with back-ups off-line on magnetic tape or floppy disk.

2.2 Organization of the Database. There are many differences between a database design in the classical sense where a DBMS is chosen and a schema (or logical design) is developed, and the design of the AFIRMS databases. AFIRMS can accommodate many different DBMSs and schemas. Complexities arise because AFIRMS resides at three different levels of the command structure. Standard database issues such as security, ad hoc query capability, and data communications become very complicated when the ability to receive and transmit data between sites is considered the basis of the system. During the Analysis Phase of the initial block of each segment, the database designer must be aware of these problems and realize that the design of the database at each level is dependent upon the other levels.

The design of the AFIRMS database will support the requirements for an interactive query capability accessing current, historical, and hypothetical (what-if) data. Historical data resides on off-line media and is copied to on-line media on an "as-needed" basis. In order to accommodate this and to minimize the amount of time necessary to develop applications, a commercial DBMS software package i.e., "off the shelf," is utilized. It should also be noted that not all site data management requirements can be met by a single DBMS. A DBMS may be resident at the central location of each site along with any other software necessary to manage the data at the functional areas. The database that the DBMS operates upon resides primarily on non-volatile random access media with backups and copies residing on non-volatile media.

The data model(s) used in a particular segment is determined during the Analysis Phase of the initial block of each segment. As a result, the DBMS used for the central database and the data management software at each functional area for each segment are unknown as is the actual physical structure of that data as it will exist on disk and tape media.

There are three basic requirements of AFIRMS at the wing level that relate to the choice of a DBMS and the design of the database. They are reliability/availability, deployability, and reportability.

The basic long-term requirements include:

a. Reliability/Availability. Reliability/Availability is the ability of the system to be accessible to all users and for the accuracy of AFIRMS data to be very high during peacetime and crises. Survivability during wartime is not presently a requirement for operational AFIRMS.

b. Deployability. Deployability is the ability of a functional user or unit to deploy and connect to an operating AFIRMS at the deployed location. The data necessary to service the individual user unit is the responsibility of the functional area or unit. Deployed units have the capability to report, at a minimum, to the AFIRMS system.

c. Reportability. Reportability is the ability of a unit or functional area to report its status upward to the parent unit regardless of its current location. When the reporting unit is able to connect to an operating AFIRMS not within its parent wing or MAJCOM, AFIRMS provides the capability to transmit, at a minimum, status of the reporting unit to the parent database.

<u>2.2.1 Database Architecture Options</u>. In order to arrive at an acceptable database architecture to support AFIRMS at the wing, a number of feasible database architectures were evaluated in terms of the requirements outlined in the previous section as well as hardware and software development costs, performance, and maintainability. These alternatives were also evaluated in terms of system expandability without modification to the data structure and software.

The AFIRMS database architecture supporting the Wing is designed to operate in normal peacetime conditions and crises. Two conceptual database architectures that were evaluated include data centralization (2.2.1.1 below) and data distribution (2.2.1.2). A brief explanation of each of these is provided in the following sections. These explanations are intended to give a summary of the conceptual database architectures, but are not intended to imply that a copy of a DBMS should reside at each functional area. Nor do they imply that any particular data management or file system should be employed to manage the data at each functional area. The primary requirement is that if data is required to be resident at a functional area, software must also be present to handle it, and to manage/control concurrency problems that occur.

In general, the operating costs of a database consist of storage costs of file copies and communications costs for queries and updates. High redundancy tends to decrease communications costs for queries because data is local to the user. However, high redundancy increases storage and communications costs for updates because many files are affected by the update of one version. Low redundancy has the opposite tendency. Cost/benefit analysis using high and low redundancy is of major importance in the database architecture selection process.

<u>2.2.1.1 Data Centralization</u>. Total centralization of data was the database architecture employed in the AFIRMS LPP for the prototype databases. All of the data used by the system resides on a central computer under the management of a single DBMS. Some transactions that occur have proven to be quite burdensome on the central computer. The degree to which the Central Processing Unit (CPU) is dominated by the DBMS is termed

CPU-boundedness and can be tuned more or less with DBMS system parameters. However, LPP applications software resident on the central computer was also highly CPU-bound. This caused competition for CPU-time when more than one transaction was executed at a time and the DBMS CPU demands compounded the problem. The DBMS can be adjusted to lower its demand for CPU but the cost is an increase in its need for input/output. Thus a CPU bottleneck becomes an input/output bottleneck. The result is that the transactions become queued waiting for disk access.

In a centralized processing environment, CPU-boundedness is to be expected. In this situation, the most straightforward solution is a larger and faster computer. However, this is relatively expensive in light of the many sites AFIRMS intends to support. I/O-bound processing is likely to occur with architectures using a back-end database machine because processes in the main computer would become queued while others finish in the database processor.

A centralized database at the wing level is a very vulnerable system in the event of hardware failure bacause of their single location. AFIRMS is unavailable during such failures. Reportability also suffers when the central database is unavailable. Conversely, software development and maintenance costs are usually at their lowest with this architecture because all of the software and data reside at a single location. High-powered hardware would be required at the central location, but dumb terminals would suffice for support of the functional areas.

<u>2.2.1.2 Data Distribution</u>. Five variations of data distribution were evaluated: full redundancy (2.2.1.2.1 - below), entity redundancy (2.2.1.2.2), attribute segmentation (2.2.1.2.3), record or tuple segmentation (2.2.1.2.4), and record/attribute segmentation (2.2.1.2.5). Conceptually, each variation could be implemented with or without a redundant master copy of data residing at a central location. This master copy is the equivalent of the union of all the functional areas' databases. A distributed data implementation without the inclusion of a master copy was deemed too costly and unreliable. Another disadvantage is that there are currently no distributed DBMSs available commercially.

Each variation discussed is based on the assumption that there is a central database at with a varying degree of data redundancy at the functional areas. A common thread exists among the variations. Updates to data are made at a functional area, transmitted to the central database, and subsequently transmitted to all affected functional areas where final updates occur. After each variation is evaluated relative to the others, a conclusion is reached concerning its feasibiltiy for operational AFIRMS.

Certain advantages are inherent to an architecture with a centralized database. A degree of interface control is available in that both magnetic tape and direct-line interfaces to other systems can occur at the central location and data can then be downloaded to the appropriate functional area(s). The same advantage works for systems desiring access to AFIRMS data. Also, periodic database backups occur more cleanly and with minimal impact on the system. Again, if the central location is incapacitated, these capabilities may be hindered if not eliminated. However, the inherent contingency capability provided by this architecture provides for standalone AFIRMS operations in the functional areas as a minimum.

Reportability is accomplished relatively easily if the central location is operating, and less smoothly from a functional area when it is down. Deployment of units or functional areas is facilitated with the unplug-upon-departure and plug-in-upon-arrival capability inherent to a centralized distributed architecture. Units or functional areas can also transfer copies of their local database to floppy disk or magnetic tape and take them for use at the new site.

Although a data distribution architecture with a central database does combine some of the advantages of the distributed and centralized concepts, there are also some disadvantages to the data distribution architecture. Specifically, more intelligent software is required to manage the distributed data. A disadvantage of total data centralization also present with this architecture is the centralization of both communications and data. Since all site data communications must be routed through the central database, AFIRMS is only as reliable as the central location of its database.

In the event that the central location goes down, the functional areas cannot receive data updates from other functional areas through the system and would have to resort to manual communications. With local data entry using manually retrieved information, the user has full use of AFIRMS tools normally available. From a system point of view, if the central location at a particular site goes down, that site is not functioning within AFIRMS. At MAJCOM and Wing levels a back-up communications mode is available through which one or more of the functional areas operating independently of each other can communicate with the next higher central location. However, the MAJCOM cannot receive Wing reports if the MAJCOM central location is inoperable.

The depth of this problem is to be studied further in the Analysis Phase of each segment, to fully understand the interdependencies of functional areas and the percentage of data affected when a central location goes down. Appendix B lists data that is used by the functional area at the Wing level. During the Analysis Phase of each segment, Appendix B is refined to include its current cross-reference between a data item and the functional area(s) using that data item and also that data item's range of values allowed at that functional area.

2.2.1.2.1 Full Redundancy. Full redundancy calls for all site data to be resident at each functional area. One advantage to this architecture is that software developed to support one functional area can support all functional areas with minimal changes. Another is that each functional area can operate independently in the event that some data from other functional areas is inaccessible. It may be that some functional areas will be forced to operate in a degraded mode with the data current as of the outage. Reportability is also very strong in this situation, since data can be generated and received at almost any functional area that survives. The disadvantages include a marked increase in required storage capacity at all functional areas and increased communications traffic whenever updates occur, making this alternative unfeasible.

2.2.1.2.2 Entity Redundancy. Entity redundancy is based on the assumption that if a functional area requires any use of a particular data attribute (field), the attribute, along with its associated attributes grouped within entity classes, resides at the functional area. This redundancy exists regardless of whether the entire entity class is used by the functional area. Updates to the data attributes within the entity classes, when initiated by other functional areas, are transmitted from the central location. The possible result is unnecessary communication and data storage costs.

For example, Figure 2-1 shows an excerpt of Aircraft-oriented data grouped in table format. Included are the AIRCRAFT NUMBER, AIRCRAFT OWNING UNIT, AIRCRAFT STATUS, AIRCRAFT LOCATION, and the AIRCRAFT CONFIGURATION. All columns (attributes) in the table describe a particular aircraft, hence, what is shown is the AIRCRAFT entity class. In entity redundancy, all columns of an entity reside at the 81TFS if that squadron needs to view any of the columns.

AIRCRAFT NUMBER	AIRCRAFT OWNING UNIT	AIRCRAFT STATUS	AIRCRAFT LOCATION	AIRCRAFT CONFIG
1234	81TFS	FMC	B11	XYZ
5678	81TFS	PMCS	C13	LNFY
9542	480TFS	NMCM	A06	FOOY

Figure 2-1. Entity Redundancy

<u>2.2.1.2.3 Attribute Segmentation</u>. Attribute segmentation is a further refinement of entity redundancy. Accordingly, this alternative is based on the assumption that only relevant entity classes reside at a functional area. Of those entity classes, only those attributes that are used by the functional area reside there. This concept further reduces functional area storage requirements and communication costs between the functional area and the central location. However, this reduction is accommodated only by greater processing requirements at the central location. Software is required at the functional areas and the central location in order to handle the logic required for transmitting and receiving the updates to certain data attributes.

This alternative is recommended to be the initial database architecture for AFIRMS due to its relatively lower software development and physical storage costs. However, there is still the possibility that the data redundancy inherent to this architecture causes unnecessary communications and storage costs. Unnecessary in the sense that there are values of attributes (residing at functional areas) that are never used. Consequently, these attributes are updated upon change by the owning functional area. Software development costs are quite lower than for record segmentation and record/attribute segmentation, and not much greater than for full or entity redundancy. Storage costs are much less than for full and entity redundancy and relatively equal to costs for record segmentation. However, storage requirements are somewhat greater for attribute segmentation than for record/attribute segmentation. Attribute segmentation can also be gradually evolved into a record/attribute segmentation architecture by adding a layer of software and instituting virtually no changes to the existing software.

Figure 2-2 shows an example of attribute segmentation. In this example, the 81TFS only needs to view the AIRCRAFT NUMBER (which is the key to the entity), AIRCRAFT OWNING UNIT, AIRCRAFT STATUS, and the AIRCRAFT LOCATION (all shown in the highlighted boxes). Note, however, that the 81TFS database still contains information pertaining to other squadrons.

AIRCRAFT NUMBER	AIRCRAFT OWNING UNIT	AIRCRAFT STATUS	AIRCRAFT LOCATION	AIRCRAFT CONFIG
1234	81TFS	FMC	B11	XYZ
5678	81TFS	PMCS	C13	LNFY
9542	480TFS	NMCM	A06	FOOY

Figure 2-2. Attribute Segmentation

<u>2.2.1.2.4 Record or Tuple Segmentation.</u> *Record, or tuple in a relational implementation,* segmentation is also a further refinement of entity redundancy. Only those records that possess keys with relevant values reside at the functional area. Storage and communications costs are significantly lower than for full or entity redundancy implementation. These costs are relatively equal to attribute segmentation storage and communications costs, but the software required to manage data communications is somewhat more complex. Storage costs are greater than for a record/attribute segmentation implementation, but the software development required is less complex. There also possibly exists, with this alternative, unnecessary data at the functional

areas that must incur storage costs and communications costs to update it. Furthermore, record segmentation is far more complex to implement than attribute segmentation and is, therefore, deemed less feasible.

Figure 2-3 shows an example of record segmentation. Note that records about aircraft assigned to the 81TFS are the only aircraft records of interest to the 81TFS. Therefore, with this architecture, only the 81TFS aircraft records are present in the Aircraft entity when it resides at the 81TFS as shown by the highlighted box. As a result, all columns, or attributes, of each record--some of which may not be used--reside in the 81TFS database. In this example, the attribute AIRCRAFT CONFIGURATION is not used by the squadron but still resides there.

AIRCRAFT NUMBER	AIRCRAFT OWNING UNIT	AIRCRAFT STATUS	AIRCRAFT LOCATION	AIRCRAFT CONFIG
1234	81TFS	FMC	B11	XYZ
5678	81TFS	PMCS	C13	LNFY
9542	480TFS	NMCM	A06	FOOY

Figure 2-3. Record or Tuple Segmentation

<u>2.2.1.2.5 Record/Attribute Segmentation.</u> This architecture is another refinement of entity segmentation, and employs the concepts of attribute and record segmentation. Only those records that possess keys with relevant values, such as in record segmentation, and only those relevant attributes within each record or tuple reside at a functional area such as in attribute segmentation. In essence, this architecture is the result of the intersection of the attribute and record segmentation concepts. Figure 2-4 shows an example of attribute/record segmentation. The 81TFS only has data that it needs to view present in its database, as shown by the highlighted box.

With this alternative, storage and communications costs are minimized. But the functional area is still able to operate independently in a degraded mode. However, software development and processing costs at the central location are highest with this alternative. Record/Attribute segmentation should be the ultimate goal of the AFIRMS database architecture, but it is unfeasible to implement in the initial block due to high data analysis and software development costs. This architecture can be reached through an evolutionary implementation from the attribute segmentation architecture, if desired, with minimal changes to existing software.

AIRCRAFT NUMBER	AIRCRAFT OWNING UNIT	AIRCRAFT STATUS	AIRCRAFT LOCATION	AIRCRAFT CONFIG
1234	81TFS	FMC	B11	XYZ
5678	81TFS	PMCS	C13	LNFY
9542	480TFS	NMCM	A06	FOOY

Figure 2-4. Record/Attribute Segmentation

2.2.2 AFIRMS Database Architecture. During the Analysis phase of the initial block of each segment it is to be determined which of the two architectures, attribute segmentation or record/attribute segmentation, will be implemented MAJCOM-wide. The choice will not affect other MAJCOMs or HQ USAF since record/attribute segmentation is, actually, a more-refined attribute segmentation approach. It may be that an architecture employing record/attribute segmentation is the ultimate goal of the AFIRMS database design in a particular MAJCOM, but attribute segmentation is desirable initially. This approach will allow more functional areas within a Wing to become operational earlier, and will permit more time for analysis of data requirements of individual functional areas. A database architecture using attribute segmentation is more readily adaptable to an orderly accommodation of functional requirements, from a database design and software development point of view. These additional data needs are accommodated by trading off the more global view in favor of a more specifically relevant local view.

Assuming attribute segmentation is used initially, a central location houses a copy of the database. Each functional area that participates in AFIRMS also has a database locally resident on its own AFIRMS hardware. In general, the characteristics of the data, as well as the data structures and relationships, are identical wherever they reside at the wing. This is true regardless of the data management or database management software employed, provided the conceptual data models, such as the IDEF-1 model shown in the Data Requirements Document, used by the software are identical.

For example, in Figure 2-5 a simplified Wing-level database is shown to include three different entity classes in the central database: Air Force Unit, Aircraft, and Airman. Note the relationships of the entity classes: an Air Force Unit has one or more Aircraft assigned to it and one or more Airmen assigned to each unit. In this case, two functional areas, the Wing Operations Center (WOC) and the Aircraft Maintenance Unit (AMU), use all or parts of the central database; hence, all or parts of the central database reside at the two functional areas for speed of access. The WOC needs to view products that use unit, aircraft, and airman data; but the AMU only view products' that use unit- and aircraft-specific data. The data that resides in both functional areas has characteristics and relationships identical to the data that resides in the central database. If a particular aircraft is repaired and its status is updated by the AMU to indicate such, then that update is transmitted to the central database, where the aircraft record is updated. Finally, the updated aircraft information is transmitted to the WOC.

By retaining the same conceptual, logical, and physical data models throughout a segment within the EIP implementation of the following areas is enhanced:

1) data analysis in the Analysis/Requirements Definition Phase;
2) software development in the Development Phase;
3) installing software, testing software, and training in the Installation Phase;
4) software and database maintenance in the Operations Phase.

2.3 Special Instructions. This section describes the desired capabilities of AFIRMS including data currency, ad hoc query, what-if capability, reporting, backup, archiving, and restoration as well as issues concerning data redundancy, external interfaces, normalization, and data models. Suggestions are made in these areas and information and guidelines are given to aid in the selection of a DBMS and other data management software for implementation at a specific site.

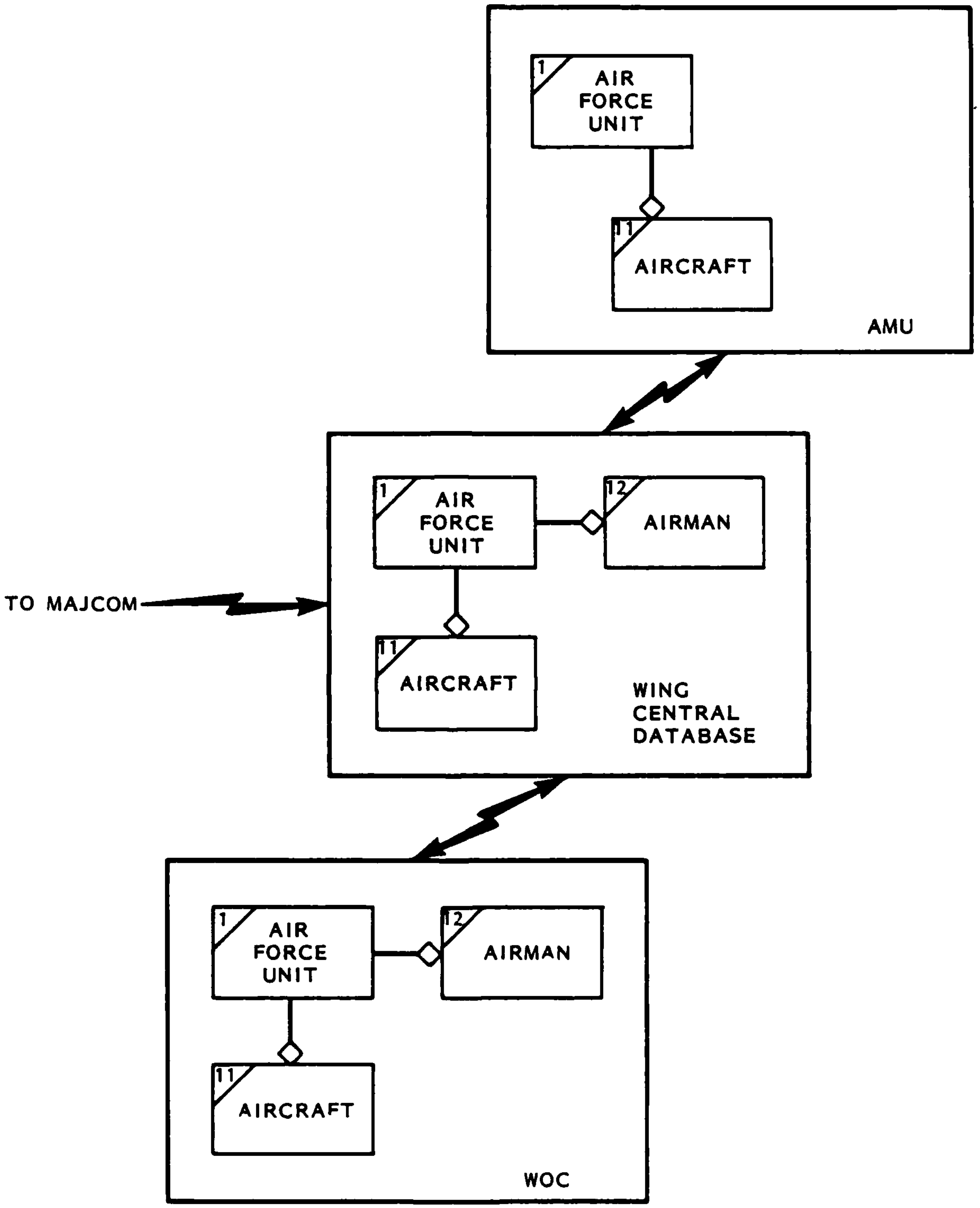

Figure 2-5. Simplified Wing Database

2.3.1 Data Currency. When changes are made to data at the functional area level, those changes are transmitted to the central database. After the central database is updated, the changes are subsequently transmitted to other functional areas having the data in question resident on their local database. The time required to complete the transactions on the central database and all affected functional areas determines the currency of data.

At a wing, this time period must be less than three minutes for AFIRMS mission-related data 90% of the time with the system operating in a normal mode. AFIRMS mission-related data consists of current tasking, and current primary resource status information or that data associated with a crisis mode. Primary resources are those resources directly utilized by the capability assessment model.

Data currency at a wing, must be achieved within one hour for AFIRMS non-missions-related data 90% of the time with the system operating in a normal mode. AFIRMS non-mission-related data consists of that information relating to ad-hoc, historic, exercise, or contingency simulations which are not designated as current exercises/crises.

Data currency between the WING and MAJCOM level must be achieved within six hours 90% of the time when the system is operating in normal mode. Data currency between the MAJCOM and HQ USAF level is achieved within twelve hours 90% of the time when the system is operating in normal mode.

2.3.2 Ad Hoc Query. Users need to execute ad hoc queries against on-line databases which they are allowed to access. Ad hoc querying is constrained by AFIRMS security and control requirements. This capability is limited to databases located at the functional area and the central location within a wing. Ad hoc queries that act on wing databases cannot be initiated from a MAJCOM or HQ USAF. Controls within the DBMS and security software are used to limit access to both the functional area and central databases on a user-by-user basis.

The ad hoc query access is provided by the AFIRMS executive. The user has the ability to interactively query the database via an "English-like" AFIRMS query utility. The user doesnot have the ability to update any data while in this mode. Ad hoc queries are limited to current or crisis mode data only. When data is requested, if it is not present in the local functional area database, the request is transmitted to the central node. The request is then processed at the central node and the results returned to the requesting functional area for display. Different data management software may be involved in the request. If so, the syntax translation between the query languages embedded within each DMS/DBMS must be transparent to the user.

It is not anticipated that wing users require the ad hoc query capability as often as MAJCOM and HQ USAF users do. Certain wing users have the ability and privilege to execute these queries and create data under the jurisdiction of the local DBMS within AFIRMS system control.

2.3.3 What-if Capability. A what-if capability exists in AFIRMS to enable certain users to input hypothetical tasking, resource, or operations scenarios in order to better predict future readiness capability. The data is input into the local database through a highly structured AFIRMS environment. The what-if capability of AFIRMS directly affects the amount of data redundancy necessary at the wing and, accordingly, the amount of physical storage capacity necessary to handle it. What-if data storage needs vary according to the level in the command structure and the functional area's what-if exercise needs. Wings typically require less physical storage for what-if capability than MAJCOMs or HQ USAF do.

2.3.4 Reporting. Reporting of a lower site to a site higher in the command structure is accommodated by similar database architectures at the different levels. Data formats and structures exist at both sites in order to facilitate report transmissions. Reports occur on a periodic basis as well as on an "as-needed" basis. The data involved in these intersite reports describes the status of the wing summary resource(s), base(s), and unit(s).

2.3.5 Data Redundancy. Data redundancy within the wing is kept to a minimum in order to decrease data consistency problems and extra software required to maintain the database. Sometimes, however, retrieval speed becomes an important requirement and a level of redundancy must be introduced to accommodate it. The AFIRMS LPP has demonstrated a need for such data redundancy, which can be handled by the minimumlocal redundancy architecture. Analysis performed in the initial block of each segment identifies the data items needed most by different functional areas, how often they are required, and who is responsible for maintaining them. The database designer must have this information in order to effect a design under the chosen architecture.

Redundancy of data between lower- and higher-level sites is required for the report function between sites. If data communications are hindered among sites, but manual communications are available, the higher sites can still operate based on the last reported summary data. This type of redundancy is only for data reported on a regular or as-needed pre-packaged basis. Ad hoc querying of lower sites is not permitted within AFIRMS.

At the wing, each functional area has locally stored data it needs on a regular basis. The database is composed of real data, exercise data, and Designed Operational Capability (DOC) data. The exercise and DOC data comprise the what-if data present at the wing level. There is a total of five what-if databases permitted to be stored on-line, plus one database storing actual current data for a total of six.

The following shows a sample breakdown of copies of AFIRMS data resident at the wing level:

1 copy of current real data

5 copies of what-if data consisting of

- 2 copies of 1 exercise database (1 beginning copy and 1 ending copy)
- 5 databases depicting results of Sortie Generation Model runs against the DOC.

Since there is a maximum of 5 copies of what-if databases on-line two of the 7 above must reside off-line at the discretion of the wing.

<u>2.3.6 Database Backup, Archiving, and Restoration</u>. Following is the regular schedule for backups of the AFIRMS databases to off-line media at the wing:

1) At the end of each working day; retained for 5 working days
2) At the end of each week; retained for 5 weeks
3) At the end of each month; retained for 12 months
4) At the end of each year; retained for 5 years.

The data involved in the backup schedule above is used for historical purposes also. Moreover, data can be backed-up on an "as-needed" basis. An example of this occurs during exercise mode or crisis situation when AFIRMS is being used outside normal usage periods, for instance, on a weekend. Normally, the database is not automatically backed-up on the weekend, but in this situation backup is manually initiated as required by the functional area user. Archiving occurs in the same manner; it is initiated manually. The difference is that archived data is not deleted from off-line media unless explicitly requested. For this reason archiving is a tool that is to be used sparingly for important data. Archiving is initiated as required by the functional area user. Restoration occurs if data in the database or transactions on the data have been lost. Whenever a transaction occurs in the local database, it is logged to an on-line journal file for use in the event restoration is needed. Restoration consists of reloading, if necessary, the latest copy of the database from off-line media and applying the journal log file to it.

2.3.7 External Interfaces. It is desired, whenever possible, for AFIRMS to have direct-line interfaces to other systems' data that is useful to AFIRMS on a regular basis. There are circumstances, however, where a direct-line interface is not feasible due to hardware, software, or security constraints. For example, as a classified NATO system, the EIFEL system currently operating in USAFE is prohibited, for security reasons, from being physically connected to classified USAF ADP systems. If it is subsequently deemed necessary to have an interface between AFIRMS and EIFEL it must be by an "airgap," i.e., hardcopy, magnetic tape, or floppy disk. Airgap interfaces occur by periodically copying to tape, or floppy disk, the necessary data from those systems and loading it to AFIRMS. Data updated via an interface consists of only that data which has changed since the previous data transfer from the external system. For example, in the AFIRMS/Air Force Operations Resource Management System (AFORMS) interface, only those events that were performed by the aircrew member through the current date since the last interface occurred constitute a transaction in the AFIRMS database.

2.3.8 Normalization and Data Models. Normalization is a technique of relating functionally dependent data for ease of understanding and operationally maintaining data integrity by reducing update anomalies. Normalization is a good starting point for any database design because, although normalization adapts most readily to the relational data model, it characterizes relationships between data to the extent where minimal changes are necessary to switch to a network, hierarchical, or other data model. This makes for ease of adaptability between wings during the Analysis Phase of their block implementations.

Each of the logical data models mentioned above has inherent advantages and disadvantages. Network logical data models have the speed and flexibility to work in almost any application but are very difficult to implement effectively and are not at all flexible if the need for reorganization arises. Hierarchical logical data models are usually a good choice for hierarchically structured applications, but they are not very flexible. While AFIRMS is hierarchical in organization, the variability of data requirements among functional areas requires significant data structure flexibility. This is particularly true when the evolutionary nature of AFIRMS' implementation is considered. Relational logical data models are the easiest to implement and are very flexible. However, they lack the access speed of some of the other models. During the AFIRMS LPP, it became apparent that flexibility and relative ease of implementation weigh heavily in the AFIRMS development environment. In this sense, the use of a relational DBMS was of great value. Other logical data models such as inverted files have greater speed than relational models but also possess limited flexibility.

2.3.9 DBMS Characteristics. This section lists the desired characteristics of a DBMS for AFIRMS in order of highest to lowest priority. Some characteristics will differ in degree of relevance between wings and should be re-prioritized accordingly during the Analysis Phase of the first blocks of the operational systems. The DBMS should support or provide:

a. Highest.

(1) Access by multiple users from interactive and batch processes for both update and retrieval of information.

(2) Application program data independent of the physically stored data structures.

(3) A database creation facility for the initialization and loading of the database.

(4) Interaction with higher-order languages (HOLs).

(5) An English-like query language to process data in any file using the DBMS.

(6) Creation of the query must be supported by the dictionary facility to inform the user of the permitted view and to permit selection of the data elements to be reported.

(7) A query language that provides interactive editing of syntax, terms, and element names.

(8) A query language that supports the use of Boolean operators.

(9) Directing the results of a query to a file that can be used by other applications or support software.

(10) The ability to optionally round or truncate numerical fields.

(11) Adding, deleting, or updating a record in either batch or on-line mode.

(12) Extending DBMS functions without changing or recompiling existing processes. Specifically, the ability to add functions to the DBMS without affecting the user language interface. The addition of these functions is transparent to any existing routines that have been written in the DBMS user language or any other languages.

(13) A database dictionary capable of:

(a) Describing databases, data elements, authorized users, logical user views, and specifying user permissions (read/write/update).

(b) Generating data definitions.

(c) Restricting access to the database dictionary according to security requirements.

(d) Defining multiple occurrences of data.

(e) Modifying the database in size, relationships, access methods, or fields per record without requiring modification of application programs for which processing logic does not change.

b. Medium.

(1) A logical comparison capability during search and update functions.

(2) Searches for a record number or a field (using alphanumeric, special characters, or wildcard notation).

(3) A built-in HELP capability accessible at any level.

(4) A query system with the ability to perform tabulations and arithmetic functions, or interface with a statistical package.

(5) Development of a query by menus, prompting, and/or HELP facilities.

(6) The ability of one query to retrieve data from multiple files with a database.

(7) A query language with the ability to logically manipulate data.

(8) A query language with the ability to perform grouping operations for totals, counts, or specified calculated fields.

(9) The results of a query displayed on a screen to be directed to a file for printing later.

(10) The ability to specify up to five control break levels (subtotals for up to ten columns).

(11) The ability of a user to store a query and allow the user or other users, subject to security constraints, to reuse the query. Stored queries must be able to be reused either in their entirety or with the addition or modification of specific parameters by the current user, and must be indexed or cataloged to support menu-driven retrieval of stored queries.

(12) Recovery and restart capabilities for the DBMS files.

(13) Utilities which permit database reorganization, dump and restore, and usage statistics.

(14) Interfaces with a report writer.

(15) The automatic return of disposed space (as in the case of a deletion) to the system or reallocate space itself. This avoids excessive compressing or reorganizing of data in order to recover disposed spaces (holes).

c. Lowest.

(1) Unlimited number of records per file within available disk space.

(2) Access of last record, previous record, and next record.

(3) File searches containing at least six search criteria.

(4) The ability of a query language to decode fields.

(5) A query language which automatically aligns decimal points or other punctuation for fields.

(6) Data integrity that prevents simultaneous updates and deadlocks, and maintains the logical and physical structure of the database.

(7) A capability under exclusive control of the Database Administrator to repair a database record that is unreadable.

(8) The ability of the host language interface to accept asynchronous requests as well as request cancellations.

2.4 Security. The most critical aspect of security protection for the operational AFIRMS is at the Wing level where the AFIRMS ADPS will be operating in a Controlled Security Mode at the secret level with a mixture of classified and unclassified terminals and users. With this security environment, it is imperative that, in compliance with AFR 205-16, database access controls be implemented based on clearance levels of users and terminals and users' need-to-know. The database security protection features for the operational AFIRMS ADPS at Wing sites must include at least the following:

a. Terminal and user profiles indicating user and terminal clearance level, access privileges, and user/terminal permissions (read/write/update).

b. The ability to assign security classification levels to files and/or data elements.

c. The ability to restrict database access based on user/terminal clearance level and need-to-know.

d. The ability to restrict the number of invalid access attempts to the system and/or database.

e. The ability to create and maintain an audit trail to include:

   1. Record of accesses made to files; how, and from where these accesses were initiated.

   2. Identity of user and terminal that initiated access.

   3. Record of all unauthorized access attempts.

SECTION 3. DATA DEFINITIONS

3.1 Data Files.

3.1.1 General Description of Data Files. Appendices A and B of this document list general wing data requirements for the central database and each functional area.

3.1.1.1 Entity Class Characteristics. The column designated appearance number in Appendices A and B has embedded within it the number of the entity class to which it belongs. Section 3.2 of the Data Requirements Document completely describes the characteristics of each entity class existing at the wing. A listing of entity classes by functional area is developed in the analysis phase of each segment.

3.1.2 Physical Characteristics of Data Files.

a. File Contents and Format. All contents of AFIRMS database files are under the control of the DBMS or data management system (DMS) resident on the local computers. They are in a format recognized by the DBMS/DMS and are accessed via the DBMS/DMS.

b. Primary and Secondary Storage Media. All AFIRMS database files reside on disk storage for on-line access and magnetic tape or floppy disk media for archiving and backup.

c. Form of the Contents. The form of the contents of all AFIRMS database files is binary.

3.1.3 Logical Characteristics of Data Files. Appendix A lists and describes all appearances of data in the Wing central database as referenced in the DRD. Appendix B lists and describes all appearances of data by functional area at the wing.

3.1.3.1 Appearance Class Characteristics. Each appearance class referenced in Appendix A and B is described completely in Section 3.2 of the Data Requirements Document.

3.2 Tables. Internal tables used to manage or describe AFIRMS data files are defined during the analysis phase of each segment.

3.3 Items. Items resident in the tables described in Section 3.2 are defined during the analysis phase of each segment.

3.4 Records and Entries. Records or entries appearing in AFIRMS data files are defined during the analysis phase of each segment.

SECTION 4. INTEGRATED DATABASE

The AFIRMS database can be divided into three different types: HQ USAF, HQ USAFE, and WING. Data is duplicated, to some degree, between levels by the reporting function. In this sense, then, the AFIRMS database is not truly integrated because of data redundancy existing at the different levels.

At the wing level, there exists a central database connected to multiple functional areas. Each functional area has, physically resident on its hardware, a database which duplicates all or part of the central database.

AFIRMS is integrated in the sense that duplication of manual data inputs is minimized by the fact that AFIRMS interfaces with other ADP systems to access necessary data. Data inputs are "integrated," since they are collected from multiple systems without need for redundant AFIRMS user input. These inputs are stored for use by AFIRMS processes. This means that the AFIRMS central database is not integrated within the wing environment since the same data is stored and used at both the central and functional areas. However, the AFIRMS central database houses data from different functional areas non-redundantly and, therefore, is itself integrated because multiple functional users are accessing the same data. Special problems such as deployability, availability, and retrieval speed require each functional area to have data that it routinely needs resident on its own hardware. From this perspective, a central database with redundant data at the functional areas is not, strictly speaking, an integrated database, when considered together even though each (considered individually) is integrated.

When one or more users in a subfunctional area are accessing the same database, then that database is also integrated because the AFIRMS architecture prohibits redundancy within that functional area. This does not preclude the possibility that the same data is duplicated at the central database or another functional area.

To summarize, AFIRMS collects data both as AFIRMS inputs and via electronic interfaces with other systems. AFIRMS stores this data for use by many different functional users in a collection of decentralized databases, each one of which (taken alone) is an integrated database. However, the data is redundant within and between AFIRMS sites as well as between other Air Force systems. Therefore, AFIRMS, as a system, does not operate on a truly integrated database.

APPENDIX A/CHG1. WING CENTRAL DATABASE STORAGE REQUIREMENTS

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
1C	UNIT MISSION	3	5	90
1E	UNIT OPERATIONS IDENTIFIER	23	1	138
1F	UNIT SHORT NAME	8	4	192
5A	RESOURCE TYPE (3 MDS + 5 A/CRW + 30 MUNITION + 4 FUEL)	20	42	5040
5E	RESOURCE UNITS OF MEASURE	8	5	240
8A	RESOURCE TYPE NEEDED FOR A TASK	23	11	1518
8B	TASK TYPE SET IDENTIFIER	23	1	138
8D	RESOURCE PRIORITY	4	35	840
8E	STANDARD QUANTITY OF RESOURCE REQUIRED	4	1100	26400
9A	TASK TYPE	18	100	10800
9B	TASK PRIORITY	4	100	2400
9C	TASK TYPE EXECUTION TIME	4	1	24
9E	TASK PERIOD FROM DAY (60 DAYS)	4	20	480
9F	TASK PERIOD TO DAY	4	20	480
11A	AIRCRAFT UNIT NAME	10	4	240
11B	AIRCRAFT SERIAL NUMBER	4	80	1920
11C	AIRCRAFT MDS	7	4	168
11E	AIRCRAFT OPERATIONAL STATUS	8	7	336
11F	AIRCRAFT OPERATIONAL STATUS REMARKS	80	80	38400
11G	AIRCRAFT LOCATION	4	80	1920
11H	AIRCRAFT ETIC	5	80	2400
11K	AIRCRAFT TANK CONFIGURATION	1	80	480
11L	AIRCRAFT STATION STATUS	3	4	72
11M	AIRCRAFT PRESELECT INDICATOR	4	80	1920
11N	AIRCRAFT GENERATION FACTOR	4	80	1920
11P	AIRCRAFT TAIL NUMBER	5	80	2400
12A	AIRMAN LAST NAME (72 MEMBERS x 3 SQDNS)	16	216	20736
12B	AIRMAN UNIT NAME	8	3	144
12C	AIRMAN AVAILABILITY STATUS	1	216	1296
12D	AIRMAN CREW DAY START	5	216	6480
12F	AIRMAN STATUS REMARKS	80	216	103680
12G	AIRMAN RANK	5	216	6480
12H	AIRMAN ETR	11.	216	14256
12I	AIRMAN CREW POSITION	3	5	90
12J	AIRMAN DUTY STATUS	5	10	300
12K	AIRMAN ATTACHED UNIT NAME	10	3	180
12L	AIRMAN ASSIGNMENT TYPE	2	216	2592
12M	AIRMAN EXPECTED MR DATE	5	216	6480
12N	AIRMAN DUTY STATUS QUALIFIER	2	216	2592
13A	UNIT NAME OWNING RESOURCE	10	1	60
13B	RESOURCE DESIGNATOR	20	54	6480
13C	RESOURCE AUTHORIZED AMOUNT (30 MUNITION + 4 FUEL + 12 ACRFT + 8 ACRW)	4	54	1296
13D	RESOURCE SET IDENTIFIER	23	1	138
13E	RESOURCE LAST INVENTORY DATE	7	54	2268
13G	RESOURCE ASSIGNED AMOUNT	4	54	1296
13H	RESOURCE CURRENT AMOUNT	4	54	1296
13I	RESOURCE CURRENT OFF BASE AMOUNT	4	54	1296
13J	BASE NAME - UNIT'S RESOURCE LOCATION (5 WING LOCATIONS)	15	5	450
13M	RESOURCE POSSESSED TOTAL	4	54	1296
13N	RESOURCE ROLL-UP DTG	13	3	234
13O	RESOURCE TRANSMIT DTG	13	3	234
13P	AIRCREWS MR	4	2	48

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
13Q	AIRCRAFT MC	4	2	48
13R	H_EXPENDED SUPPLY	4	30	720
13S	RESOURCE CURRENT BUILT AMOUNT	4	30	720
13T	H_OFF BASE AMOUNT	4	30	720
13U	RESOURCE REMARKS1	30	30	5400
13V	RESOURCE SUPPLY CRITICAL LEVEL	4	30	720
13W	RESOURCE TOTAL CURRENTLY AVAILABLE	4	30	720
13X	RESOURCE SUPPLY DAYS REMAINING	4	30	720
13Y	RESOURCE DAILY EXPENDITURE RATE	4	30	720
13Z	RESOURCE SUPPLY DAYS UNTIL CRITICAL	4	30	720
15C	MISSION NUMBER (50 x 5 DAYS IN SCHEDULE)	7	250	10500
15D	PRIMARY MISSION TYPE ASSIGNED	5	5	150
15E	MISSION UNIT NAME	10	3	180
15F	MISSION NUMBER OF AIRCRAFT	4	250	6000
15G	MISSION START TIME OVER TARGET	5	250	7500
15H	MISSION STOP TIME OVER TARGET	5	250	7500
15L	SUPPORT MISSION NUMBER	7	250	10500
15N	MISSION TARGET DESCRIPTION	15	250	22500
15O	MISSION PRIORITY	4	250	6000
15U	MISSION TURN BACK FLAG	1	250	1500
15V	MISSION REMARKS	60	250	90000
15W	MISSION TASKED MUNITION CODE	6	250	9000
20A	UNIT NAME OF SUPPLY OWNER AT THIS LOCATION	10	1	60
20B	RESOURCE TYPE OF SUPPLY AT THIS LOCATION	20	54	6480
20C	SUPPLY LOCATION TYPE	15	2	180
20D	SUPPLY LOCATION NUMBER (12 FUEL TANK + 80 ACRFT SHELTER)	12	92	6624
20E	SUPPLY LOCATION RESOURCE CAPACITY (12 FUEL LOCATIONS)	4	12	288
20F	T_SUPPLY LOCATION RESOURCE INVENTORY (12 FUEL LOCATIONS)	4	12	288
20G	SUPPLY LOCATION RESOURCE INVENTORY DATE (12 FUEL LOCATIONS)	7	12	504
20H	RESOURCE SUPPLY IDENTIFIER	23	1	138
20J	STORAGE CONTAINER SERVICEABILITY (12 FUEL LOCATIONS)	15	12	1080
20K	STORAGE CONTAINER ETIC (12 FUEL LOCATIONS)	12	12	864
20L	STORAGE CONTAINER REMARKS (12 FUEL LOCATIONS)	15	12	1080
39A	OWNING RESOURCE DESIGNATOR	20	25	3000
39B	SUBORDINATE RESOURCE DESIGNATOR	20	54	6480
50A	SORTIE SEQUENCE NUMBER (1 WEEK'S WORTH)	4	375	9000
50D	SORTIE ASSIGNED TAKE-OFF TIME	5	375	11250
50E	SORTIE EXPECTED LAND TIME	5	375	11250
50P	SORTIE AIRCREW SHOW TIME	5	375	11250
50Q	SORTIE AIRCREW COMPLETION TIME	5	375	11250
50S	SORTIE MISSION AIRCRAFT MDS	7	4	168
53A	BASE NAME	15	5	450
53D	BASE OPERATIONAL STATUS	3	5	90
53E	BASE NBC STATUS	3	5	90
53F	BASE ETIC	11	5	330
53G	BASE STATUS REMARKS	140	5	4200
53H	BASE STATUS AS OF DTG	10	5	300
54A	ORDER IDENTIFIER	23	4	552
54E	ORDER DATE	7	1	42
54G	ORDER CHANGE NUMBER	4	4	96
54K	ORDER CLASSIFICATION	21	1	126
54Q	NUMBER OF DAYS TO RUN SGM MODEL	4	10	240

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
54R	SORTIE GENERATION MODEL RUN REMARKS	45	10	2700
56A	TASKED UNIT NAME	10	1	60
56D	UNIT ORDER IDENTIFICATION	23	1	138
56E	BASE NAME - UNIT EMPLOYMENT LOCATION	15	1	90
56F	UNIT EMPLOYMENT DAY	5	1	30
56G	T UNIT DAILY SORTIE TASK	4	60	1440
56H	T UNIT DAILY INTEGRATED SORTIE CAPABILITY	4	60	1440
56J	UNIT PLANNED SORTIE DURATION	4	60	1440
56K	UNIT SHIFT DURATION	4	60	1440
56L	UNIT FLY DAY NUMBER	4	60	1440
56M	T_UNIT DAILY RESOURCE QUANTITY TASKED	4	60	1440
59B	UNIT NAME	7	1	42
59C	UNIT TURN TIME FOR ORDER	4	20	480
59D	PERIOD START DAY FOR UNIT'S PIECE OF ORDER	4	20	480
59E	PERIOD END DAY FOR UNIT'S PIECE OF ORDER	4	20	480
59F	UNIT MAINT ATTRIT RATE FOR ORDER	4	20	480
59G	MISSION TYPE	5	5	150
59H	UNIT AIRCRAFT REPAIR RATE FOR ORDER	4	20	480
59I	UNIT MIN TIME BETWEEN TAKEOFFS	4	20	480
59J	UNIT COMBAT ATTRIT RATE FOR ORDER	4	20	480
59K	SORTIES PER DAY	4	20	480
59L	MISSION PRIORITY	4	5	120
59N	PRIMARY RESOURCE TYPE	6	30	1080
61A	AIRMAN LAST NAME - POSSESSOR OF SKILL	16	216	20736
61B	SKILL IDENTIFIER - SKILL POSSESSED	3	20	360
61C	SKILL LEVEL	1	10	60
61D	SKILL IDENTIFIER - RESOURCE	13	20	1560
71A	ORDER IDENTIFIER	23	1	138
71B	TASK PERIOD START DAY	4	20	480
71C	TASK PERIOD END DAY	4	20	480
71D	RESOURCE TYPE REQUIRED FOR TOTAL ORDER (3 ACRFT + 1 ACRW + 34 RESOURCE)	20	38	4560
71E	RESOURCE QUANTITY REQUIRED FOR TOTAL ORDER	4	2280	54720
71F	SORTIE AIRCRAFT RATE (60 DAY x 3 MDS)	4	180	4320
71G	SORTIE DURATION (60 DAY x 5 MISSION)	4	300	7200
73A	UNIT NAME - FOR TASKED UNIT	10	1	60
73C	RESOURCE TYPE SUPPORTING UNIT TASK	4	38	912
73D	T_UNIT DAILY RESOURCE SORTIE CAPABILITY (38 RESOURCES x 60 DAYS)	4	2280	54720
73F	T_UNIT DAILY RESOURCE QUANTITY CAPABLE	4	2280	54720
73L	UNIT RESOURCE AMOUNT TASKED	4	2280	54720
74A	TASKED UNIT NAME	10	1	60
74B	RESOURCE TYPE IN UNIT'S TASKING PIECE	20	38	4560
74D	RESOURCE QUANTITY REQUIRED FOR TASK TYPE IN UNIT'S PIECE OF ORDER (5 x 38 RES)	4	190	4560
74G	FLY DAY WAVE	4	5	120
74J	DAILY TOTAL SORTIE RESOURCES PRODUCED	4	10200	244800
88C	QUANTITY OF TYPE IN STATUS	4	80	1920
88D	RESOURCE TYPE OF UNIT'S SUPPLY IN STATUS	20	54	6480
89N	FLY DAY START	5	20	600
89O	SHIFT PERCENT FORMED AIRCREW	4	40	960
89P	FLY DAY DURATION	2	20	240
89Q	SHIFT START TIME	5	40	1200
92A	REQUISITION RESOURCE TYPE	20	20	2400
92B	DUE-OUT REQUISITION NUMBER	14	20	1680

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
92C	DUE-IN REQUISITION NUMBER	14	20	1680
92D	MICAP START DATE	11	20	1320
92E	NUMBER OF MICAP DAYS	4	20	480
92F	REQUISITION CAUSE CODE	1	20	120
92G	REQUISITION ROUTE ID	3	20	360
92H	REQUISITION REMARKS	30	20	3600
92J	REQUISITION UNIT NAME	10	20	1200
96B	RESOURCE NAME	23	7	966
96C	RESOURCE STATUS	3	7	126
96D	RESOURCE ETIC	11	7	462
96E	RESOURCE REMARKS	4	0	0

TOTAL DATA SIZE = 1109472

TOTAL OPERATIONAL DATABASE SIZE = 2951195

SOFTECH

APPENDIX B/CHG1. WING FUNCTIONAL AREA DATABASE STORAGE REQUIREMENTS

AIRCRAFT MAINTENANCE UNITS (AMU)

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
11A	AIRCRAFT UNIT NAME	10	4	240
11B	AIRCRAFT SERIAL NUMBER	4	80	1920
11C	AIRCRAFT MDS	7	4	168
11E	AIRCRAFT OPERATIONAL STATUS	8	7	336
11F	AIRCRAFT OPERATIONAL STATUS REMARKS	80	80	38400
11G	AIRCRAFT LOCATION	4	80	1920
11H	AIRCRAFT ETIC	5	80	2400
11K	AIRCRAFT TANK CONFIGURATION	1	80	480
11L	AIRCRAFT STATION STATUS	3	4	72
11M	AIRCRAFT PRESELECT INDICATOR	4	80	1920
11N	AIRCRAFT GENERATION FACTOR	4	80	1920
11P	AIRCRAFT TAIL NUMBER	5	80	2400
13C	RESOURCE AUTHORIZED AMOUNT	4	54	1296
13G	RESOURCE ASSIGNED AMOUNT	4	54	1296
13H	RESOURCE CURRENT AMOUNT	4	54	1296
13I	RESOURCE CURRENT OFF BASE AMOUNT	4	54	1296
13M	RESOURCE POSSESSED TOTAL	4	54	1296
53A	BASE NAME	15	5	450
53D	BASE OPERATIONAL STATUS	3	5	90
53E	BASE NBC STATUS	3	5	90
53F	BASE ETIC	11	5	330
53G	BASE STATUS REMARKS	140	5	4200
53H	BASE STATUS AS OF DTG	10	5	300
88C	QUANTITY OF TYPE IN STATUS	4	54	1296
96B	RESOURCE NAME	23	7	966
96C	RESOURCE STATUS	3	7	126
96D	RESOURCE ETIC	11	7	462
96E	RESOURCE REMARKS	4	0	0

TOTAL DATA SIZE = 66966

TOTAL OPERATIONAL DATABASE SIZE = 300007

SOFTECH

FUELS CONTROL

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
1C	UNIT MISSION	3	5	90
1F	UNIT SHORT NAME	8	4	192
5A	RESOURCE TYPE	20	42	5040
5E	RESOURCE UNITS OF MEASURE	8	5	240
11A	AIRCRAFT UNIT NAME	10	4	240
11B	AIRCRAFT SERIAL NUMBER	4	80	1920
11C	AIRCRAFT MDS	7	4	168
11E	AIRCRAFT OPERATIONAL STATUS	8	7	336
11F	AIRCRAFT OPERATIONAL STATUS REMARKS	80	80	38400
11G	AIRCRAFT LOCATION	4	80	1920
11H	AIRCRAFT ETIC	5	80	2400
11K	AIRCRAFT TANK CONFIGURATION	1	80	480
11L	AIRCRAFT STATION STATUS	3	4	72
11M	AIRCRAFT PRESELECT INDICATOR	4	80	1920
11N	AIRCRAFT GENERATION FACTOR	4	80	1920
11P	AIRCRAFT TAIL NUMBER	5	80	2400
13A	UNIT NAME OWNING RESOURCE	10	1	60
13B	RESOURCE DESIGNATOR	20	54	6480
13C	RESOURCE AUTHORIZED AMOUNT	4	54	1296
13D	RESOURCE SET IDENTIFIER	23	1	138
13G	RESOURCE ASSIGNED AMOUNT	4	54	1296
13H	RESOURCE CURRENT AMOUNT	4	54	1296
13I	RESOURCE CURRENT OFF BASE AMOUNT	4	54	1296
13J	BASE NAME - UNIT'S RESOURCE LOCATION	15	5	450
13M	RESOURCE POSSESSED TOTAL	4	54	1296
13N	RESOURCE ROLL-UP DTG	13	3	234
13O	RESOURCE TRANSMIT DTG	13	3	234
13P	AIRCREWS MR	4	2	48
13Q	AIRCRAFT MC	4	2	48
20A	UNIT NAME OF SUPPLY OWNER AT THIS LOCATION	10	1	60
20B	RESOURCE TYPE OF SUPPLY AT THIS LOCATION	20	54	6480
20C	SUPPLY LOCATION TYPE	15	2	180
20D	SUPPLY LOCATION NUMBER	12	92	6624
20E	SUPPLY LOCATION RESOURCE CAPACITY	4	12	288
20F	T_SUPPLY LOCATION RESOURCE INVENTORY	4	12	288
20G	SUPPLY LOCATION RESOURCE INVENTORY DATE	7	12	504
20J	STORAGE CONTAINER SERVICEABILITY	15	12	1080
20K	STORAGE CONTAINER ETIC	12	12	864
20L	STORAGE CONTAINER REMARKS	15	12	1080
39A	OWNING RESOURCE DESIGNATOR	20	25	3000
39B	SUBORDINATE RESOURCE DESIGNATOR	20	54	6480
53A	BASE NAME	15	5	450
53D	BASE OPERATIONAL STATUS	3	5	90
53E	BASE NBC STATUS	3	5	90
53F	BASE ETIC	11	5	330
53G	BASE STATUS REMARKS	140	5	4200
53H	BASE STATUS AS OF DTG	10	5	300
54A	ORDER IDENTIFIER	23	1	138
54E	ORDER DATE	7	1	42
54G	ORDER CHANGE NUMBER	4	1	24
54K	ORDER CLASSIFICATION	21	1	126
56E	BASE NAME - UNIT EMPLOYMENT LOCATION	15	1	90

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
56F	UNIT EMPLOYMENT DAY	5	1	30
73A	UNIT NAME - FOR TASKED UNIT	10	1	60
73C	RESOURCE TYPE SUPPORTING UNIT TASK	4	38	912
73D	T_UNIT DAILY RESOURCE SORTIE CAPABILITY	4	2280	54720
88C	QUANTITY OF TYPE IN STATUS	4	54	1296
92J	REQUISITION UNIT NAME	10	20	1200
96B	RESOURCE NAME	23	7	966
96C	RESOURCE STATUS	3	7	126
96D	RESOURCE ETIC	11	7	462
96E	RESOURCE REMARKS	4	0	0

TOTAL DATA SIZE = 164490

TOTAL OPERATIONAL DATABASE SIZE = 519788

SOFTECH

MAINTENANCE CONTROL OR JOB CONTROL (MOC)

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
11A	AIRCRAFT UNIT NAME	10	4	240
11B	AIRCRAFT SERIAL NUMBER	4	80	1920
11C	AIRCRAFT MDS	7	4	168
11E	AIRCRAFT OPERATIONAL STATUS	8	7	336
11F	AIRCRAFT OPERATIONAL STATUS REMARKS	80	80	38400
11G	AIRCRAFT LOCATION	4	80	1920
11H	AIRCRAFT ETIC	5	80	2400
11K	AIRCRAFT TANK CONFIGURATION	1	80	480
11L	AIRCRAFT STATION STATUS	3	4	72
11M	AIRCRAFT PRESELECT INDICATOR	4	80	1920
11N	AIRCRAFT GENERATION FACTOR	4	80	1920
11P	AIRCRAFT TAIL NUMBER	5	80	2400
13C	RESOURCE AUTHORIZED AMOUNT	4	54	1296
13G	RESOURCE ASSIGNED AMOUNT	4	54	1296
13H	RESOURCE CURRENT AMOUNT	4	54	1296
13I	RESOURCE CURRENT OFF BASE AMOUNT	4	54	1296
13M	RESOURCE POSSESSED TOTAL	4	54	1296
15C	MISSION NUMBER	7	250	10500
15D	PRIMARY MISSION TYPE ASSIGNED	5	5	150
15E	MISSION UNIT NAME	10	3	180
15F	MISSION NUMBER OF AIRCRAFT	4	250	6000
15G	MISSION START TIME OVER TARGET	5	250	7500
15H	MISSION STOP TIME OVER TARGET	5	250	7500
15L	SUPPORT MISSION NUMBER	7	250	10500
15N	MISSION TARGET DESCRIPTION	15	250	22500
15O	MISSION PRIORITY	4	250	6000
15O	MISSION PRIORITY	4	0	0
15U	MISSION TURN BACK FLAG	1	250	1500
15V	MISSION REMARKS	60	250	90000
15W	MISSION TASKED MUNITION CODE	6	250	9000
53A	BASE NAME	15	5	450
53D	BASE OPERATIONAL STATUS	3	5	90
53E	BASE NBC STATUS	3	5	90
53F	BASE ETIC	11	5	330
53G	BASE STATUS REMARKS	140	5	4200
53H	BASE STATUS AS OF DTG	10	5	300
54A	ORDER IDENTIFIER	23	1	138
54E	ORDER DATE	7	1	42
54G	ORDER CHANGE NUMBER	4	1	24
54K	ORDER CLASSIFICATION	21	1	126
56A	TASKED UNIT NAME	10	1	60
56L	UNIT FLY DAY NUMBER	4	60	1440
59B	UNIT NAME	7	1	42
59C	UNIT TURN TIME FOR ORDER	4	20	480
59D	PERIOD START DAY FOR UNIT'S PIECE OF ORDER	4	20	480
59E	PERIOD END DAY FOR UNIT'S PIECE OF ORDER	4	20	480
59F	UNIT MAINT ATTRIT RATE FOR ORDER	4	20	480
59G	MISSION TYPE	5	5	150
59H	UNIT AIRCRAFT REPAIR RATE FOR ORDER	4	20	480
59I	UNIT MIN TIME BETWEEN TAKEOFFS	4	20	480
59J	UNIT COMBAT ATTRIT RATE FOR ORDER	4	20	480
59K	SORTIES PER DAY	4	20	480

MAINTENANCE CONTROL OR JOB CONTROL (MOC) (Continued)

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
59N	PRIMARY RESOURCE TYPE	6	30	1080
73C	RESOURCE TYPE SUPPORTING UNIT TASK	4	38	912
73D	T_UNIT DAILY RESOURCE SORTIE CAPABILITY	4	2280	54720
73L	UNIT RESOURCE AMOUNT TASKED	4	2280	54720
74A	TASKED UNIT NAME	10	1	60
74B	RESOURCE TYPE IN UNIT'S TASKING PIECE	20	38	4560
74D	RESOURCE QUANTITY REQUIRED FOR TASK TYPE IN UNIT'S PIECE OF ORDER	4	190	4560
74G	FLY DAY WAVE	4	5	120
74J	DAILY TOTAL SORTIE RESOURCES PRODUCED	4	10200	244800
88C	QUANTITY OF TYPE IN STATUS	4	80	1920
92A	REQUISITION RESOURCE TYPE	20	20	2400
92B	DUE-OUT REQUISITION NUMBER	14	20	1680
92C	DUE-IN REQUISITION NUMBER	14	20	1680
92D	MICAP START DATE	11	20	1320
92E	NUMBER OF MICAP DAYS	4	20	480
92F	REQUISITION CAUSE CODE	1	20	120
92G	REQUISITION ROUTE ID	3	20	360
92H	REQUISITION REMARKS	30	20	3600
96B	RESOURCE NAME	23	7	966
96C	RESOURCE STATUS	3	7	126
96D	RESOURCE ETIC	11	7	462

TOTAL DATA SIZE = 621954

TOTAL OPERATIONAL DATABASE SIZE = 2207936

SOFTECH

MUNITIONS CONTROL

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
11A	AIRCRAFT UNIT NAME	10	4	240
11B	AIRCRAFT SERIAL NUMBER	4	80	1920
11C	AIRCRAFT MDS	7	4	168
11E	AIRCRAFT OPERATIONAL STATUS	8	7	336
11F	AIRCRAFT OPERATIONAL STATUS REMARKS	80	80	38400
11G	AIRCRAFT LOCATION	4	80	1920
11H	AIRCRAFT ETIC	5	80	2400
11K	AIRCRAFT TANK CONFIGURATION	1	80	480
11L	AIRCRAFT STATION STATUS	3	4	72
11M	AIRCRAFT PRESELECT INDICATOR	4	80	1920
11N	AIRCRAFT GENERATION FACTOR	4	80	1920
11P	AIRCRAFT TAIL NUMBER	5	80	2400
13A	UNIT NAME OWNING RESOURCE	10	1	60
13B	RESOURCE DESIGNATOR	20	54	6480
13C	RESOURCE AUTHORIZED AMOUNT	4	54	1296
13D	RESOURCE SET IDENTIFIER	23	1	138
13E	RESOURCE LAST INVENTORY DATE	7	54	2268
13G	RESOURCE ASSIGNED AMOUNT	4	54	1296
13H	RESOURCE CURRENT AMOUNT	4	54	1296
13I	RESOURCE CURRENT OFF BASE AMOUNT	4	54	1296
13J	BASE NAME - UNIT'S RESOURCE LOCATION	15	5	450
13M	RESOURCE POSSESSED TOTAL	4	54	1296
13N	RESOURCE ROLL-UP DTG	13	3	234
13O	RESOURCE TRANSMIT DTG	13	3	234
13P	AIRCREWS MR	4	2	48
13Q	AIRCRAFT MC	4	2	48
13R	H_EXPENDED SUPPLY	4	30	720
13S	RESOURCE CURRENT BUILT AMOUNT	4	30	720
13T	H_OFF BASE AMOUNT	4	30	720
13U	RESOURCE REMARKS1	30	30	5400
13V	RESOURCE SUPPLY CRITICAL LEVEL	4	30	720
13W	RESOURCE TOTAL CURRENTLY AVAILABLE	4	30	720
13X	RESOURCE SUPPLY DAYS REMAINING	4	30	720
13Y	RESOURCE DAILY EXPENDITURE RATE	4	30	720
13Z	RESOURCE SUPPLY DAYS UNTIL CRITICAL	4	30	720
15C	MISSION NUMBER	7	250	10500
15D	PRIMARY MISSION TYPE ASSIGNED	5	5	150
15E	MISSION UNIT NAME	10	3	180
15F	MISSION NUMBER OF AIRCRAFT	4	250	6000
15G	MISSION START TIME OVER TARGET	5	250	7500
15H	MISSION STOP TIME OVER TARGET	5	250	7500
15L	SUPPORT MISSION NUMBER	7	250	10500
15N	MISSION TARGET DESCRIPTION	15	250	22500
15O	MISSION PRIORITY	4	250	6000
15O	MISSION PRIORITY	4	0	0
15U	MISSION TURN BACK FLAG	1	250	1500
15V	MISSION REMARKS	60	250	90000
15W	MISSION TASKED MUNITION CODE	6	250	9000
53A	BASE NAME	15	5	450
53D	BASE OPERATIONAL STATUS	3	5	90
53E	BASE NBC STATUS	3	5	90
53F	BASE ETIC	11	5	330

MUNITIONS CONTROL (Continued)

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
53G	BASE STATUS REMARKS	140	5	4200
53H	BASE STATUS AS OF DTG	10	5	300
54A	ORDER IDENTIFIER	23	1	138
54E	ORDER DATE	7	1	42
54G	ORDER CHANGE NUMBER	4	1	24
54G	ORDER CHANGE NUMBER	4	4	96
54K	ORDER CLASSIFICATION	21	1	126
56A	TASKED UNIT NAME	10	1	60
56F	UNIT EMPLOYMENT DAY	5	1	30
73C	RESOURCE TYPE SUPPORTING UNIT TASK	4	38	912
73F	T_UNIT DAILY RESOURCE QUANTITY CAPABLE	4	2280	54720
73L	UNIT RESOURCE AMOUNT TASKED	4	2280	54720
74A	TASKED UNIT NAME	10	1	60
74B	RESOURCE TYPE IN UNIT'S TASKING PIECE	20	38	4560
74D	RESOURCE QUANTITY REQUIRED FOR TASK TYPE IN UNIT'S PIECE OF ORDER	4	190	4560
88C	QUANTITY OF TYPE IN STATUS	4	80	1920
96B	RESOURCE NAME	23	7	966
96C	RESOURCE STATUS	3	7	126
96D	RESOURCE ETIC	11	7	462
96E	RESOURCE REMARKS	4	0	0

TOTAL DATA SIZE = 380088

TOTAL OPERATIONAL DATABASE SIZE = 1208679

WING AND SQUADRON SCHEDULING/TRAINING, SQUADRON OPERATIONS, WING HQ (OPS)

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
1C	UNIT MISSION	3	5	90
1E	UNIT OPERATIONS IDENTIFIER	23	1	138
8A	RESOURCE TYPE NEEDED FOR A TASK	23	11	1518
8B	TASK TYPE SET IDENTIFIER	23	1	138
8D	RESOURCE PRIORITY	4	35	840
8E	STANDARD QUANTITY OF RESOURCE REQUIRED	4	1100	26400
9A	TASK TYPE	18	100	10800
9B	TASK PRIORITY	4	100	2400
9C	TASK TYPE EXECUTION TIME	4	1	24
9E	TASK PERIOD FROM DAY	4	20	480
9F	TASK PERIOD TO DAY	4	20	480
11A	AIRCRAFT UNIT NAME	10	4	240
11B	AIRCRAFT SERIAL NUMBER	4	80	1920
11C	AIRCRAFT MDS	7	4	168
11E	AIRCRAFT OPERATIONAL STATUS	8	7	336
11F	AIRCRAFT OPERATIONAL STATUS REMARKS	80	80	38400
11G	AIRCRAFT LOCATION	4	80	1920
11H	AIRCRAFT ETIC	5	80	2400
11K	AIRCRAFT TANK CONFIGURATION	1	80	480
11L	AIRCRAFT STATION STATUS	3	4	72
11M	AIRCRAFT PRESELECT INDICATOR	4	80	1920
11N	AIRCRAFT GENERATION FACTOR	4	80	1920
11P	AIRCRAFT TAIL NUMBER	5	80	2400
12A	AIRMAN LAST NAME	16	216	20736
12B	AIRMAN UNIT NAME	8	3	144
12C	AIRMAN AVAILABILITY STATUS	1	216	1296
12D	AIRMAN CREW DAY START	5	216	6480
12F	AIRMAN STATUS REMARKS	80	216	103680
12G	AIRMAN RANK	5	216	6480
12H	AIRMAN ETR	11	216	14256
12I	AIRMAN CREW POSITION	3	5	90
12J	AIRMAN DUTY STATUS	5	10	300
12K	AIRMAN ATTACHED UNIT NAME	10	3	180
12L	AIRMAN ASSIGNMENT TYPE	2	216	2592
12M	AIRMAN EXPECTED MR DATE	5	216	6480
12N	AIRMAN DUTY STATUS QUALIFIER	2	216	2592
13A	UNIT NAME OWNING RESOURCE	10	1	60
13B	RESOURCE DESIGNATOR	20	54	6480
13C	RESOURCE AUTHORIZED AMOUNT	4	54	1296
13D	RESOURCE SET IDENTIFIER	23	1	138
13E	RESOURCE LAST INVENTORY DATE	7	54	2268
13G	RESOURCE ASSIGNED AMOUNT	4	54	1296
13H	RESOURCE CURRENT AMOUNT	4	54	1296
13I	RESOURCE CURRENT OFF BASE AMOUNT	4	54	1296
13J	BASE NAME - UNIT'S RESOURCE LOCATION	15	5	450
13M	RESOURCE POSSESSED TOTAL	4	54	1296
13P	AIRCREWS MR	4	2	48
13R	H_EXPENDED SUPPLY	4	30	720
13S	RESOURCE CURRENT BUILT AMOUNT	4	30	720
13T	H_OFF BASE AMOUNT	4	30	720
13U	RESOURCE REMARKS1	30	30	5400
13V	RESOURCE SUPPLY CRITICAL LEVEL	4	30	720

WING AND SQUADRON SCHEDULING/TRAINING, SQUADRON OPERATIONS, WING HQ (OPS) (Continued)

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
13W	RESOURCE TOTAL CURRENTLY AVAILABLE	4	30	720
13X	RESOURCE SUPPLY DAYS REMAINING	4	30	720
13Y	RESOURCE DAILY EXPENDITURE RATE	4	30	720
13Z	RESOURCE SUPPLY DAYS UNTIL CRITICAL	4	30	720
15C	MISSION NUMBER	7	250	10500
15D	PRIMARY MISSION TYPE ASSIGNED	5	5	150
15E	MISSION UNIT NAME	10	3	180
15F	MISSION NUMBER OF AIRCRAFT	4	250	6000
15G	MISSION START TIME OVER TARGET	5	250	7500
15H	MISSION STOP TIME OVER TARGET	5	250	7500
15L	SUPPORT MISSION NUMBER	7	250	10500
15N	MISSION TARGET DESCRIPTION	15	250	22500
150	MISSION PRIORITY	4	250	6000
150	MISSION PRIORITY	4	0	0
15U	MISSION TURN BACK FLAG	1	250	1500
15V	MISSION REMARKS	60	250	90000
15W	MISSION TASKED MUNITION CODE	6	250	9000
20H	RESOURCE SUPPLY IDENTIFIER	23	1	138
50A	SORTIE SEQUENCE NUMBER	4	375	9000
50D	SORTIE ASSIGNED TAKE-OFF TIME	5	375	11250
50E	SORTIE EXPECTED LAND TIME	5	375	11250
50P	SORTIE AIRCREW SHOW TIME	5	375	11250
50Q	SORTIE AIRCREW COMPLETION TIME	5	375	11250
50S	SORTIE MISSION AIRCRAFT MDS	7	4	168
53A	BASE NAME	15	5	450
53D	BASE OPERATIONAL STATUS	3	5	90
53E	BASE NBC STATUS	3	5	90
53F	BASE ETIC	11	5	330
53G	BASE STATUS REMARKS	140	5	4200
53H	BASE STATUS AS OF DTG	10	5	300
54A	ORDER IDENTIFIER	23	1	138
54A	ORDER IDENTIFIER	23	4	552
54E	ORDER DATE	7	1	42
54G	ORDER CHANGE NUMBER	4	1	24
54K	ORDER CLASSIFICATION	21	1	126
54Q	NUMBER OF DAYS TO RUN SGM MODEL	4	10	240
54R	SORTIE GENERATION MODEL RUN REMARKS	45	10	2700
56A	TASKED UNIT NAME	10	1	60
56D	UNIT ORDER IDENTIFICATION	23	1	138
56E	BASE NAME - UNIT EMPLOYMENT LOCATION	15	1	90
56F	UNIT EMPLOYMENT DAY	5	1	30
56G	T UNIT DAILY SORTIE TASK	4	60	1440
56J	UNIT PLANNED SORTIE DURATION	4	60	1440
56K	UNIT SHIFT DURATION	4	60	1440
56L	UNIT FLY DAY NUMBER	4	60	1440
56M	T_UNIT DAILY RESOURCE QUANTITY TASKED	4	60	1440
59B	UNIT NAME	7	1	42
59C	UNIT TURN TIME FOR ORDER	4	20	480
59D	PERIOD START DAY FOR UNIT'S PIECE OF ORDER	4	20	480
59E	PERIOD END DAY FOR UNIT'S PIECE OF ORDER	4	20	480
59F	UNIT MAINT ATTRIT RATE FOR ORDER	4	20	480
59G	MISSION TYPE	5	5	150

WING AND SQUADRON SCHEDULING/TRAINING, SQUADRON OPERATIONS, WING HQ (OPS) (Continued)

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
59H	UNIT AIRCRAFT REPAIR RATE FOR ORDER	4	20	480
59I	UNIT MIN TIME BETWEEN TAKEOFFS	4	20	480
59J	UNIT COMBAT ATTRIT RATE FOR ORDER	4	20	480
59K	SORTIES PER DAY	4	20	480
59L	MISSION PRIORITY	4	5	120
59N	PRIMARY RESOURCE TYPE	6	30	1080
61A	AIRMAN LAST NAME - POSSESSOR OF SKILL	16	216	20736
61B	SKILL IDENTIFIER - SKILL POSSESSED	3	20	360
61C	SKILL LEVEL	1	10	60
61D	SKILL IDENTIFIER - RESOURCE	13	20	1560
71A	ORDER IDENTIFIER	23	1	138
71B	TASK PERIOD START DAY	4	20	480
71C	TASK PERIOD END DAY	4	20	480
71D	RESOURCE TYPE REQUIRED FOR TOTAL ORDER	20	38	4560
71E	RESOURCE QUANTITY REQUIRED FOR TOTAL ORDER	4	2280	54720
71F	SORTIE AIRCRAFT RATE	4	180	4320
71G	SORTIE DURATION	4	300	7200
73A	UNIT NAME - FOR TASKED UNIT	10	1	60
73C	RESOURCE TYPE SUPPORTING UNIT TASK	4	38	912
73D	T_UNIT DAILY RESOURCE SORTIE CAPABILITY	4	2280	54720
73F	T_UNIT DAILY RESOURCE QUANTITY CAPABLE	4	2280	54720
73L	UNIT RESOURCE AMOUNT TASKED	4	2280	54720
74A	TASKED UNIT NAME	10	1	60
74B	RESOURCE TYPE IN UNIT'S TASKING PIECE	20	38	4560
74D	RESOURCE QUANTITY REQUIRED FOR TASK TYPE IN UNIT'S PIECE OF ORDER	4	190	4560
74G	FLY DAY WAVE	4	5	120
74J	DAILY TOTAL SORTIE RESOURCES PRODUCED	4	10200	244800
88C	QUANTITY OF TYPE IN STATUS	4	80	1920
88D	RESOURCE TYPE OF UNIT'S SUPPLY IN STATUS	20	54	6480
89N	FLY DAY START	5	20	600
89O	SHIFT PERCENT FORMED AIRCREW	4	40	960
89P	FLY DAY DURATION	2	20	240
89Q	SHIFT START TIME	5	40	1200
96B	RESOURCE NAME	23	7	966
96C	RESOURCE STATUS	3	7	126
96D	RESOURCE ETIC	11	7	462
96E	RESOURCE REMARKS	4	0	0

TOTAL DATA SIZE = 1062342

TOTAL OPERATIONAL DATABASE SIZE = 2464633

SOFTECH

SUPPLY

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
1F	UNIT SHORT NAME	8	4	192
5A	RESOURCE TYPE	20	42	5040
5E	RESOURCE UNITS OF MEASURE	8	5	240
11A	AIRCRAFT UNIT NAME	10	4	240
11B	AIRCRAFT SERIAL NUMBER	4	80	1920
11C	AIRCRAFT MDS	7	4	168
11E	AIRCRAFT OPERATIONAL STATUS	8	7	336
11F	AIRCRAFT OPERATIONAL STATUS REMARKS	80	80	38400
11G	AIRCRAFT LOCATION	4	80	1920
11H	AIRCRAFT ETIC	5	80	2400
11K	AIRCRAFT TANK CONFIGURATION	1	80	480
11L	AIRCRAFT STATION STATUS	3	4	72
11M	AIRCRAFT PRESELECT INDICATOR	4	80	1920
11N	AIRCRAFT GENERATION FACTOR	4	80	1920
11P	AIRCRAFT TAIL NUMBER	5	80	2400
13A	UNIT NAME OWNING RESOURCE	10	1	60
13B	RESOURCE DESIGNATOR	20	54	6480
13C	RESOURCE AUTHORIZED AMOUNT	4	54	1296
13G	RESOURCE ASSIGNED AMOUNT	4	54	1296
13H	RESOURCE CURRENT AMOUNT	4	54	1296
13I	RESOURCE CURRENT OFF BASE AMOUNT	4	54	1296
13M	RESOURCE POSSESSED TOTAL	4	54	1296
20A	UNIT NAME OF SUPPLY OWNER AT THIS LOCATION	10	1	60
20B	RESOURCE TYPE OF SUPPLY AT THIS LOCATION	20	54	6480
20C	SUPPLY LOCATION TYPE	15	2	180
20D	SUPPLY LOCATION NUMBER	12	92	6624
20E	SUPPLY LOCATION RESOURCE CAPACITY	4	12	288
20F	T_SUPPLY LOCATION RESOURCE INVENTORY	4	12	288
20G	SUPPLY LOCATION RESOURCE INVENTORY DATE	7	12	504
20J	STORAGE CONTAINER SERVICEABILITY	15	12	1080
20K	STORAGE CONTAINER ETIC	12	12	864
20L	STORAGE CONTAINER REMARKS	15	12	1080
39A	OWNING RESOURCE DESIGNATOR	20	25	3000
39B	SUBORDINATE RESOURCE DESIGNATOR	20	54	6480
53A	BASE NAME	15	5	450
53D	BASE OPERATIONAL STATUS	3	5	90
53E	BASE NBC STATUS	3	5	90
53F	BASE ETIC	11	5	330
53G	BASE STATUS REMARKS	140	5	4200
53H	BASE STATUS AS OF DTG	10	5	300
88C	QUANTITY OF TYPE IN STATUS	4	80	1920
92A	REQUISITION RESOURCE TYPE	20	20	2400
92B	DUE-OUT REQUISITION NUMBER	14	20	1680
92C	DUE-IN REQUISITION NUMBER	14	20	1680
92D	MICAP START DATE	11	20	1320
92E	NUMBER OF MICAP DAYS	4	20	480
92F	REQUISITION CAUSE CODE	1	20	120
92G	REQUISITION ROUTE ID	3	20	360
92H	REQUISITION REMARKS	30	20	3600
92J	REQUISITION UNIT NAME	10	20	1200
96B	RESOURCE NAME	23	7	966
96C	RESOURCE STATUS	3	7	126

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
96D	RESOURCE ETIC	11	7	462
96E	RESOURCE REMARKS	4	0	0

TOTAL DATA SIZE = 119370

TOTAL OPERATIONAL DATABASE SIZE = 225609

SOFTECH

WING OPERATIONS CENTER

(CSS, LRC, PRC, SRC, SR. BATTLESTAFF, MISSION DIRECTOR, FRAG SHOP) (WOC)

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
1C	UNIT MISSION	3	5	90
1E	UNIT OPERATIONS IDENTIFIER	23	1	138
1F	UNIT SHORT NAME	[illegible]	4	192
5A	RESOURCE TYPE	20	42	5040
5E	RESOURCE UNITS OF MEASURE	8	5	240
8A	RESOURCE TYPE NEEDED FOR A TASK	23	11	1518
8B	TASK TYPE SET IDENTIFIER	23	1	138
8D	RESOURCE PRIORITY	4	35	840
8E	STANDARD QUANTITY OF RESOURCE REQUIRED	4	1100	26400
9A	TASK TYPE	18	100	10800
9B	TASK PRIORITY	4	100	2400
9C	TASK TYPE EXECUTION TIME	4	1	24
9E	TASK PERIOD FROM DAY	4	20	480
9F	TASK PERIOD TO DAY	4	20	480
11A	AIRCRAFT UNIT NAME	10	4	240
11B	AIRCRAFT SERIAL NUMBER	4	80	1920
11C	AIRCRAFT MDS	7	4	168
11E	AIRCRAFT OPERATIONAL STATUS	8	7	336
11F	AIRCRAFT OPERATIONAL STATUS REMARKS	80	80	38400
11G	AIRCRAFT LOCATION	4	80	1920
11H	AIRCRAFT ETIC	5	80	2400
11K	AIRCRAFT TANK CONFIGURATION	1	80	480
11L	AIRCRAFT STATION STATUS	3	4	72
11M	AIRCRAFT PRESELECT INDICATOR	4	80	1920
11N	AIRCRAFT GENERATION FACTOR	4	80	1920
11P	AIRCRAFT TAIL NUMBER	5	80	2400
12A	AIRMAN LAST NAME	16	216	20736
12B	AIRMAN UNIT NAME	8	3	144
12C	AIRMAN AVAILABILITY STATUS	1	216	1296
12D	AIRMAN CREW DAY START	5	216	6480
12F	AIRMAN STATUS REMARKS	80	216	103680
12G	AIRMAN RANK	5	216	6480
12H	AIRMAN ETR	11	216	14256
12I	AIRMAN CREW POSITION	3	5	90
12J	AIRMAN DUTY STATUS	5	10	300
12K	AIRMAN ATTACHED UNIT NAME	10	3	180
12L	AIRMAN ASSIGNMENT TYPE	2	5	60
12M	AIRMAN EXPECTED MR DATE	5	216	6480
12N	AIRMAN DUTY STATUS QUALIFIER	2	10	120
13A	UNIT NAME OWNING RESOURCE	10	1	60
13B	RESOURCE DESIGNATOR	20	54	6480
13C	RESOURCE AUTHORIZED AMOUNT	4	54	1296
13D	RESOURCE SET IDENTIFIER	23	1	138
13E	RESOURCE LAST INVENTORY DATE	7	54	2268
13G	RESOURCE ASSIGNED AMOUNT	4	54	1296
13H	RESOURCE CURRENT AMOUNT	4	54	1296
13I	RESOURCE CURRENT OFF BASE AMOUNT	4	54	1296
13J	BASE NAME - UNIT'S RESOURCE LOCATION	15	5	450
13M	RESOURCE POSSESSED TOTAL	4	54	1296
13N	RESOURCE ROLL-UP DTG	13	3	234
13O	RESOURCE TRANSMIT DTG	13	3	234
13P	AIRCREWS MR	4	2	48

SOFTECH

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
13Q	AIRCRAFT MC	4	2	48
13R	H_EXPENDED SUPPLY	4	30	720
13S	RESOURCE CURRENT BUILT AMOUNT	4	30	720
13T	H_OFF BASE AMOUNT	4	30	720
13U	RESOURCE REMARKS1	30	30	5400
13V	RESOURCE SUPPLY CRITICAL LEVEL	4	30	720
13W	RESOURCE TOTAL CURRENTLY AVAILABLE	4	30	720
13X	RESOURCE SUPPLY DAYS REMAINING	4	30	720
13Y	RESOURCE DAILY EXPENDITURE RATE	4	30	720
13Z	RESOURCE SUPPLY DAYS UNTIL CRITICAL	4	30	720
15C	MISSION NUMBER	7	250	10500
15D	PRIMARY MISSION TYPE ASSIGNED	5	5	150
15E	MISSION UNIT NAME	10	3	180
15F	MISSION NUMBER OF AIRCRAFT	4	250	6000
15G	MISSION START TIME OVER TARGET	5	250	7500
15H	MISSION STOP TIME OVER TARGET	5	250	7500
15L	SUPPORT MISSION NUMBER	7	250	10500
15N	MISSION TARGET DESCRIPTION	15	250	22500
15O	MISSION PRIORITY	4	250	6000
15O	MISSION PRIORITY	4	0	0
15O	MISSION PRIORITY	4	0	0
15U	MISSION TURN BACK FLAG	1	250	1500
15V	MISSION REMARKS	60	250	90000
15W	MISSION TASKED MUNITION CODE	6	250	9000
20A	UNIT NAME OF SUPPLY OWNER AT THIS LOCATION	10	1	60
20B	*RESOURCE TYPE OF SUPPLY AT THIS LOCATION*	20	54	6480
20C	SUPPLY LOCATION TYPE	15	2	180
20D	SUPPLY LOCATION NUMBER	12	92	6624
20E	SUPPLY LOCATION RESOURCE CAPACITY	4	12	288
20F	T_SUPPLY LOCATION RESOURCE INVENTORY	4	12	288
20G	SUPPLY LOCATION RESOURCE INVENTORY DATE	7	12	504
20H	RESOURCE SUPPLY IDENTIFIER	23	1	138
20J	STORAGE CONTAINER SERVICEABILITY	15	12	1080
20K	STORAGE CONTAINER ETIC	12	12	864
20L	STORAGE CONTAINER REMARKS	15	12	1080
39A	OWNING RESOURCE DESIGNATOR	20	25	3000
39B	SUBORDINATE RESOURCE DESIGNATOR	20	54	6480
50A	SORTIE SEQUENCE NUMBER	4	375	9000
50D	SORTIE ASSIGNED TAKE-OFF TIME	5	375	11250
50E	SORTIE EXPECTED LAND TIME	5	375	11250
50F	SORTIE AIRCREW SHOW TIME	5	375	11250
50Q	SORTIE AIRCREW COMPLETION TIME	5	375	11250
50S	SORTIE MISSION AIRCRAFT MDS	7	4	168
53A	BASE NAME	15	5	450
53D	BASE OPERATIONAL STATUS	3	5	90
53E	BASE NBC STATUS	3	5	90
53F	BASE ETIC	11	5	330
53G	BASE STATUS REMARKS	140	5	4200
53H	BASE STATUS AS OF DTG	10	5	300
54A	ORDER IDENTIFIER	23	1	138
54E	ORDER DATE	7	1	42
54G	ORDER CHANGE NUMBER	4	1	24

WING OPERATIONS CENTER
(CSS, LRC, PRC, SRC, SR. BATTLESTAFF, MISSION DIRECTOR, FRAG SHOP)
(WOC) (Continued)

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
54K	ORDER CLASSIFICATION	21	1	126
54Q	NUMBER OF DAYS TO RUN SGM MODEL	4	10	240
54R	SORTIE GENERATION MODEL RUN REMARKS	45	10	2700
56A	TASKED UNIT NAME	10	1	60
56D	UNIT ORDER IDENTIFICATION	23	1	138
56E	BASE NAME - UNIT EMPLOYMENT LOCATION	15	1	90
56F	UNIT EMPLOYMENT DAY	5	1	30
56G	T UNIT DAILY SORTIE TASK	4	60	1440
56H	T UNIT DAILY INTEGRATED SORTIE CAPABILITY	4	60	1440
56J	UNIT PLANNED SORTIE DURATION	4	60	1440
56K	UNIT SHIFT DURATION	4	60	1440
56L	UNIT FLY DAY NUMBER	4	60	1440
56M	T_UNIT DAILY RESOURCE QUANTITY TASKED	4	60	1440
59B	UNIT NAME	7	1	42
59C	UNIT TURN TIME FOR ORDER	4	20	480
59D	PERIOD START DAY FOR UNIT'S PIECE OF ORDER	4	20	480
59E	PERIOD END DAY FOR UNIT'S PIECE OF ORDER	4	20	480
59F	UNIT MAINT ATTRIT RATE FOR ORDER	4	20	480
59G	MISSION TYPE	5	5	150
59H	UNIT AIRCRAFT REPAIR RATE FOR ORDER	4	20	480
59I	UNIT MIN TIME BETWEEN TAKEOFFS	4	20	480
59J	UNIT COMBAT ATTRIT RATE FOR ORDER	4	20	480
59K	SORTIES PER DAY	4	20	480
59L	MISSION PRIORITY	4	5	120
59N	PRIMARY RESOURCE TYPE	6	30	1080
61A	AIRMAN LAST NAME - POSSESSOR OF SKILL	16	216	20736
61B	SKILL IDENTIFIER - SKILL POSSESSED	3	20	360
61C	SKILL LEVEL	1	10	60
61D	SKILL IDENTIFIER - RESOURCE	13	20	1560
71A	ORDER IDENTIFIER	23	1	138
71B	TASK PERIOD START DAY	4	20	480
71C	TASK PERIOD END DAY	4	20	480
71D	RESOURCE TYPE REQUIRED FOR TOTAL ORDER	20	38	4560
71E	RESOURCE QUANTITY REQUIRED FOR TOTAL ORDER	4	2280	54720
71F	SORTIE AIRCRAFT RATE	4	180	4320
71G	SORTIE DURATION	4	300	7200
73A	UNIT NAME - FOR TASKED UNIT	10	1	60
73C	RESOURCE TYPE SUPPORTING UNIT TASK	4	38	912
73D	T_UNIT DAILY RESOURCE SORTIE CAPABILITY	4	2280	54720
73F	T_UNIT DAILY RESOURCE QUANTITY CAPABLE	4	2280	54720
73L	UNIT RESOURCE AMOUNT TASKED	4	2280	54720
74A	TASKED UNIT NAME	10	1	60
74B	RESOURCE TYPE IN UNIT'S TASKING PIECE	20	38	4560
74D	RESOURCE QUANTITY REQUIRED FOR TASK TYPE IN UNIT'S PIECE OF ORDER	4	190	4560
74G	FLY DAY WAVE	4	5	120
74J	DAILY TOTAL SORTIE RESOURCES PRODUCED	4	10200	244800
88C	QUANTITY OF TYPE IN STATUS	4	80	1920
88D	RESOURCE TYPE OF UNIT'S SUPPLY IN STATUS	20	54	6480
89N	FLY DAY START	5	20	600
89O	SHIFT PERCENT FORMED AIRCREW	4	40	960
89P	FLY DAY DURATION	2	20	240
89Q	SHIFT START TIME	5	40	1200

WING OPERATIONS CENTER

(CSS, LRC, PRC, SRC, SR. BATTLESTAFF, MISSION DIRECTOR, FRAG SHOP)

(WOC) (Continued)

APPEARANCE NUMBER	APPEARANCE NAME	SIZE	QUANTITY	TOTAL SIZE
92A	REQUISITION RESOURCE TYPE	20	20	2400
92B	DUE-OUT REQUISITION NUMBER	14	20	1680
92C	DUE-IN REQUISITION NUMBER	14	20	1680
92D	MICAP START DATE	11	20	1320
92E	NUMBER OF MICAP DAYS	4	20	480
92F	REQUISITION CAUSE CODE	1	20	120
92G	REQUISITION ROUTE ID	3	20	360
92H	REQUISITION REMARKS	30	20	3600
92J	REQUISITION UNIT NAME	10	20	1200
96B	RESOURCE NAME	23	7	966
96C	RESOURCE STATUS	3	7	126
96D	RESOURCE ETIC	11	7	462
96E	RESOURCE REMARKS	4	0	0

TOTAL DATA SIZE = 1103982

TOTAL OPERATIONAL DATABASE SIZE = 2947631

Change 1
CDRL 0012
September 1985

AIR FORCE INTEGRATED READINESS MEASUREMENT SYSTEM (AFIRMS)

WING DATABASE SPECIFICATION

FINAL

Page Insert Changes:

REMOVE	DATE	INSERT
1-11, 1-12	31 May 1985	1-11/CHG1, 1-12
2-3, 2-4	31 May 1985	2-3/CHG1, 2-4
Appendix A	31 May 1985	Appendix A/CHG1
Appendix B	31 May 1985	Appendix B/CHG1

AF-007

SOFTECH

END
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