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ABSTRACT

The objective of the unified database (UDB) program was to develop an automated information system that would be useful in the design, development, testing, and support of new Air Force aircraft weapon systems. Primary emphasis was on the development of: (1) a historical logistics data repository system to provide convenient and timely access to relevant information about existing aircraft weapon systems; (2) a fully automated logistics support analysis record system that would satisfy current Air Force and Department of Defense requirements; and (3) an overall UDB system to function as a closed-loop system for use throughout the life of a weapon system. This report summarizes the accomplishments of the UDB program and major UDB system features and capabilities. Report sections describe project background; the UDB concept and objectives; the Automated Logistics Support Analysis Record (ALSAR) system, which has been fully developed and partially tested using HH-60 helicopter data; the current development status of the prototype Aircraft Characteristics Data File (ACDF), which will contain historical data on aircraft weapon systems; related studies of the Air Force Operational Test and Evaluation Center (AFOTEC) requirements for a new weapon system and of combat data sources; and conclusions and recommendations for future UDB development. A four-item bibliography, a list of abbreviations, and sample ALSAR data sheets and ACDF online data screens are also provided. (Author/ESR)

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AIR FORCE

HUMAN RESOURCES

UNIFIED DATABASE DEVELOPMENT PROGRAM

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The objective of the unified database (UDB) program was to develop an automated system that would be useful to those responsible for the design, development, testing, and support a new Air Force aircraft weapon system. Primary emphasis was on (a) development of an historical logistics data repository system to provide convenient and timely access to relevant information about existing aircraft weapon systems, (b) development of a fully automated logistics support analysis record system that would satisfy current Air Force and Department of Defense requirements, and (c) develop the overall UDB system to function as a closed-loop system for use throughout the life of a weapon system. This report summarizes the accomplishments of the UDB program to date and describes the major features and capabilities of the UDB system.

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SUMMARY

Objectives

The objectives were to provide a logistics database structure that p[illegible]ctical use of historical and current logistics information. The structure was to be tested for its use in facilitating [illegible]nce of logistics factors upon weapon system design.

Background

The Air Force is concerned with the lack of adequate logistics consideration during the weapon system design process. To produce a weapon system with optimal cost and mission effectiveness, logistics factors must be considered very early and throughout the system design and acquisition process. Recent DoD Standards and Instructions have indicated a strong commitment to consider logistics as an integral part of the weapon system design activity.

The logistics information system available to the designer and logistician must be adequate. Yet, for many years large amounts of logistics information and data have been collected and processed on many different weapon systems, but this was done mainly to improve the capability of existing weapon systems and the information systems were structured to support that end. The existing logistics systems do not provide timely responses to requests for information or data, there is no traceability to the data origin, and in many instances the data are neither consistent nor accurate to the degree that is required to support weapon system design. The Unified Data Base (UDB) program was formulated to address these issues.

Approach

The UDB development program was conducted in three phases. In the first phase, the detailed definitions, specifications, standards, formats, and computer flow charting were addressed and completed. In accordance with published DoD guidance, the UDB elements were based on Military Standard (MIL-STD) 1388-2. Additional elements were added to allow for the feedback of historical operational logistics information and to address additional data needs associated with common logistics support analysis techniques. The UDB was programmed for computer application during the second phase. The third phase consisted of the demonstration, testing, and further de-bugging of the UDB using two acquisition programs as test vehicles.

Specifics

This UDB development program continued building on the results of a previous program that established the need for additional data elements beyond those outlined in MIL-STD-1388-2 and on the results of the Tri-Services Logistics Support Analysis Record (LSAR) Working Group (which continuously reviews the logistics data needs and requirements of all the Services). Specifically, the automated LSAR requirements and the various logistics-related Contract Definition Requirements List (CDRL) items associated with the C-X procurement activity were closely reviewed.

The UDB can be accessed via computer terminals, by punched card input, or by high speed printers (batch processes). About 70 different computer terminal formats (screens) were designed to permit very efficient and timely input, update, access, deletion, etc. of logistics information for any weapon system program. Large amounts of data input, standard output reports, summarizations, and CDRL items are best handled via batch processes. Ample subsets of the data can be safeguarded from unauthorized updating, inputting, deleting, reading, etc. Audit trails are maintained as to who input, read, updated, etc. the information and when and where it occurred.

The UDB was tested and demonstrated using the HH-60 helicopter and the B-1B aircraft acquisition programs. The historical-information side of the UDB was demonstrated on the HH-60 using previously generated data from the Army. Some standard summary reports were generated by the UDB from this data. No potential HH-60 problem areas were discovered. The current logistics information side of the UDB is being demonstrated on the B-1B program. B-1B defensive avionics maintenance and training information for the operational, intermediate, and depot levels of maintenance are being entered into the UDB. The training and technical-manual functional areas retrieved this information via terminals from the UDB so that critical concerns could be relayed immediately to design for appropriate design consideration.

Conclusions and Recommendations

The objectives were attained. A logistics database structure, the UDB, was developed. Its practicality was demonstrated by using historical information on the HH-60 program and current information on the B-1B program. As a result of this UDB effort, both historical and current logistics information can now have more influence on the design of weapons systems.

It is recommended that the UDB be further expanded to incorporate more efficiently the Air Force Operational Test and Evaluation Center (AFOTEC) results into the UDB and, thereby, into the design activity. This expansion should build on the initial work by a contractor to outline the mapping between AFOTEC data and UDB data and to identify additional AFOTEC data needs that the UDB does not currently address. The UDB should also be expanded to interface more efficiently with computer-aided design (CAD) activities that are themselves becoming so predominate throughout the aerospace industry. Commonality of data elements between UDB and CAD databases should be identified, and processes to further introduce logistics factors into the CAD design activities should be defined.

PREFACE

This work was initiated by the Logistics and Human Factors Division, Air Force Human Resources Laboratory, Wright-Patterson Air Force Base, Ohio, under Project 1710, Weapon Systems Logistics and Combat Maintenance, Lt. Col. Joseph A. Birt, Project Scientist. Project 1710 addresses the planning, developing and managing of logistics support of Air Force Logistics and Combat Operations. The Work Unit was 1710-00-20, Unified Database for Weapons Systems Design. Work Unit 1710-00-20 develops logistics among logistics resources, systems design, and operational procedures.

Appreciation is extended to Dr. William B. Askren and to Mr. Russell M. Genet for their guidance and direction throughout this effort. Appreciation is also extended to the many individuals of the Air Force Logistics Command, Air Force Acquisition Logistics Division, and the Air Force Operational Test and Evaluation Center without whose assistance this work would not have been possible.

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SECTION I

BACKGROUND

POLICY

DIRECTIVES

The need for improved weapon system availability, supportability, and overall cost-effectiveness has been a continuing concern of the Department of Defense (DOD). DOD Directive (DODD) 5000.39, "Acquisition and Management of Integrated Logistics Support for Systems and Equipment," establishes important policy addressing this need. It defines management and technical activities to be accomplished throughout the weapon system acquisition process with emphasis on Integrated Logistics Support (ILS) and Logistics Support Analysis (LSA). Specifically, DODD 5000.39 stresses the need (a) to effectively utilize information about existing operational equipment to establish a Baseline Comparison System (BCS), (b) to integrate LSA activity into the overall system design process, (c) to establish and maintain a common, consistent Logistics Support Analysis Record (LSAR) used to support both ILS and Reliability and Maintainability (R&M) development efforts, and (d) to verify the LSAR during operational service of the weapon system.

MILITARY STANDARD (MIL-STD) 1388

Military Standard (MIL-STD) 1388 describes the LSA tasks to be accomplished during a system acquisition program to satisfy the objectives of DODD 5000.39. In addition, MIL-STD-1388 defines the LSAR needed to document the results of LSA. In 1973 the Army Development and Readiness Command (DARCOM) developed the LSAR Automated Data Processing (ADP) system to implement MIL-STD-1388. DARCOM Pamphlet 750-16 (DARCOM, 1979) is the governing document for the system.

Lack of LSA/LSAR standardization between service acquisition efforts led to the formation of a Joint Service LSA Working Group in November 1978. The working group's efforts were specifically directed toward standardization of the LSAR input data sheets and data element definitions. In June 1981, the working group effort resulted in a draft revision of MIL-STD-1388. In December 1981, the DARCOM Materiel Readiness Support Activity (MRSA) was assigned to DOD LSA Support Activity mission. This mission included the requirements to develop a MIL-STD on LSA documentation and a standard DOD LSAR ADP system. As a result, in June 1982, a draft MIL-STD-1388-2A was developed. A revised draft (MIL-STD-1388-2A, 1983) was carefully reviewed by industry representatives, and the approved version is expected to be published in May 1984.

Concurrent with development of MIL-STD-1388-2A, MRSA has been developing a DOD LSAR ADP system. At present, the concept for this system, written in American National Standard Institute (ANSI) COBOL, is for batch processing of input data resulting in sequential master files. The difference between the DOD LSAR ADP system and the DARCOM 750-16 ADP system is that the DOD system will accept all inputs at a single entry point, relieving the functional user from having to know which one of the five DARCOM ADP system programs to use for a given input.

PRODUCT PERFORMANCE FEEDBACK SYSTEM (PPFS)

On 27 September 1979, the Air Force issued Program Management Directive (PMD) L-Y9094(1) directing the definition and development of a Product Performance Feedback System (PPFS). The primary objective of the PPFS is to provide an historical data repository of design-related information about operational systems for use by system designers, analysts, and support planners involved in new weapon system and equipment acquisition programs. The PPFS will be automated to provide convenient and timely access to relevant design, reliability and maintainability (R&M) and support cost data to establish initially a baseline comparison system (BCS) for the new weapon system being developed. Once the new weapon system becomes operational, the PPFS will provide performance data feedback to those responsible for operation and support (O&S) throughout its life cycle.

UNIFIED DATABASE TECHNOLOGY

DEFINITION STUDY

During 1978-1979, the Logistics and Human Factors Division of the Air Force Human Resources Laboratory (AFHRL) conducted a study to define the requirements and establish a plan for development of an integrated system that would assist in satisfying the requirements and objectives stated in DODD 5000.39. This work by Thomas and Hankins (1979) and Thomas, Hankins and Newhouse (1980) resulted in a concept and development approach for the Unified Database (UDB) system. As conceived, the UDB addressed the requirements of DODD 5000.39, MIL-STD-1388, PPFS, and the specific Air Force requirements associated with ILS throughout the weapon system acquisition process.

UDB DEVELOPMENT

In January 1980 AFHRL began a three-phased effort to develop a prototype UDB system, with each phase lasting approximately 1 year. The objective of Phase I was to accomplish detailed definition and system level design of the UDB. The objective of Phase II was to develop the UDB. The objective of Phase III was to test and demonstrate the UDB. This UDB development effort was completed in March 1983. This report provides an overview of the UDB concept and summarizes the results of the development effort.

SECTION II

UDB CONCEPT

GENERAL

In this section the overall concept of the UDB is presented. It was necessary to have a global perspective of the UDB concept to insure that the "building blocks" were developed consistent with the overall objectives. The UDB development status will be covered in later sections of this report.

PURPOSE

The purpose of the UDB is to assist government and industry organizations in accomplishing the objectives of DODD 5000.39, MIL-STD-1388, current ILS reporting requirements typically imposed on Air Force acquisition programs, and PPFS.

OBJECTIVES

The primary objective of the UDB program is to develop an integrated system that will provide mechanisms (a) to establish and maintain an historical data repository of relevant information about operational weapon systems, (b) to enable convenient and timely access to the historical data repository and provide information in a useful form and content, (c) to assist in establishing a BCS for use in trade-off studies, analyses, and predictions about the new weapon system under development, (d) to assist in developing, managing, and utilizing a common LSAR throughout the acquisition process, (e) to provide convenient interfaces between LSAR and standard analytical models for predictive and planning purposes, (f) to update the LSAR with measured values during the Operational Test and Evaluation (OT&E) phase, (g) to validate the LSAR using operational field data during the O&S phase, and (h) to utilize the UDB as a means for product performance measurement and feedback.

CONCEPTUAL APPROACH

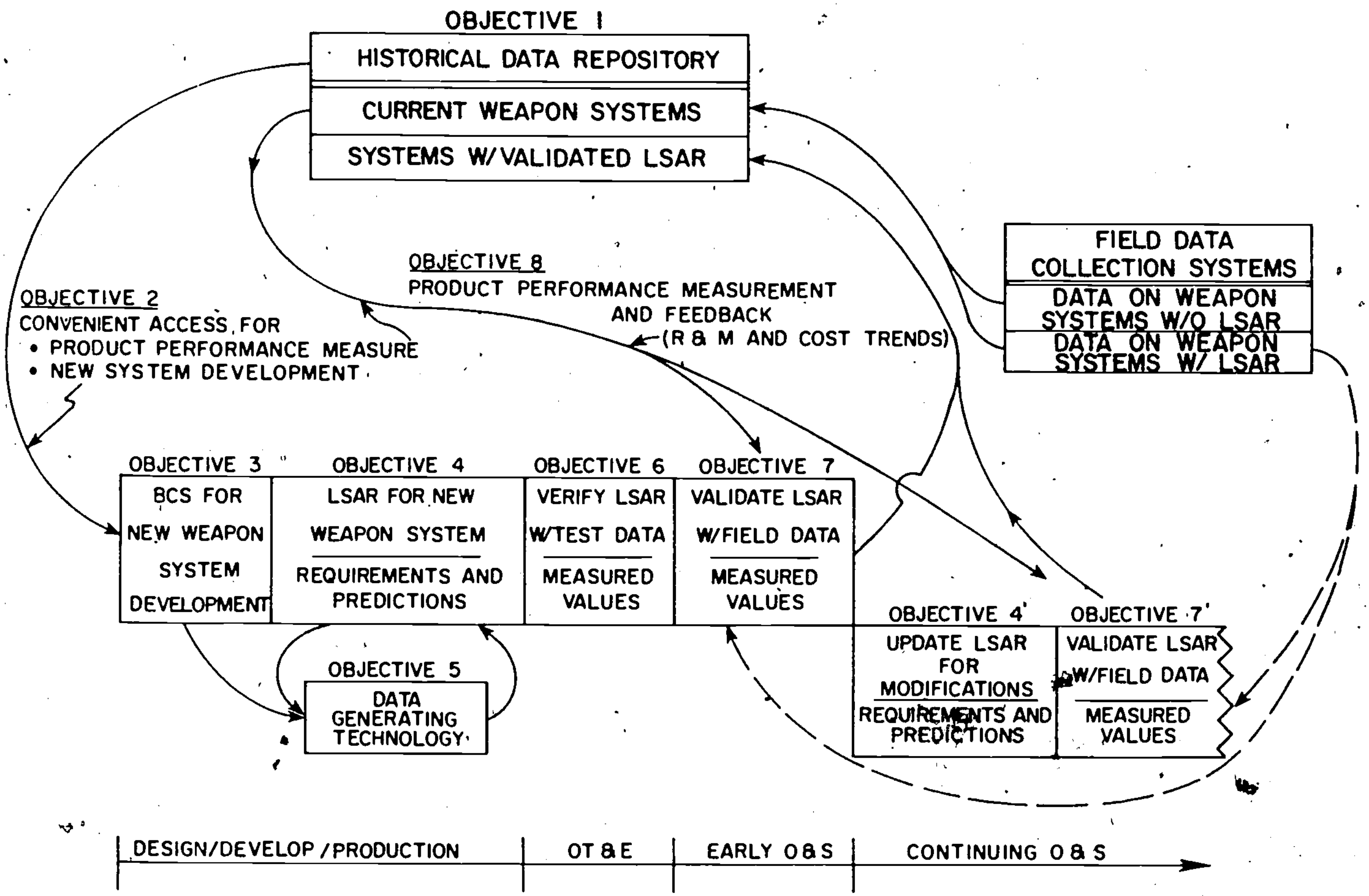
CLOSED-LOOP SYSTEM

In order to satisfy the UDB objectives optimally, a closed-loop system is needed to insure consistency and compatibility. Figure 1 shows the closed-loop nature of the UDB in terms of its objectives and the time-phased activities of the weapon system acquisition process.

Objective 1 - It was concluded early in this program (Thomas et al., 1980) that the Air Force should establish and maintain a central Historical Data Repository (HDR) for each major product category such as aircraft, missiles, and ground electronics. The HDR will contain design, R&M, and support cost information about operational weapon systems and equipment. In the future, as weapon systems are developed using the UDB concept, the HDR would contain validated LSAR for these systems.

The design data in the HDR for a given weapon system configuration would remain constant, while the R&M and support cost data would be periodically updated using existing field data collection systems such as the Maintenance Data Collection System (MDCS), Air Force Logistics Command (AFLC) DO-56 systems, and the Visibility and Management of Operational Support Cost (VAMOSC) system. If and when modifications to a current weapon system are made, the design data in the HDR will be changed to reflect the modification, and the corresponding R&M and support cost data in the HDR may be correlated to the modified design configuration. In this regard, maintenance of the HDR will be relatively difficult until such time that operational weapon systems populating the HDR are developed using the UDB concept, and therefore have an active LSAR. (This point will be discussed later under Objective 4.)

Objective 2 - The automated HDR will process input data, as appropriate, to create output information in the form and content desired by users. Information in the HDR will be stored on disk or on tape, as appropriate. Regardless of the data storage mechanism, the HDR will provide users



UDB IN WEAPON SYSTEM LIFE CYCLE

FIGURE 1

convenient and timely access to selected information via remote on-line cathode ray tube (CRT) terminals.

In the weapon system acquisition and support environment, convenient and timely access to relevant data is extremely important. If this capability is missing, the utility and cost-effectiveness of the HDR is severely compromised. There is simply little value in having an HDR loaded with valid and useful information if users cannot get it when they need it.

Objective 3 - The community of organizations involved with new weapon system acquisition programs would use the HDR to identify the BCS for the new weapon system under development. The BCS would be either a currently operational weapon system, or a composite system composed of equipment from two or more currently operational systems. Once the BCS is identified based on design characteristics, users would selectively retrieve R&M and support cost information from the HDR to serve as baseline of departure for the new weapon system.

The BCS would first be established at the top system level, then at the major subsystem levels, and finally at the component levels, as appropriate. A most convenient and useful feature would be to enable users to retrieve selected BCS information from the HDR in LSAR format for each desired level of indenture. Establishing the BCS in LSAR format would greatly assist the government in establishing system level availability and R&M requirements. It would be enormously helpful to industry for allocating system level requirements to major subsystems and lower indenture levels. Finally, it would greatly reduce the time and cost required to accomplish trade studies and analyses for obtaining predictions at all levels in the LSA/LSAR process. In addition to achieving substantial time and cost savings, such a BCS capability would greatly enhance the effectiveness of the ILS activity throughout the system acquisition process.

Achieving the capability to transform field data into comparable LSAR data, and vice-versa, is the key to creating a truly closed-loop UDB system. This capability will be totally achieved only if a mechanism is developed to resolve the basic incompatibilities between field data collection systems and the LSA/LSAR system requirements. The UDB achieves this by a set of transformation tables.

Objective 4 - When the user retrieves the BCS information on tape from the HDR in LSAR form and content, the automated LSAR (ALSAR) system of the UDB will enable the user to load the BCS. The BCS would be used to support the LSA activity for the new weapon system development program. The results of the LSA would be recorded in the LSAR for the new weapon system. The ALSAR will provide a cross-reference between the BCS and the new weapon system LSAR at each level of indenture, as applicable. This feature provides a convenient audit trail for future use.

Since the detailed LSA/LSAR must be accomplished by industry, the ALSAR will provide on-line and batch features to enhance systems engineering integration throughout the design, development, and production phases of the new weapon system acquisition process. The LSA/LSAR would be accomplished at the system and major subsystem levels early in the design/development process. As the preliminary and detailed design is expanded to lower indenture levels, the LSA/LSAR expands accordingly.

The ALSAR provides the mechanism to create, manage, and utilize a common, consistent LSAR database for the new weapon system to the lowest reparable level, and for all ILS elements. The ALSAR will machine generate standard output reports that satisfy most of the ILS related requirements associated with new weapon system acquisition programs. This automated feature will result in significant cost savings in report preparation and will enhance consistency and cost-effectiveness in planning and developing the required ILS elements.

It is envisioned that all required, allocated, and predicted values for the new weapon system LSAR would be recorded in the ALSAR by the end of the full-scale development phase. To be sure, however, the ALSAR would continue to be used throughout the production phase to reflect design modifications and assist in the development of ILS elements. Furthermore, the ALSAR would continue to be used during OT&E and O&S, but this will be discussed later.

Objective 5 - Standard models are available to assist in accomplishing LSA during the design and development of new weapon systems. The Network Repair Level Analysis (NRLA) Model and the Logistics Composite Model (LCOM) are examples of these important tools. The UDB should be designed to provide an interface mechanism between ALSAR and these standard models.

In Figure 1 this capability is shown as Data Generating Technology. While the current UDB has addressed this area, there is tremendous potential for future development to improve and enhance this capability. An important example is the interface between the HDR and ALSAR with computer-aided design and computer-aided manufacturing (CAD/CAM).

Objective 6 - The ALSAR will provide the capability to record allocated, predicted, and measured values for parameters required to determine the operational suitability and effectiveness of the new weapon system. Prior to OT&E the ALSAR will contain allocated and predicted values for the new weapon system LSAR. When the weapon system moves into the OT&E phase, measured values based on test results may be entered using the on-line or batch system of the ALSAR.

This ALSAR feature will enable the government and contractors to compare requirements, allocations, predictions, and measured results in a consistent and directly comparable manner. To the extent desired and applicable, comparison with the BCS could also be achieved. This capability will permit early identification of specific problem areas and permit problem resolution on a management-by-exception basis. This process will permit early verification of LSAR in areas where no problem areas exist.

Objective 7 - During the early O&S phase the existing field data collection and reporting systems (MDCS, D056, VAMOSC) will be used to validate the new weapon system LSAR. On the right side of Figure 1, a dashed-arrow is shown that implies that measured values for validation of the new weapon system LSAR are provided directly from the Field Data Collection Systems. Although this is not totally possible due to the incompatibility between the LSAR and the field data systems, as was mentioned in the discussion of the BCS under Objective 3 above, the UDB Transformation Tables make it possible to some degree.

At the beginning of the new weapon system program a BCS will be created and loaded into the ALSAR. When this new weapon system eventually moves into the early O&S phase, the UDB Transformation Tables will be used to process the field data collected on the newly fielded weapon system. Instead of creating a BCS, however, the output at this point will reflect measured values for appropriate LSAR parameters of the newly fielded weapon system. When this output is loaded into the ALSAR, the measured values derived from field data may be used to validate the LSAR for the newly fielded weapon system.

When the newly fielded weapon system LSAR is validated, this LSAR record will be loaded in the HDR for use by future weapon system development programs. This is shown in Figure 1 by the arrow leading from the validated LSAR (Objective 7) to the block in the HDR titled "Systems with Validated LSAR." Selected portions of the LSAR may be stored on disk, while other portions may be stored on magnetic tape. When this newly fielded weapon system, or any portion thereof, is used as the BCS for a future weapon system, a complete and validated LSAR will be available for the BCS. As the HDR is increasingly populated with weapon systems for which a Validated LSAR is available, the full potential value of the closed-loop UDB system will be realized.

Objective 8 - Another important function of the automated HDR will be to provide trend data for selected R&M and support cost parameters. This is shown in Figure 1 as product performance measurement and feedback to those responsible for continuing development (modifications), operation and support of a weapon system.

Again, the capability to accomplish this function totally will be dependent on the mechanisms discussed earlier to create the BCS and validate the LSAR for a new weapon system. As shown in Figure 1, the Field Data Collection Systems would supply information for currently operational systems; both those with and without the LSAR. The UDB would process these field data and calculate and capture trend data as a function of selected LSAR parameters over time/utilization. These trend data would be available to users via on-line command and displayed on CRT terminal screens or hard copy printout as shown by Objective 8 in Figure 1.

The rationale for utilizing the same mechanisms to create the BCS, validate the new weapon system LSAR, and supply trend data for the new weapon system during the O&S phase is straightforward. The R&M and support cost parameters of interest should and do remain applicable throughout the life cycle of a weapon system. In the beginning the baseline values are established, followed by requirements and allocated values. Next the predicted values are established during design, development, and production. In the OT&E phase, test results produce measured values to verify the predictions and identify problem areas. Finally, the field data collected in the O&S phase supplies measured values to validate the parameters of interest. These validated parameter values are then stored in the HDR and used as the BCS for future weapon system acquisition programs, as applicable. Using the same mechanisms to accomplish these functions is both practical and necessary to facilitate a consistent, compatible closed-loop UDB system.

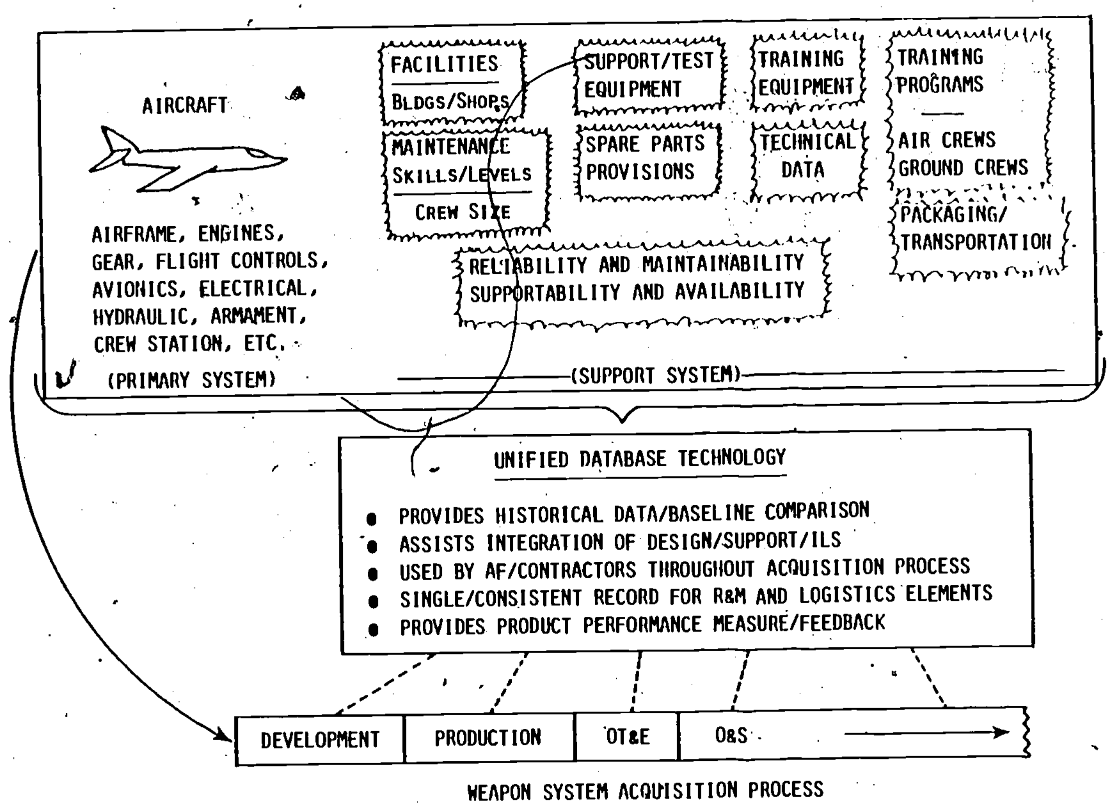
Objective 4' - A vitally important concept of the UDB is that the LSAR for a given weapon system will be maintained throughout its life cycle. During the design, development, and production phases, the ALSAR captures design information as part of the overall LSAR for a new weapon system. As the weapon system moves into OT&E and O&S, the measured values are used to verify and validate the LSAR as a function of its design characteristics, concept of employment, and concept of maintenance.

Figure 1 shows that those responsible for developing and supporting a new weapon system would continue to utilize the ALSAR to maintain the new weapon system LSAR throughout the O&S phase. During OT&E and/or early O&S, design-related problems may be identified that require modifications to the weapon system. When this occurs, LSA will be reaccomplished, as appropriate, and the LSAR will be updated to reflect the modified design configuration. Similarly, if and when changes to the operational and/or maintenance concepts for the weapon system are eminent, the LSA/LSAR will be updated to reflect these changes whether or not design modifications were also made.

Objective 7' - After modifications are incorporated in the weapon system, the ALSAR will again be used in conjunction with the HDR to validate the updated LSAR. This step would also be accomplished if only a change to the operational and/or maintenance concept was made. Once validated, the modified LSAR would be stored in the HDR for use on future programs. Trend data on R&M and support cost parameters would be provided for the modified weapon system on a continuing basis, as appropriate.

PROTOTYPE UDB APPROACH

Conceptually, the UDB could be used to support many types of DOD weapon systems and equipment. The UDB development effort was limited to Air Force requirements for aircraft weapon systems. Figure 2 portrays a total aircraft weapon system and how the UDB would be used by the Air Force and contractors throughout the acquisition process.



TOTAL AIRCRAFT WEAPON SYSTEM

FIGURE 2

INITIAL PLAN

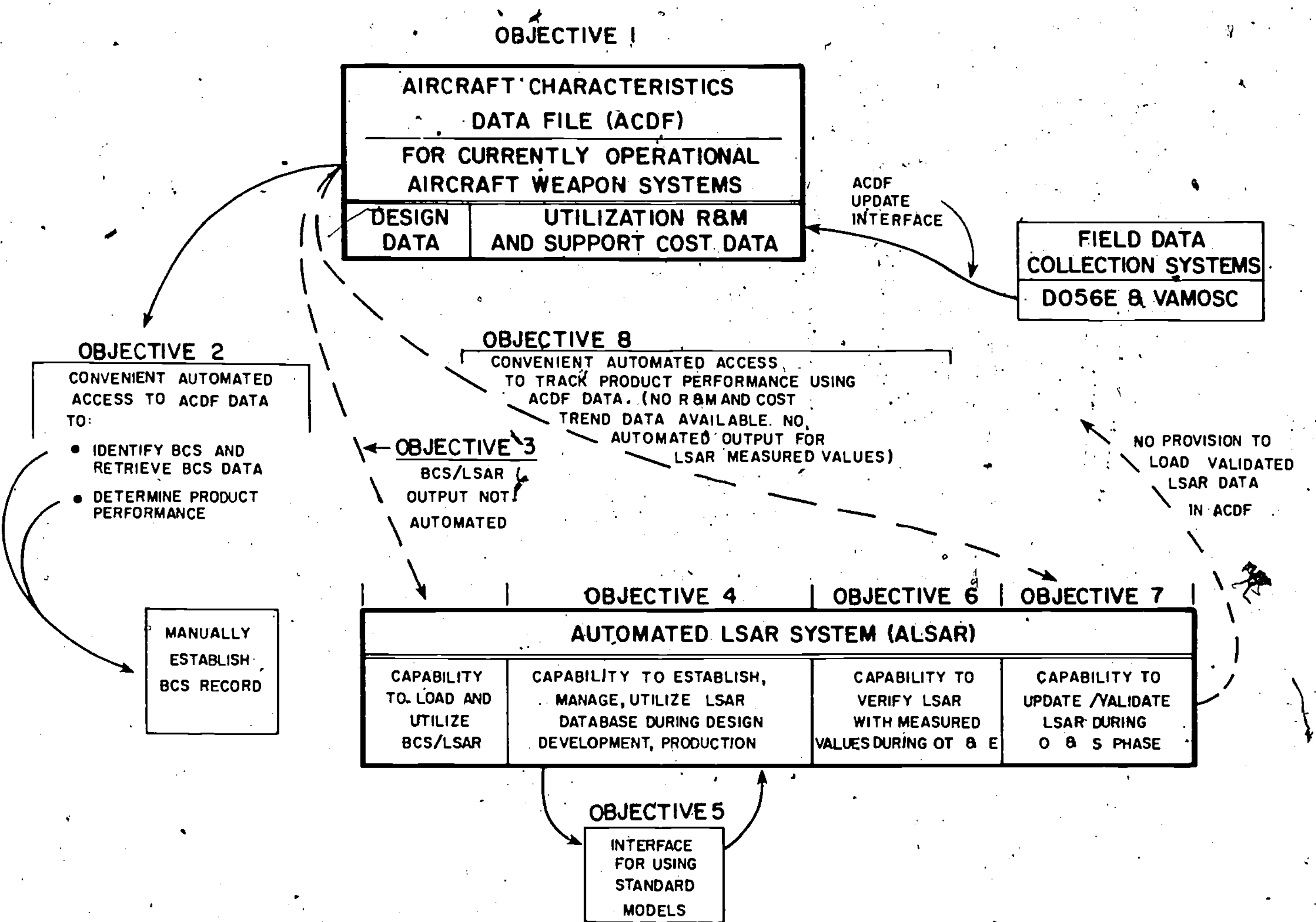
As discussed earlier, the ALSAR and HDR are the most important features of the closed-loop UDB concept. Given these features, the data generating technology would then be extremely useful in accomplishing LSA. The initial plan for the UDB effort was to focus primary attention on the HDR and data generating technology, and to use the DARCOM ADP/LSAR system to satisfy the requirements of ALSAR. A detailed study of the DARCOM system, however, revealed that it could not accommodate the UDB objectives for the ALSAR. Because the ALSAR is vitally important to the viability and utility of the overall UDB, primary emphasis was shifted to development of this fully automated LSAR system, with secondary emphasis on the HDR.

UDB FEATURES

Figure 3 shows in bold-lined boxes the two major features of the UDB system; the ALSAR and the Aircraft Characteristics Data File (ACDF). These features were developed so as to be consistent and compatible with the UDB system objectives discussed earlier in Figure 1 and shown in Figure 3. A discussion follows as to the degree to which these objectives were satisfied in the UDB development effort.

Objective 1 - The ACDF represents the HDR for currently operational aircraft weapon systems. For each mission, design, and series (MDS), the ACDF will contain design characteristics data and processed field data pertaining to utilization, R&M, and support cost parameters. Initial programs have been developed to process data from D056E and VAMOSC to update the ACDF.

Objective 2 - The automated ACDF provides convenient and selective access to data via remote on-line CRT terminal screens. This capability will assist users in determining the BCS for a new weapon system and selectively retrieving BCS information. Using the same capability, users may retrieve information from the ACDF to assist in determining the performance of products, in terms of R&M and support cost parameters.



PROTOTYPE UDB FEATURES
FIGURE 3

Objective 3 - The transformation tables necessary to relate field data to LSAR terms have been developed. As discussed earlier, this is a very important and needed capability; first, to permit establishment of a BCS/LSAR, and second, to permit validation of the new weapon system LSAR using existing field data collection systems. Development of this capability should be accomplished in future UDB efforts.

Users must manually create a BCS record using data elements and values currently retrievable from the ACDF. Using the BCS data retrieved from the ACDF, users may utilize the field-to-LSAR transformation tables for constructing manually BCS data that could be loaded in ALSAR.

Objectives 4-7 - The ALSAR system has been fully developed to satisfy Air Force requirements. A BCS may be loaded into the ALSAR and cross-referenced to the new weapon system LSAR. The system is fully automated to assist in systems engineering integration and to create, manage, and utilize a common, consistent record for all ILS elements. ALSAR programs are available to create outputs from the LSAR that may be batch loaded as input to standard logistics models. The ALSAR has an extensive output summary report capability in accordance with standard Data Item Descriptions (DID) typically required in Air Force programs.

The ALSAR has provisions for recording measured values for R&M parameters required to be tested during OT&E. This provision may also be used to enter measured values to validate the LSAR during the O&S phase. As discussed under Objective 3, however, the ACDF capability to process field data so as to machine output the required LSAR measured values has not yet been developed.

Objective 8 - The same ACDF programs used for Objective 2 may be used to track the continuing performance of operational weapon systems. The ACDF presents average values for numerous R&M and support cost parameters. No trend data capability is provided in the prototype ACDF, but it is expected that future UDB efforts will address this need.

SECTION III

AUTOMATED LSAR SYSTEM

OVERVIEW

As discussed in the previous sections, the ALSAR is a vitally important part of the UDB. Specifically, the ALSAR is needed to satisfy Objectives 3, 4, 6, and 7 shown in Figure 1 and discussed in Section II. The ALSAR system discussed in this section has been fully developed and partially tested, using HH-60 helicopter data. Since December 1982, the system has been successfully used in a production mode to support the Defensive Avionics portion of the B-1B Strategic Bomber Program. As this program progresses, the ALSAR system features will be fully validated for operational use on other programs.

BASELINE

The DARCOMP 750-16 data elements, data definitions, and data sheets/records were used as the baseline for the ALSAR system. To the extent practical, consistent with Air Force requirements, compatibility with the DARCOM baseline was maintained. Substantive additions to the baseline were necessary, however, in order to develop a fully automated system that would satisfy Air Force and DOD requirements, and provide many useful and cost-saving features for industry and Government users. Since the ALSAR is a fully automated database system, none of the DARCOM ADP/LSAR software or programs are used.

DOCUMENTATION

The ALSAR system has been fully documented and delivered to the Air Force. In Table 1 the individual documents associated with the ALSAR are listed.

TABLE 1. ALSAR DOCUMENTATION

Document		Purpose
Data Sheets	-	Data input sheets used by ALSAR
Data Element Descriptions	-	For data elements on each data sheet
Data Entry Instructions	-	For entering information about each data element on each data sheet
ALSAR Users Guide	-	For using each feature of the automated system
Access and Security Manual	-	On-line procedures to control database security
Maintenance and Update Manual	-	Instructions for ADP maintenance and update
Software Documentation	-	Complete programming documentation for ALSAR system

Data Sheets

The ALSAR input data sheets A through J are listed in Figure 4 and included in Appendix A. Figure 4 is actually a CRT menu screen of the on-line ALSAR system. These data sheets contain all of the data elements in the ALSAR system. The on-line CRT screens used to input data are designed in a manner consistent with the card record layouts on each sheet. A data sheet status output report may be machine produced, on command, in the format and content identical to each input data sheet.

In Appendix A the reader will notice that the basic 80-column card format is used for the data sheets. This was the result of an Air Force requirement that ALSAR be developed so as to retain consistency with the DARCOM ADP/LSAR system wherever possible. Since the DARCOM system is basically a sequential file batch processing scheme, it requires the 80-column card format along with duplication of key information on each card. The fully automated ALSAR system would permit more simplified, efficient, and user friendly data sheets. For example, Data Sheet A

```
DPR  LSAOM-01, MENU SCREEN 1, AFM01D, AFM01U
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX AS OF XXXXXXX XX/XX/XX

   MENU 1

                                SHEET

      _  A      OPERATIONS AND MAINTENANCE REQUIREMENTS
      _  B      ITEM RELIABILITY(R) AND MAINTAINABILITY(M) CHARACTERISTICS
      _  C      TASK ANALYSIS SUMMARY
      _  D      MAINTENANCE AND OPERATOR TASK ANALYSIS
      _  E      SUPPORT AND TEST EQUIPMENT OR TRAINING MATERIAL
                  DESCRIPTION AND JUSTIFICATION
      _  F      FACILITY DESCRIPTION AND JUSTIFICATION
      _  G      SKILL EVALUATION AND JUSTIFICATION
      _  H      SUPPLY SUPPORT REQUIREMENTS
      _  I      AUTOMATIC TESTING EQUIPMENT/TEST PROGRAM SET DESCRIPTION
      _  J      TRANSPORTABILITY ENGINEERING CHARACTERISTICS


     FOR A LIST OF REPORT REQUESTS TYPE   RPTMENU
```

DATA SHEET MENU SCREEN

FIGURE 4

could be changed to display the Logistics Support Analysis Control Number (LSACN) only once, rather than displaying it on each card. In future UDB development efforts, consideration will be given to designing the data sheets in a manner consistent with the fully automated ALSAR system.

Initial user reaction to the ALSAR data sheets may be negative because of the redundant key data elements appearing on all sheets and the data elements added to the A, B, E, and H Sheets appear to increase the user workload. In fact, the fully automated ALSAR system eliminates the need for users to enter redundant data. The new data elements added to the data sheets enable the ALSAR to satisfy multiple Air Force and DOD requirements and to facilitate automated output reporting that will result in significant time and cost savings.

Data Entry Instructions

All of the data elements on the ALSAR data sheets are defined in the Data Element Descriptions (DED) document. The Data Entry Instructions (DEI) document tells the user how to fill out each data sheet. Since the ALSAR is fully automated for on-line data entry and update, it is not mandatory that users manually fill out data sheets. In any case, users should be thoroughly familiar with the ALSAR procedures and conventions regarding data entry in order to capitalize on the many useful and time-saving features of the fully automated system.

ALSAR Users Guide

While the DEI instructs the user in how and where to enter the results of the LSA on each data sheet, this guide describes the on-line and batch functions of the ALSAR system and provides instruction for operation and use of the on-line system. This includes procedures for retrieving CRT terminal screens to enter, update, and display information in the database relating to any data sheet and also for requesting hard copy or tape output summary products and reports available from the ALSAR system.

Access and Security Manual

This document provides instructions for establishing and controlling the ALSAR database accessibility and security. While this on-line feature is easy to use, it provides great flexibility in controlling the access and update capability of functional area users.

Maintenance and Update Manual

This document provides information of interest only to computer center personnel responsible for the maintenance and update of the ALSAR system. This document, along with the complete software documentation package, should be sufficient to permit installation, operation, and maintenance of the ALSAR at a computer facility that has compatible hardware and system software.

SYSTEM DESIGN

Figure 5 shows the basic design approach for the fully automated ALSAR system. Notice that the ALSAR utilizes the Integrated Database Management

System (IDMS) developed by Cullinet Corporation. The IDMS components used are the Integrated Data Dictionary, Data Dictionary Reporter, On-Line Query, Data Communications Monitor, and Database Manager. Clemson University developed a general purpose software package for creating CRT terminal screens and performing full screen edits. This package is provided with the ALSAR.

All on-line application programs are designed to run with the IDMS Data Communications Monitor, an efficient and multi-tasking communications monitor. This enables excellent response for larger multi-terminal real-time systems and also provides for automatic journaling of all transactions.

IDMS

- Integrated Data Dictionary
- Data Dictionary Reporter
- On-Line Query
- Data Communications Monitor
- Database Manager

GENERAL PURPOSE SOFTWARE

- Screen Mapping
- Full Screen Editing

APPLICATION PROGRAMS

- On-Line Features
- Batch Features
- ANSI-COBOL with embedded IDMS verbs

ALSAR SYSTEM DESIGN

FIGURE 5

There are approximately 300 application programs written to accomplish the on-line and batch functions of the ALSAR. They are written in ANSI COBOL with embedded IDMS verbs. Each program was designed with functional modularity in order to allow for ease of maintenance and adaptation to new environments. The application system contains a complete security subsystem that can be used to control access to and modification of data by users. This security feature also provides a complete audit trail of changes made during on-line operations.

GENERAL FEATURES

There are several important features of the ALSAR that relate to the overall LSA process and specific DOD requirements.

LSA CONTROL NUMBER (LSACN)

The LSACN is a key data element in the ALSAR system and is comprised of the Work Unit Code (WUC) and the Work Breakdown Structure (WBS). This approach accomplishes several important objectives addressed in DODD 5000.39 and MIL-STD-1388. First, it permits convenient and effective management of a common, consistent database of information necessary to support all ILS elements. Second, it provides an effective mechanism to relate field data to LSAR data during the O&S phase, thus facilitating validation of the LSAR for a weapon system. Third, it provides an inherent cross-reference between WUC and WBS for correlation of support costs to acquisition costs.

The ALSAR does not depend upon the LSACN to generate provisioning technical documentation, as does the DARCOM system. The manner in which ALSAR accomplishes automatic generation of provisioning documentation is discussed later. Since this approach is used, the ALSAR assigns LSACNs only to the lowest reparable level of the end item. Assignment of LSACNs to non-reparable items is not required.

PERFORMANCE TRACKING

The Air Force typically requires that the performance of specified parameters be verified in OT&E and tracked during O&S. In order to achieve the objectives of the UDB, specifically Objectives 6 and 7 in Figure 1 which address this Air Force requirement, several features were incorporated into the ALSAR system:

Additional Data Elements

Numerous data elements were added to the A and B Data Sheets, as shown in Table 2. With these additional data elements the required or allocated,

TABLE 2. ALSAR PERFORMANCE TRACKING

I. PERFORMANCE PARAMETER VALUES

REQUIRED/ALLOCATED VALUE	PREDICTED VALUE	MEASURED VALUE

SYSTEM LEVEL ONLY

- MISSION COMPLETION SUCCESS PROBABILITY
- AVAILABILITY:
  - FMC, PMC/M, PMC/S, PMC/M&S
  - NMC, NMC/M, NMC/S, NMC/M&S
  - FMC, MPT/SORTIE
- BASE LEVEL MMH/FH: BOTH ORGANIZATIONAL LEVEL AND INTERMEDIATE LEVEL
  - SUPPORT GENERAL
  - SCHEDULED AND SPECIAL INSPECTIONS (03 & 04)
  - PREVENTIVE MAINTENANCE
  - CORRECTIVE MAINTENANCE
  - TOTAL BASE LEVEL MMH/FH
- BASE LEVEL: BOTH ORGANIZATIONAL LEVEL AND INTERMEDIATE LEVEL
  - MEAN MAINTENANCE M/H TO REPAIR (MMHTR)
  - MAXIMUM ELAPSED TIME TO REPAIR
- DEPOT MMH/FH:
  - PROGRAMMED DEPOT MAINTENANCE
  - COMPONENT REPAIR/OVERHAUL
- MISSION RECONFIGURATION TIME:
  - MEAN ELAPSED TIME
  - 90th PERCENTILE
  - MEAN CREW SIZE
- ANALYTICAL CONDITION INSPECTION
  - MEAN ELAPSED TIME
  - MEAN MANHOURS
- QUICK TURNAROUND TIME
  - ELAPSED TIME
  - MAINTENANCE MAN-MINUTES
  - CREW SIZE
  - AIRCREW MAN-MINUTES
- FAULT DETECTION/ISOLATION AND FALSE FAULT INDICATION
- RELIABILITY:
  - MEAN TIME BETWEEN REMOVALS (MTBR)
  - MEAN TIME BETWEEN CORRECTIVE MAINTENANCE (MTBM)
  - INHERENT MALFUNCTIONS (TYPE 1 MTBM)
  - INDUCED MALFUNCTIONS (TYPE 2 MTBM)
  - NO DEFECT (TYPE 6 MTBM)
  - PREVENTIVE (SCHEDULED REMOVALS) (MTBM)
  - MEAN TIME BETWEEN MAINTENANCE ACTIONS (MTBMA)
  - RATIO OF MAINTENANCE ACTIONS TO MAINTENANCE EVENTS
  - MEAN TIME TO REPAIR

SUBSYSTEM & COMPONENT LEVELS

- FAULT DETECTION/ISOLATION AND FALSE FAULT INDICATION
- RELIABILITY:
  - MEAN TIME BETWEEN REMOVALS (MTBR)
  - MEAN TIME BETWEEN CORRECTIVE MAINT (MTBM)
  - INHERENT MALFUNCTIONS (TYPE 1 MTBM)
  - INDUCED MALFUNCTIONS (TYPE 2 MTBM)
  - NO DEFECT (TYPE 6 MTBM)
  - PREVENTIVE (SCHEDULED REMOVALS) MTBM
  - MEAN TIME BETWEEN MAINTENANCE ACTIONS (MTBMA)
  - RATIO OF MAINTENANCE ACTIONS TO MAINTENANCE EVENTS
  - MEAN TIME TO REPAIR
- BASE LEVEL MMH/FH - BOTH ORGANIZATIONAL (ON-EQUIP) AND INTERMEDIATE (OFF-EQUIP) LEVELS
  - PREVENTIVE MAINTENANCE
  - CORRECTIVE MAINTENANCE
  - TOTAL BASE LEVEL MMH/FH
- BASE LEVEL MEAN MAINTENANCE M/H
  - PREVENTIVE
  - CORRECTIVE
- DEPOT LEVEL MMH/FH AND MEAN TIME TO REPAIR (MTTR)
- WORK UNIT CODE BY TASK CODE: (TASK SUMMARY)
  - TASK FREQUENCY
  - TASK TIME (ELAPSED)
  - TASK MANHOURS
  - NO. OF MEN/TASK

II. COST PARAMETER VALUES

ESTIMATED	ACTUAL

SYSTEM LEVEL ONLY

- ESTIMATED AND ACTUAL UNIT (FLYAWAY) COST - BOTH RECURRING & NON-RECURRING
- ESTIMATED AND ACTUAL ANNUAL O&S COST
- INITIAL SUPPORT EQUIPMENT COST - BOTH COMMON AND PECULIAR S.E.
- SPARES COST - BOTH INITIAL AND REPLENISHMENT SPARES
- BASE MATERIAL COST/YR
- BASE POL COST/YR
- TECHNICAL PUBLICATIONS COST & QUANTITY
- TRAINING COST - PERSONNEL & MATERIAL/EQUIPMENT — BOTH AT BASE & DEPOT LEVELS
- NUMBER OF PEOPLE TRAINED & NEW SKILLS REQUIRED
- PROGRAMMED DEPOT MAINTENANCE COST/YR
- COMPONENT REPAIR/OVERHAUL DEPOT COST/YR
- INITIAL DEPOT SUPPORT EQUIPMENT COST
- FACILITIES COST - BOTH FOR BASE LEVEL & DEPOT LEVEL

ACTUAL

SUBSYSTEM & COMPONENT LEVELS

- BCS SUPPORT COST IN ACDF
- NEW SYSTEM SUPPORT COST DATA PROVIDED/UPDATED IN ACDF

predicted, and measured values of performance parameters may be recorded and tracked throughout the life cycle of a system. These parameters may be measured at the system, major subsystem, and component levels if desired.

At the system level, data elements were also added to the A Sheet to capture predicted and measured values of selected cost parameters. The predicted values would be entered early in the development phase, and the measured values during the production phase. This information would be valuable in the future for establishing cost estimating relationships and improving predictions on future weapon system programs. At the subsystem and component levels, the UDB will use the ACDF to capture selected VAMOSC data to track cost parameters for a weapon system.

Task Codes

The ALSAR uses the following approach to assign maintenance task codes for Air Force applications. The fifth and eighth positions of the Task Code use unique task identifiers, as applicable, to facilitate comparability between LSAR and field data systems. All other positions of the Task Code are assigned in accordance with MIL-STD-1388-2A. The manner in which ALSAR utilizes the WUC and Task Code is crucial to verifying the LSAR for a weapon system after fielding.

How Malfunction Codes and Work Center

The ALSAR D Sheet incorporates a How Malfunctioned (How Mal) code for further relating the LSAR data to field data. The ALSAR also uses an automated scheme to relate the Skill Specialty Code (SSC) primarily responsible for a task to a performing work center, thus providing another necessary link for comparing LSAR data to field data.

Maintenance Events/Maintenance Actions

There are other features incorporated in the ALSAR system to bridge the inherent gap between LSAR and field data. For example, the procedures for documenting maintenance requirements on the B Sheet result in automatic identification of maintenance actions that comprise a maintenance event. All of the above features, plus some provided but not mentioned here, are needed to effectively utilize field data to update and verify the LSAR, thus making the ALSAR a useful tool throughout the life cycle of a weapon system.

ALTERNATE ACTION

Each ALSAR data sheet has a data field to record an Alternate Action Code (A, B, C, etc.). When an LSA/LSAR is accomplished for multiple design concepts, the Alternate Action Code is used to partition the data for each separate concept. The provision is useful in trade-off studies and provides a permanent record, if desired, for candidate approaches considered. Since the Alternate Action Code is a key parameter, the alternate chosen as the final design is designated as Alternate Action A. In this way the primary LSA/LSAR record for an entire end item will be partitioned under a single Alternate Action Code. Alternate Action Code Z is used to designate the BCS for the new weapon system within the UDB, thereby providing a fully automated BCS conveniently cross-referenced to the new weapon system LSA/LSAR.

LSAR REVISIONS

The specific LSA/LSAR requirements of any given program will determine the extent to which the ALSAR data sheets are completed. For each card on each data sheet required by a given acquisition program, users may determine the specific data elements that must be filled in to constitute a completed card. Some programs may require all data elements on a given card, while others may require only a portion of the card to be filled in. The point is that only the user on a given program will know what constitutes a completed card and data sheet.

The Update Code (UC) in the right-hand column of each card (see Appendix A) will be used to indicate whether the card is in-work or completed. When the user changes the card status to "completed," the ALSAR will automatically record and track subsequent revisions using the UC and date. The same is true for a completed data sheet. This provides an automated capability to assist ILS Managers in monitoring the progress of LSA/LSAR activity in terms of initial completion status, as well as the revisions made to completed work. From an historical perspective, this capability will provide an LSAR audit trail that may be used throughout the life cycle of a weapon system. This may be particularly useful when tracking the performance of key parameters, since it will provide a date benchmark corresponding to equipment modifications during O&S.

EFFICIENT DATA ENTRY

As mentioned earlier, the ALSAR data sheets were patterned after the DARCOMP 750-16 formats. As a result, there is significant redundancy of key data elements on most of the data sheets. The fully automated ALSAR has been designed to eliminate the requirement for the user to enter redundant data. Some of the automated features incorporated to save user time and effort are discussed below.

Key Parameters

The ALSAR database is structured to utilize key parameters such as the LSACN, Alternate Action, and Manufacturers Part Number (MPN). While it is necessary to specify key parameters when using the on-line system, the machine will automatically enter these specified parameter values on multiple cards, as appropriate. For example, it is not necessary to enter the LSACN on each card of the A, B, C, D1, E, F, and G Sheets.

Header Information

The first three cards of the A, B, and C Sheets contain identical header information. When an A Sheet is completed for the system and major subsystem levels, the ALSAR will automatically enter the B Sheet header information. Similarly, when a B Sheet is completed for component levels, the C Sheet header information will automatically be entered.

When information describing a part is entered on the B, C, or D1 Sheet, the ALSAR will automatically enter selected parts information in the Supply Support (H Sheet) record or the Support/Test Equipment (E Sheet) record, as appropriate. This provision not only saves data entry time, but insures consistency between the maintenance, supply support, and support equipment records.

Multiple Applications

The first time a Line Replaceable Unit (LRU), Shop Replaceable Unit (SRU), or repair part is recorded in the maintenance record (B, C, or DI Sheet), a basic Supply Support record (H01, H02 and H03 cards) will be established for that part. This basic record will not be repeated even though a part may be used in multiple applications in an end item. For each individual application of the part, only the application significant information must be entered. The ALSAR system transfers available information to the basic record the first time a part is identified, and prompts the user to complete the basic and application significant information. For subsequent applications of that part, the ALSAR system notifies the user that only application significant information is needed, and automatically aggregates relevant provisioning information for the part.

The same process is used for support and test equipment on the E Sheet. The first time a particular piece of equipment is required to support a maintenance task, the machine will transfer the available information and prompt the user to complete a basic E Sheet. When subsequent maintenance tasks require this piece of equipment, the ALSAR will automatically record these requirements by maintenance task and the item being supported. In a similar manner the ALSAR permits a basic record for each Facility (F Sheet) and Skill (G Sheet), and automatically records each individual requirement for this logistics resource.

NARRATIVE DATA

The narrative cards on the ALSAR data sheets incorporate a card letter and sequence line number (Seq. No.) provision that enables virtually unlimited space for narrative information. This provision will enable ILS Managers to further integrate and support the efforts of those responsible for technical manuals through the ALSAR. The provision is required to enable the ALSAR to produce important output reports such as the Support Equipment Recommendations Document (SERD).

ON-LINE PROCESSING

The ALSAR system utilizes on-line CRT terminal screens to enter, retrieve, and update information in the LSAR database. In addition, all of the output products available from ALSAR may be requested using the on-line system. The ALSAR Users Guide shown in Table 1 provides the detailed information for operation of the on-line system.

MENU SCREENS

Thirteen menu screens are provided for those getting acquainted with the system. Figure 4 is the menu screen that shows all of the ALSAR data sheets. Placing an X by one of the data sheets will cause the menu for that sheet to be displayed. For example, placing an X by the A-Sheet will display the A-Sheet menu screen as shown in Figure 6. All of the card records on the A-Sheet are shown in Figure 6, and to display a screen for a particular card record, the user would simply place an X by the desired card.

```
A - SHEET

  ALL COMMANDS REQUIRE
      LSACN ________          ALT-ACT _

      COMMANDS

          _ A01          _ A07          _ A13B
          _ A02          _ A08          _ A14
          _ A03A         _ A09          _ A15
          _ A03B         _ A10          _ A16
          _ A04          _ A11          _ A17
          _ A05          _ A12          _ A18
          _ A06          _ A13A         _ A19

   THE COMMAND AFTER EACH OF THESE MAY BE   U - UPDATE    F - FORCE
```

A-SHEET MENU SCREEN

FIGURE 6

DATA ENTRY SCREENS

There are 70 on-line screens to enter, retrieve, and update information in the database. Each screen consists of data elements for one or more card records on one of the data sheets in Appendix A. Figures 7 and 8 are representative examples of these on-line screens. Figure 7 is the screen for the A05 and A06 cards of the A-Sheet, and Figure 8 is for the B01, B02, and B03A cards of the B-Sheet. Each on-line screen may be called by simply entering a command for the desired card along with the required parameters.

```
DPR LSAOA-03. DATA SHEET A. ORG LEVEL/ON-EQUIP MAINT. AFA03D. AFA03U
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX AS OF XXXXXXXX XX/XX/XX

CARD: A05  LSACN XXXXXXXXXXX NUMBER SYS SUPPORTED(16) ____
     DAILY INSP: MEAN ELAPSED TIME(22) ____      MEAN MAN HRS(27) ____
     PREOP INSP: MEAN ELAPSED TIME(32) ____      MEAN MAN HRS(37) ____
    POSTOP INSP: MEAN ELAPSED TIME(42) ____      MEAN MAN HRS(47) ____
    HOME STATION MEAN ELAPSED TIME(52) ____      MEAN MAN HRS(57) ____
    INTERM INSP: MEAN ELAPSED TIME(62) ____      MEAN MAN HRS(67) ____
                                                         UPDATE(80) _

CARD: A06  LSACN XXXXXXXXXXX
     PERIODIC INSP          MEAN ELAPSED TIME(16) ____ MEAN MAN HRS(21) ____
     UNSCHEDULED MAINT      MEAN ELAPSED TIME(26) ____ MEAN MAN HRS(31) ____
     TURNAROUND             MEAN ELAPSED TIME(36) ____ MEAN MAN HRS(41) ____
     MISSION PROFILE CHANGE MEAN ELAPSED TIME(46) ____ MEAN MAN HRS(51) ____
     M/H PER HOUR           SCHEDULED         (56) ____  UNSCHEDULED(61) ____
     ANNUAL MAINT M/H       SCHEDULED         (66) ____  UNSCHEDULED(72) ____
                                                            UPDATE(80) _
```

A-SHEET ON-LINE SCREEN

FIGURE 7

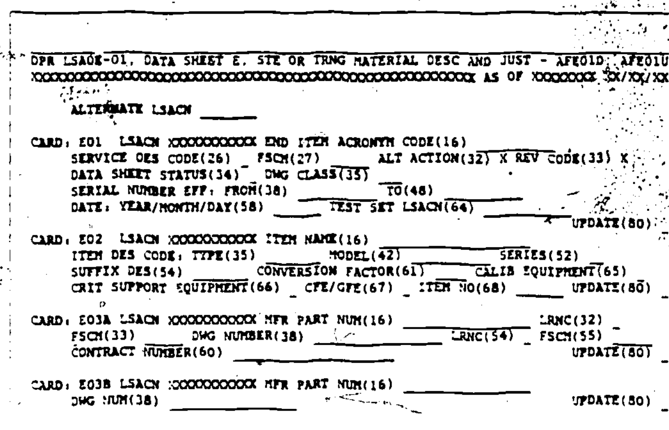
```
DPR LSAOB-04. DATA SHEET B. ITEM R/M CHARACTERISTICS. AFB01D. AFB01U
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX AS OF XXXXXXXX XX/XX/XX

     ALTE[illegible]TE LSACN ______

CARD: B01  L[illegible]CN XXXXXXXXXXX END ITEM ACRONYM CODE(16) ________
     SERVICE [illegible]S CODE(26) _ FSCM(27) ____  ALT ACTION(32) X REV [illegible]E(33) X
     DATA SHE[illegible] STATUS(34) _ DWG CLASS(35) __
     SERIAL NU[illegible]R EFF: FROM(38) ________ TO(48) ________
     DATE, YE[illegible]NTH/DAY(58) ______                          UPDATE(80) _

CARD: B02 [illegible]CN XXXXXXXXXXX ITEM NAME(16) ____________
     IT[illegible]ODE: TYPE(35) ______   MODEL(42) ________ SERIES(52) __
     SU[illegible](54) ______  CONVERSION FACTOR(61) ___          UPDATE(80) _

CARD: B03A LSACN XXXXXXXXXXX MFR PART NUM(16) ____________    LRNC(32) _
     FSCM(33) ____  DWG NUMBER(38) ____________  LRNC(54) _ FSCM(55) ____
                                                            UPDATE(80) _

[illegible]RD: B03B LSACN XXXXXXXXXXX MFR PART NUM(16) ____________ UPDATE(80) _
     DWG NUM(38) ____________
```

B-SHEET ON-LINE SCREEN

FIGURE 8

BEST COPY AVAILABLE

For example, entering the E01 command, along with the desired LSACN and Alternate Action will retrieve the screen shown in Figure 9; this screen



```
DPR LSA0E-01, DATA SHEET E, STE OR TRNG MATERIAL DESC AND JUST - AFE01D, AFE01U
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX AS OF XXXXXXXX XX/XX/XX

    ALTERNATE LSACN ______

CARD: E01  LSACN XXXXXXXXXXX END ITEM ACRONYM CODE(16) ________
    SERVICE DES CODE(26) _ FSCM(27) _____ ALT ACTION(32) X REV CODE(33) X
    DATA SHEET STATUS(34) _ DWG CLASS(35) _
    SERIAL NUMBER EFF: FROM(38) __________ TO(48) __________
    DATE: YEAR/MONTH/DAY(58) ______ TEST SET LSACN(64) __________
                                                           UPDATE(80) _
CARD: E02  LSACN XXXXXXXXXXX ITEM NAME(16) ________________
    ITEM DES CODE: TYPE(35) ______ MODEL(42) __________ SERIES(52) __
    SUFFIX DES(54) ______ CONVERSION FACTOR(61) ____ CALIB EQUIPMENT(65) _
    CRIT SUPPORT EQUIPMENT(66) _ CFE/GFE(67) _ ITEM NO(68) _____ UPDATE(80) _

CARD: E03A LSACN XXXXXXXXXXX MFR PART NUM(16) ________________ LRNC(32) _
    FSCM(33) _____ DWG NUMBER(38) ________________ LRNC(54) _ FSCM(55) _____
    CONTRACT NUMBER(60) ____________________                   UPDATE(80) _

CARD: E03B LSACN XXXXXXXXXXX MFR PART NUM(16) ________________
    DWG NUM(38) ________________                               UPDATE(80) _
```

E-SHEET ON-LINE SCREEN

FIGURE 9

also contains the E02, E03A, and E03B cards. When the screen is retrieved, the LSACN is machine entered in each card, as indicated by the X's in the LSACN fields.

The numbers in parentheses after each data element denote the column number of the first position for a data element field. This feature will reduce errors when data are being entered from hard-copy worksheets. The screen cursor is programmed to move automatically to the next unfilled data field to simplify and expedite data entry.

ENTERING DATA

Once a screen has been displayed, the user may complete all or part of the data elements, as desired. Changes or corrections may be made on the screen prior to hitting the "ENTER" key on the terminal. The "ENTER" key records the screen display on the ALSAR database, assuming data have been entered by the user.

EDIT CHECKS

The on-line system incorporates edit checks for selected data elements.

The edits performed on each screen are described in the ALSAR Users Guide, and generally consist of checks for required presence, alphanumeric characters, field size, special codes, and format. When the user attempts to enter data that do not pass an edit check, the CRT terminal screen will indicate the error by flashing the affected data element field and will not allow any of the data on the screen to be entered in the database. At this point the user has two options. First, the user may correct the errant data on the screen and then enter them in the database. Alternately, the user may force the errant data to be entered in the database. This is accomplished by using the Force (F) command and then pushing the "ENTER" key. The F command would be used when it is not convenient or possible to determine the cause of an error immediately, and the majority of the data on the screen are correct.

DATA RETRIEVAL

When information has been entered on the database, such data may be retrieved and displayed by simply calling the screen for the card, with appropriate parameters, on which the data were entered. When errant data were forced, the ALSAR system will display the errant data field with a series of question marks (???), whether retrieved on-line or on hard-copy printout.

DATA UPDATE

Except for key parameters which are protected fields, any information in the ALSAR database may be updated at the discretion of a user. After the appropriate on-line screen containing the information of interest is retrieved, the UPDATE (U) command would be used to activate this mode. At this point the user may make any desired modifications or deletions by simply typing over the existing data and entering the updated information in the database.

When an update is accomplished on a card previously coded "COMPLETE" in the Update Code (UC), the ALSAR will automatically record the update as a modification to the LSAR. The purpose and value of this feature was discussed earlier.

GLOBAL CHANGE CAPABILITY

At times it may be necessary to change key parameter values (LSACN, MPN, etc.) previously entered in the database. While such changes are not possible using the UPDATE command, batch programs are provided to accomplish changes in a global manner. For example, if an LSACN requires a change, this program will replace the old LSACN with the new LSACN at every appropriate location throughout the database.

GENERIC COPY CAPABILITY

When an LSA has been accomplished on an item and the LSAR entered in the database, the user may find that all or part of this information may be applicable to another item for which LSA/LSAR is required. The ALSAR system will, on user command, selectively copy all or part of the database record for one LSACN to another LSACN, whether it be one card or multiple data sheets. Once the desired copy function has been accomplished, the update capability would be used to make corrections, as necessary, to satisfy unique requirements of the newly created LSACN record.

MAINTENANCE AND SUPPLY SUPPORT FILES

Supply support requirements are basically derived from maintenance requirements, as are the requirements for personnel, support equipment, training, training equipment, facilities, and technical manuals. Maintenance requirements are derived from the system level operational and support concepts, and from detailed R&M analyses at all levels of hardware indenture. The ALSAR system incorporates features that, in essence, take the maintenance requirements documented on the B, C, D, and D-1 Sheets and automatically create basic records of other support requirements on appropriate data sheets (E, F, G and H). These features were mentioned earlier in the paragraph addressing efficient data entry for multiple applications. Using this approach, the ALSAR system assures consistency and compatibility between the maintenance requirements and the other ILS elements.

Portions of the B, C, and D1 Sheets are used to drive the supply support requirements documented on the H-Sheet. The C03 card is used to establish the top-down hardware breakdown in accordance with engineering drawings and the MPN to Next-Higher-Assembly MPN relationships. Using this information, the ALSAR automatically creates H40 cards from which the Provisioning Parts List (PPL) is machine produced. Using this approach, the ALSAR eliminates the need to use the LSACN to produce provisioning technical documentation as required by DARCOM. This permits the LSACN to be assigned only to the reparable level using the WUC/WBS, which in turn results in the significant advantages discussed earlier. Non-reparable items are appropriately accounted for and documented in accordance with standard reporting requirements.

When specific LSA requirements for a given acquisition program do not logically result in a complete top-down breakdown of the MPN to Next-Higher-Assembly MPN relationship for the total system, the user would utilize the ALSAR on-line system to enter H40 cards to add missing parts, as applicable. The ALSAR system processing will notify the user when and where gaps in the PPL exist.

BATCH PROCESSING

INITIAL BATCH LOAD

The Initial Batch Load can be used for initial loading of the database or for subsequent additions of new records if the key information is unique. It is not intended for update or editing capability for existing data. The system accepts ALSAR card formatted data from sequential files. There are three phases to the load process, each of which performs edits on the input data and produces a report. These reports should be used to guarantee the integrity of the loaded database.

Phase 1

In this phase the card images are read, edited individually while flow assurance editing is done, and finally, the narrative data are separated from the rest of the inputs. The first report that is produced from this phase is a control report which is to be used until this phase is completed. It is a sequential listing assigning a control number for future reference. Next an edit report is produced detailing which fields are in error and indicating whether insufficient previous cards have been received. This report also warns of possible key parameter information problems that may be encountered in Phase 2. Regardless of the error, all should be corrected to insure a sound database. The edits performed are identical to those for the on-line data entry process. Phase 1 should be rerun until an error-free run is obtained, or it is determined that all remaining errors are inconsequential.

Phase 2

Most of the database records consist of multiple cards, but sometimes a card is used to create one database record and occasionally cards are broken down to produce multiple database records. Phase 2 performs the function of breaking down and/or building up the cards to obtain these records. It produces a sequential file and a report which warns of incomplete information, duplicate information, or unidentifiable data detected in this process. The report identifies the sequential number that was assigned in the first phase, pinpointing the exact card to be checked.

Phase 3

The third and final phase takes the records created from Phase 2 after all errors are corrected and actually stores them onto the database in their appropriate position. Again some errors may be detected since records are connected to each other in a like fashion as the cards were in Phase 2. When duplicates are found, or inadequate connecting records are available, then an error is flagged to indicate further action is required to store the record properly.

SUSPENSE REPORT

There are times when it is appropriate to store cards onto the database which have a field in error. This may be done from the Initial Batch Load when all of the card edit errors are not corrected in Phase 1 of that process. Errors may also be stored from on-line processing. When an element fails to pass an edit, the element will blink on the screen. If the error cannot be corrected, the user can force the rest of the data on the screen to be stored by typing an "F" for forced update in the command field and pressing the "ENTER" key. The element in error will be stored as question marks. This feature allows the valid data to be stored and available for use, and saves the time that would be required to re-enter the data from scratch later.

Each database record has a suspense flag that will be set when an error is stored in that record. Periodically, a Suspense Report will identify all cards that have elements in error. The software will re-edit all records that are flagged suspended. If all errors in the record have been corrected, the suspense flag is turned off. All remaining errors will be included in the Suspense Report.

The Suspense Report is used to insure that errors are identified so that corrective action can be taken. Errors listed on the report are sorted by card type, by LSACN. The card images correspond to the data sheets, and errant data elements are identified. Errors may be corrected by calling the screen with the data in error and re-entering the element using the Update Command.

TURNAROUND DOCUMENTS

When data are entered on the database via on-line or batch processing, the ALSAR will generate a Turnaround Document if desired by the user. These hard copy printouts display information in data sheet format and provide additions/changes to the database that occurred during the processing period since the last turnaround was generated. When database transactions were modifications or updates to information previously entered, the Turnaround Document will display a before and after image.

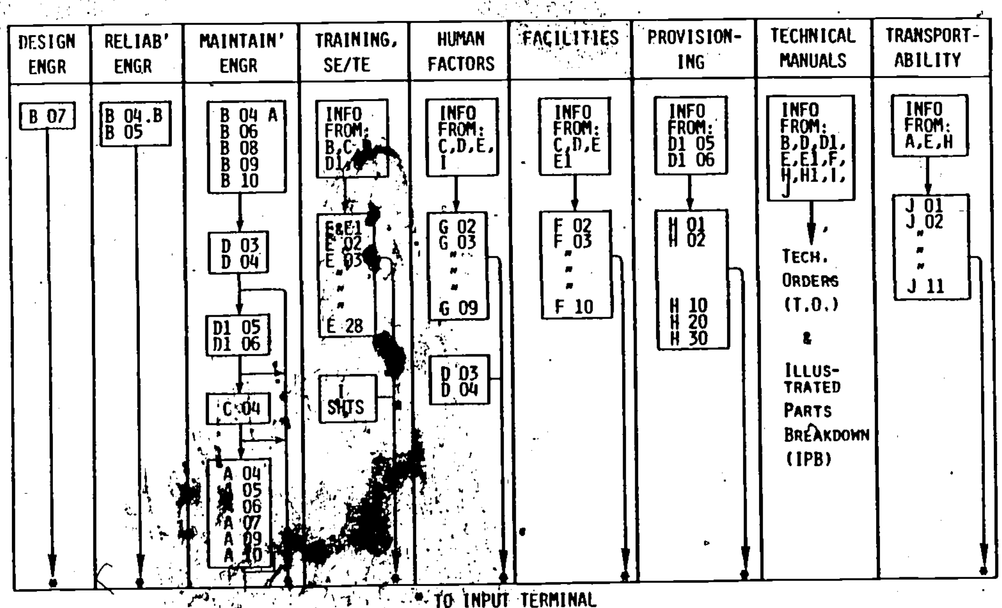
The purpose of the Turnaround Document is to provide a hard copy printout of information actually loaded in the database to functional area users who are responsible for the accuracy and completeness of the data. Data elements that did not pass edit checks and were forced on the database will appear as question marks on the Turnaround Document. The user may use this document to verify and correct data entries. This would be particularly useful when engineers/analysts responsible for data quality do not actually perform the data entry. Managers could use the Turnaround Documents to monitor the LSA/LSAR activity and for hard copy backup files, as desired.

PROMPTING DOCUMENTS

Although systems engineering is a highly iterative process involving many different functional areas, it can generally be described in the following way. The process starts with design engineering activity. Next, the results of design engineering are used by reliability engineering to accomplish failure modes, effects, and criticality analyses (FMECA) and other important functions. Next, the results of reliability engineering would be used by maintainability engineering to determine the maintenance and support requirements necessary to achieve and sustain a fully mission capable weapon system. These three steps can be thought of as occurring in a serial manner. When maintainability engineering completes the detailed task analyses and identifies support requirements necessary to repair and sustain the weapon system in operational status, the activities of many other functional areas may be accomplished in a generally parallel manner.

The ALSAR system uses Prompting Documents to assist in the integration of all functional area activities involved in the systems engineering process. When information is entered in the database by one functional area, the ALSAR keys on selected data fields to determine if the data entered are needed by another functional area user. If so, the machine generates a Prompting Document to that functional area. The Prompting Document preprints information needed by the next functional area to accomplish additional LSA and reminds the user that additional LSAR input data are now owed to the system. The information on the Prompting Document is extracted from portions of the data sheets in Appendix A and is presented in a format consistent with these data sheets.

Figure 10 shows the basic approach used to generate and distribute Prompting Documents. It is seen that specific data sheet cards generally relate to the functional area across the top. The card numbers in the body of Figure 10 relate to the data sheets in Appendix A. Since the specific functional area responsibilities may vary from one organization to another, the prompting scheme is table driven. That is, the Prompting Documents may be flexibly tailored to fit any particular organization.

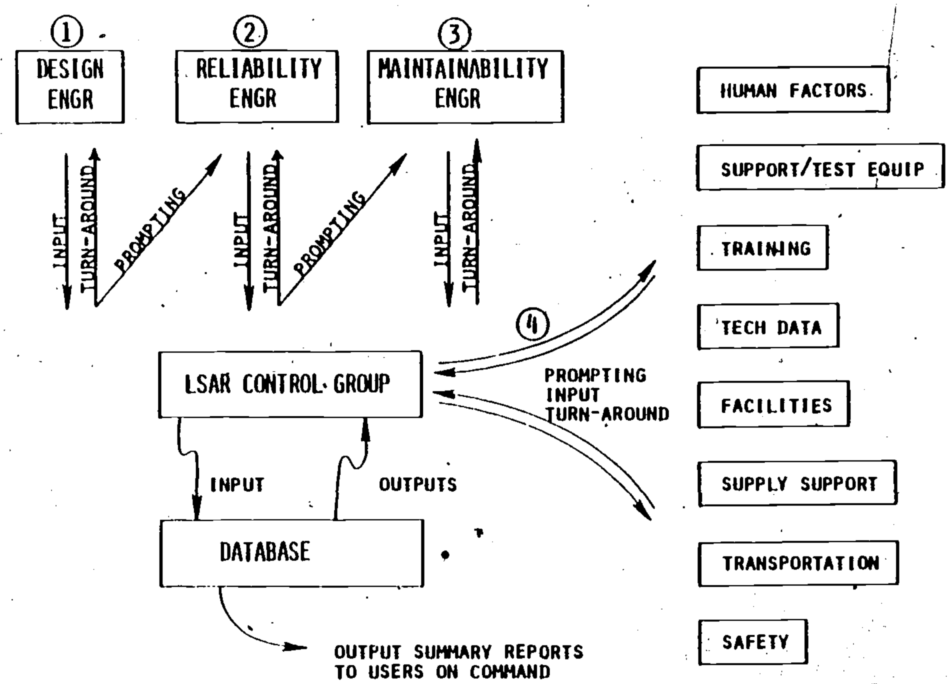


GENERATION OF PROMPTING DOCUMENTS

FIGURE 10

Figure 11 shows the process beginning in Step 1 with design engineering entering a functional design description of the item under analysis. A Turnaround Document is sent back to design engineering, and a Prompting Document is sent to reliability engineering, Step 2. When reliability enters the information it owes the system, the process is repeated and a Prompting

Document is sent to maintainability engineering, Step 3. When maintainability engineering enters the information it owes the system, Step 4 simultaneously sends prompting documents to one or more functional areas as shown on the right side of Figure 11, depending upon the particular support requirements. That is, if support requirements for that functional area exist, a Prompting Document is sent; otherwise, it is not sent.



USE OF PROMPTING DOCUMENTS

FIGURE 11

In actual practice the systems engineering process should involve Design, Reliability, and Maintainability Engineering working as a team to investigate and evaluate alternative design concepts in an iterative closed-loop manner. Similarly, the maintainability engineers should team with Provisioning, Technical Manuals, and other functional areas to evaluate the overall support requirements and capabilities. This evaluation, in turn, should be fedback to the design and R&M loop to insure that supportability factors influence design alternatives and decisions.

The Prompting Documents provide a useful mechanism to enhance timely integration and feedback in the overall systems engineering. Managers could use this capability as a tool to assist in formally organizing the integration activity and in monitoring the results.

LSA/LSAR PROGRESS REPORTS

Managers and functional area analysts may, on occasion, have a need to review the current status of the LSA/LSAR effort for a given program. The ALSAR system currently provides two reports for this purpose.

LSACN Status Report

This report has been designed to list all of the active LSACNs associated with a given program effort. The report, which may be requested using an on-line menu screen, provides a list of all currently active LSACNs in the database for a specified end item. For each LSACN the report will list all of the data sheets that have been entered, along with the date that each sheet was last revised. If the LSACN requires new skills, the G-Sheet for each of the required new skills is reported along with the status of each G-Sheet. If the LSACN requires facilities, the F-Sheet for each required facility is reported along with the status of each F-Sheet.

Data Sheet Status

The ALSAR system will provide a hard copy printout of the current status of the data sheets that exist for a specified LSACN. The on-line screen shown in Figure 12 may be used to obtain this output. The user may specify one or more of the data sheets. The output will include all of the information in the database for each sheet requested, including narrative. The format and content of each sheet will be identical to those of the corresponding data sheet in Appendix A, except that cards for which no data exist will be omitted. The data sheets requested will be printed in alphabetical order.

```
DPR  LSAOM-OS, SHEET REQUEST, AFMOSD, AFMOSU
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX AS OF XXXXXXX XX/XX/XX

SHEET REQUEST

     THE FOLLOWING REQUESTS REQUIRE
          LSACN ___________     ALT-ACT _

     _ A          _ B          _ C

     _ E          _ F          _ I

     _ D  ALSO REQUIRES A TASK CODE ________

     _ G  ALSO REQUIRES A SKILL SPEC CODE _______

     _ J  ALSO REQUIRES A DRAWING NUMBER _________________________

     THE H SHEET REQUEST REQUIRES    _ H
          MPN _________________________   END-ITEM LSACN ______
```

DATA SHEET STATUS

FIGURE 12

REPORTING SYSTEM

Many reports may be generated by the ALSAR system. Table 3 lists the reports that fully comply with standard specifications.

DARCOM LSA REPORTS

The LSA summary reports shown in Table 3 are the standard DARCOM reports that the ALSAR system is programmed to generate. The reports shown are those currently required by the Air Force. The ALSAR also generates the D-220 output for provisioning purposes.

TABLE 3. ALSAR OUTPUT REPORTS

LSA SUMMARY REPORTS

LSA-01	DIRECT ANNUAL MAINTENANCE MAN-HOUR BY SKILL SPECIALTY CODE AND CATEGORY OF MAINTENANCE
LSA-02	PERSONNEL AND SKILL SUMMARY
LSA-03	RELIABILITY AND MAINTENANCE SUMMARY
LSA-04	MAINTENANCE ALLOCATION SUMMARY
LSA-05	SUPPORT ITEM UTILIZATION SUMMARY
LSA-06	CRITICAL MAINTENANCE TASK SUMMARY
LSA-07	SUPPORT ITEM REQUIREMENTS BY SKILL SPECIALTY CODE AND MAINTENANCE CATEGORY
LSA-08	SUPPORT ITEM REQUIREMENTS BY MAINTENANCE CATEGORY AND SKILL SPECIALTY CODE
LSA-09	SUPPORT ITEMS LIST
LSA-10	SUPPORT ITEMS LIST
LSA-11	SPECIAL TRAINING DEVICE SUMMARY
LSA-12	SPECIAL FACILITY REQUIREMENTS
LSA-13	SUPPORT EQUIPMENT GROUPING NUMBER UTILIZATION SUMMARY
LSA-14	TRAINING TASK LIST
LSA-16	PRELIMINARY MAINTENANCE ALLOCATION SUMMARY
LSA-17	PRELIMINARY MAINTENANCE ALLOCATION SUMMARY TOOL PAGE
LSA-20	TOOL AND EQUIPMENT REQUIREMENTS
LSA-27	SPECIAL TOOLS LIST
LSA-30	SPECIAL TOOLS LIST

DATA ITEM DESCRIPTIONS

DI-S-6176	SUPPORT EQUIPMENT RECOMMENDATION DATA (SERD)
DI-S-6177	CALIBRATION MEASUREMENT REQUIREMENTS SUMMARY (CMRS)
DI-V-6183A/M	CONSOLIDATED SUPPORT EQUIPMENT LIST (CSEL)
DI-L-6147A	PRESENTATION AND PACKAGING DATA
DI-V-6181/M	REPAIR PARTS/GSE PRICE LIST (JET ENGINE)
DI-V-6185A/M	LIST OF STANDARD/MODIFIED HAND TOOLS
D220	AFLC PROVISIONING SYSTEM
DI-V-7008	COMMON BULK ITEMS LIST (CBIL)
DI-V-7006/M	INTERIM SUPPORT ITEMS LIST (ISIL)
DI-V-7004	LONG LEAD ITEMS LIST (LLIL)
DI-V-7002	PROVISIONING PARTS LIST (PPL)
DI-V-7005	REPAIRABLE ITEMS LIST (RIL)
DI-V-7007	TOOLS AND TEST EQUIPMENT LIST (TTEL)
DI-V-7016D/M	PRE-PROCUREMENT SCREENING
DI-H-3256	TRAINING EQUIPMENT LIST (TEL)

DATA ITEM DESCRIPTIONS (DID)

Table 3 also shows many complex reports that the ALSAR can generate in total compliance with standard DIDs. The SERD, CMRS, and CSEL are reports that are extremely costly to accomplish manually. Using the ALSAR procedures and conventions, these reports are completely machine generated. Likewise, the provisioning technical documentation listed is completely machine generated.

REPORT SELECTION SCREENS

All of the reports listed in Table 3 may be requested via on-line report selection screens. Figure 13 is the Report Menu screen from the ALSAR Users Guide. Placing an X by the desired report will produce the appropriate Report Selection Screen. For example, if an X was placed by CMRS, the Report Selection Screen shown in Figure 14 would appear.

```
RPTOR-M1, REPORT REQUEST SELECTION, AFR15D, AFR15U
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX AS OF XXXXXXX XX/XX/XX

                    REPORT REQUEST

  _ LSA01    _ LSA02    _ LSA03    _ LSA04    _ LSA05    _ LSA06
  _ LSA07    _ LSA08    _ LSA09    _ LSA10    _ LSA11    _ LSA12
  _ LSA13    _ LSA14    _ LSA16    _ LSA17    _ LSA20    _ LSA27
  _ LSA30    _ CBIL     _ CMRS     _ CSEL     _ D220     _ ISIL
  _ LLIL     _ MOD-METRIC          _ NRLA     _ PPL      _ RIL
  _ SERD     _ TEL      _ TTEL

  _ PKRQ  PRESERVATION AND PACKAGING DATA
  _ RPGP  REPAIR PARTS/GSE PRICE LIST
  _ SMHT  LIST OF STANDARD/MODIFIED HAND TOOLS
  _ SCPR  PRE-PROCUREMENT SCREENING
  _ LSAS  LSACN STATUS REPORT
```

ALSAR REPORT MENU SCREEN

FIGURE 13

```
RPTOR-13, AFR15D, AFR01U
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX AS OF XXXXXXXX XX/XX/XX

REPORT SELECTION FOR
  SUPPORT EQUIPMENT RECOMMENDATION DATA (SERD)
  CALIBRATION/MEASUREMENT REQUIREMENTS SUMMARY (CMRS)
  CONSOLIDATED SUPPORT EQUIPMENT LIST (CSEL)

                  SRV DES CD  _
                    LOCATION  ________
                     ALT ACT  _
                     AGCY CD  _
                      COPIES  __
                       LSACN  __________
                              (SERD ONLY)
              END ITEM LSACN  __________
                              (CMRS ONLY)
       END ITEM ACRONYM CODE  __________
                              (CMRS ONLY)
```

CMRS REPORT SELECTION SCREEN

FIGURE 14

This screen is also used to request the SERD and CSEL reports. The user would then enter the information necessary to specify the CMRS report for the desired end item, indicate how many copies are desired, and specify the location of the printer to be used to produce the hard copy report.

All of the output reports have similar Report Selection Screens, with the required report specification parameters listed.

TAPE OUTPUTS

The ALSAR system can also generate tape outputs that may be used as input to three standard models used by the Air Force; the Mod-Metric, NRLA, and LCOM.

Figures 15 and 16 are the on-line Report Selection Screens for requesting the ALSAR to generate the output tapes for the MOD-METRIC and NRLA, respectively. A pseudo Base Level History Tape (ABD6DA) and B-4 Master File Tape are generated for input to the LCOM. The ALSAR Users Guide provides detailed instructions for building a constant data file to enable the ALSAR to generate the ABD6DA using LSAR data.

REPORT REQUEST SUMMARY

The ALSAR has an on-line screen that displays a current status summary of all the reports that have been requested by a specific user but that have not been printed. This screen may be used to check the status of a report, to delete or hold a report, or to initiate some changes to the original request.

```
RPTOR-40, AFR15D, AFR01U
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX AS OF XXXXXXXX XX/XX/XX
REPORT SELECTION FOR MOD-METRIC (MODM)

        AGCY CD _                        ALT ACT _
        BUDGET MIN ________              BUDGET MAX ________
        LRU _____    BUDGET __________       BACK ORDER ________.____

     OUTPUT DEVICE _      INPUT DEVICE _      DBSO _____.____

   NUMBER OF BASES __
      FLYING HOURS _____  _____  _____  _____  _____  _____
  ORDER & SHIP TIME  __    __     __     __     __     __

  PRINTER DESIGNATOR _   PRINT QUANTITY _   COMBINE DEVICE _   SQOD _

     BASE REPAIR TIME __    DEPOT REPAIR TIME _._    PRIME ALC _

     BSTART __.__     BSTOP __.__     CFAC __.__     PBINC __.__

    TITLE
    TITLE/COMMENT
     ________________________________________________________
```

MOD-METRIC TAPE SELECTION SCREEN

FIGURE 15

```
RPTOR-41, AFR15D, AFR01U
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX AS OF XXXXXXXX XX/XX/XX
REPORT SELECTION FOR NETWORK REPAIR LEVEL ANALYSIS (NRLA)

        AGCY CD _      ALT ACT _
        REQUESTED LRUS ____  ____  ____  ____  ____
                       ____  ____  ____  ____  ____
                       ____  ____  ____  ____  ____
                       ____  ____  ____  ____  ____

    DEPOT WORK BREAKDOWN STRUCTURE ___   END ITEM ACRONYM CODE ________
    REPAIR CYCLE TIME:  DEPOT CON ___    DEPOT OS ___   BASE ___

  TYPE 1: END ITEM NAME ________      NUMBER BASES _     RATIO OF FORCE _.99
          SERVICE LIFE _           EQUIV. WEAP.SYS __   OPERATION HOURS __
          SENSITIVITY ALT. _          LOWER RATIO _.99    UPPER RATIO _.99
          EXTREMES/COMPLETE _      RUN IDENTIFIER ______________
  TYPE 2: BASE SHOP MHRS __        BASE TURNOVER RATE _.999
          DEPOT SHOP MHRS __       DEPOT TURNOVER RATE _.999
  TYPE 3: ORDER/SHIP TIME CONUS _.999   PACKING COST CONUS _.99
          ORDER/SHIP TIME OS _.999      PACKING COST OS _.99
          TECHNICAL COST ___
```

NRLA TAPE SELECTION SCREEN

FIGURE 16

SECTION IV

AIRCRAFT CHARACTERISTICS DATA FILE

GENERAL

In this section the current development status of the protytype Aircraft Characteristics Data File (ACDF) is presented in summary form. The reader is encouraged to review again Figure 1 and the discussion of the conceptual UDB approach and objectives presented in Section II. In addition, the reader is encouraged to review again Figure 3 and the discussion of the UDB features relative to the overall system objectives.

PURPOSE AND USE

The purpose of the ACDF is to provide a mechanism whereby [illegible]ment and industry users have convenient and timely access to design, R&M, and support cost information about existing operational aircraft weapon systems. Primary users of the ACDF would be those from Government and industry who are responsible for the acquisition and support of new weapon systems and equipment.

Conceptual Phase

In the early weapon system planning stages, the ACDF would be useful to those responsible for establishing system and major subsystem requirements and specifications. The ACDF design and utilization data could be used to assist in identifying the BCS for the new weapon system. When the operational and support concepts are formulated, the R&M and support cost data associated with the BCS would assist in establishing the system availability and R&M requirements and in the allocation of R&M system requirements to the subsystem levels. In general, the ACDF data can then be used in conjunction with early LSA/LSAR efforts to support and influence tradeoff studies of alternate design approaches for the new weapon system.

Preliminary and Detailed Design Phases

As the design activity proceeds through increasing levels of detail, the ACDF may be used to obtain BCS data at lower hardware indenture levels. The process of using the BCS in conjunction with LSA/LSAR to support design tradeoff studies and analyses can be used throughout the preliminary and detailed design phases.

O&S Phase

When the new weapon system becomes operational, the ACDF can be used to measure and evaluate the system performance in terms of R&M parameters and support costs. Field data from the MDCS and VAMOSC systems would be processed by ACDF programs and provided to users via the on-line access system.

Research and Development (R&D) Activities

Those organizations involved with R&D to develop new or improved predictive models and tools would be users of the ACDF. Timely and convenient access to this database would greatly reduce the cost and increase the effectiveness of data collection efforts by a large community of researchers. The results of R&D efforts that utilize the ACDF for source data would be easier to compare and validate, as opposed to those that did not use a common data source.

TECHNICAL APPROACH

The ACDF was developed under the concept that it would eventually be implemented and maintained at a central Government facility. Since the specific machine and software environment to house the ACDF was not known, there was a strict requirement to design the system for optimal transportability. As a result of this requirement, and the need for an efficient on-line capability to serve remote users, the ACDF was designed as an interactive Time-Sharing Option (TSO) system that utilizes the Virtual Storage Access Method (VSAM). Application programs are written exclusively in American National Standard Common Business Oriented Language (ANS COBOL). VSAM records are designed to group or categorize data in a manner intended to ehhance the utility of the ACDF to multiple users and the efficiency of operating the system.

MODES OF OPERATION

<u>Data Entry</u> - The ACDF system data files would be initially loaded and subsequently updated by the organization responsible for operation and maintenance of the ACDF. Batch load programs would be used for data entry, which would be be accomplished by the host computer facility. Remote on-line users would not have the capability to enter or modify data in the ACDF.

<u>Data Retrieval</u> - Data loaded in the ACDF may be retrieved by any authorized user via on-line CRT terminal screen, or batch output programs generating hard copy printouts. Users may specify and request hard copy outputs using the on-line mode of operation. The ACDF output for specified data is presented in the same image, form, and content, whether displayed on the CRT or hard copy. Users operating CRT terminals with screen image printers could obtain hard copy of selected data. The system is designed to permit dial-up line access to the ACDF.

DOCUMENTATION

Table 4 lists the documents that record the results of the ACDF development effort. This documentation, dated April 1983, has been delivered to the Air Force.

TABLE 4. ACDF DOCUMENTATION

DOCUMENT	PURPOSE
ACDF Data Element Descriptions (DED)	Defines each data element in each ACDF Record
ACDF Data Input Record Layout	Defines the record layouts for data input to ACDF
ACDF Users Guide	Provides instructions for use of the on-line system
ACDF Programming Documentation	Contains all programs developed for operation of the ACDF

ACDF DED

Unlike the ALSAR which used DARCOMP 750-16 as the baseline, no baseline system was available for the ACDF. As a result, the data elements in the DED were selected on the basis of the previous work by Thomas and Hankins (1980), which included a major industry survey that investigated the data needs of those responsible for weapon system design, R&M, and logistics support. The ACDF DED provides the definition for each data element in the system, including the field size and other characteristics. The data elements are then organized into specific records for greater utility to the user when retrieving ACDF data.

Data Input Record Layouts

This document contains the data sheets depicting the layouts for each record in the ACDF. Those responsible for loading data in the ACDF would use these data sheets in conjunction with the DED to input data. There are 66 data input sheets covering all of the ACDF records. An example of the data sheets is shown in Figure 17, which includes a portion of the System Features, Electrical Power Supply, and Hydraulic Power Supply Records.

Users Guide

This document provides detailed instructions for using the on-line

SAMPLE ACDF DATA INPUT RECORD LAYOUTS

FIGURE 17

AIRCRAFT - SYSTEM FEATURES - SYSTEM DESIGN AND PERFORMANCE

- RECORD TYPE
- SRD
- MISSION DESIGN SERIES
- REFERENCE NAME
- MANUFACTURER
- TYPE
- PRIMARY MISSION
- WEIGHT CLASS
- DENSITY
- NUMBER AIRCREW
- CREW ESCAPE SYSTEM
- ENGINE
- TOTAL ENGINES
- ENGINES IN FUSELAGE
- ENGINES FUSELAGE PODS
- ENGINE WINGS
- ENGINE WINGS PODS
- TYPE ENGINE INSTALLED
- ENGINE AUGMENTATION
- VARIABLE GEOMETRY INLETS
- THRUST REVERSER
- WING LOCATION
- VARIABLE WING GEOMETRY
- WET WINGS
- HIGH TECHNOLOGY WINGS
- BOUNDARY LAYER CONTROL
- INDEPENDENT FLIGHT CONTROL SYSTEM
- FLY-BY-WIRE
- STABILITY CONTROL SYSTEM
- ELECTRICAL MULTIPLEX
- NUMBER OF INDEPENDENT ELECTRICAL POWER SYSTEM
- AUXILIARY POWER UNITS
- NUMBER OF INDEPENDENT HYDRAULIC POWER SYSTEM
- HYDRAULIC SYSTEM PRESSURE
- HYDRAULIC DEPENDENT SUBSYSTEM
- HF COMMUNICATION
- VHF COMMUNICATION
- UHF COMMUNICATION
- FM COMMUNICATION
- RADIO NAVIGATION
- RADAR NAVIGATION
- AIR TO AIR RADAR
- I R NAVIGATION
- ELECTRO-OPTICAL SYSTEM
- RADIO FREQUENCY SURVEILLANCE (RFS)
- ELECTRONIC COUNTERMEASURES (ECM)
- HEADS UP DISPLAY
- INTERNAL GUNS
- AA MISSILES
- AO MISSILES
- CRUISE MISSILES
- ON BOARD MAINTENANCE RECORDER
- LANDING GEAR TYPE
- LANDING GEAR NUMBER
- NUMBER WHEELS - TIRES
- DE-ICING
- ANTI-ICING
- BLEED AIR

ELECTRICAL POWER SUPPLY SUBSYSTEM RECORD

- RECORD TYPE
- SRD
- GENERATORS - ENGINE
- GENERATORS - HYDRAULIC
- KVA PER GENERATOR
- KVA - TOTAL
- GENERATOR RPM
- TYPE GENERATOR DRIVE MECHANISM
- GENERATOR DRIVE TEMPERATURE
- GENERATOR - TEMPERATURE
- INVERTERS - INSTRUMENT
- INVERTERS - OTHER THAN INSTRUMENTS
- VOLTAGE, A-C, INSTRUMENT INVERTER
- CONVERTERS
- CIRCUIT BREAKERS RATINGS AMPS: LOWEST / HIGHEST
- CIRCUIT BREAKERS - TOTAL
- VOLTAGE, A-C, THREE PHASE
- VOLTAGE, A-C, SINGLE PHASE
- VOLTAGE, A-C, CYCLES
- AMPERES; MAXIMUM
- BATTERY TYPE
- BATTERY - NUMBER
- BATTERY - VOLTAGE
- BATTERY - AMPERE HOURS
- VOLTAGE, D-C AIRCRAFT
- ELECTRICAL DISTRIBUTION METHOD
- FUSE RATINGS AMPS: LOWEST / HIGHEST
- MINIMUM FREQUENCY
- MAXIMUM FREQUENCY
- D-C BUSES
- POWER DISTRIBUTION BOXES, A-C
- CONNECTORS, ELECTRICAL TOTAL
- TRANSFORMERS, ELECTRICAL - TOTAL
- MULTIPLEX TERMINALS

HYDRAULIC AND PNEUMATIC POWER SUPPLY SUBSYSTEM

- RECORD TYPE
- SRD
- HYDRAULIC SYSTEMS - TOTAL
- HYDRAULIC SYSTEMS - ENGINES DRIVEN
- HYDRAULIC SYSTEMS - ELECTRICAL DRIVEN
- HYDRAULIC PUMPS - TOTAL
- HYDRAULIC PUMPS - ENGINE
- HYDRAULIC PUMPS - ELECTRICAL
- HYDRAULIC SUPPORT SUBSYSTEMS
- HYDRAULIC PUMP FLOW - ENGINE
- HYDRAULIC PUMP PRESSURE - ENGINE
- HYDRAULIC PUMP FLOW - ELECTRICAL
- HYDRAULIC PUMP PRESSURE - ELECTRICAL
- HYDRAULIC TANKS CAPACITY
- NUMBER HYDRAULIC TANKS
- HYDRAULIC SYSTEM PRESSURE - MAXIMUM
- HYDRAULIC PUMP RPM - ENGINE RATIO
- HYDRAULIC TANK PRESSURE
- HYDRAULIC PUMP RPM - ELECTRICAL
- HYDRAULIC PUMP - AUXILIARY
- HYDRAULIC PUMP FLOW - AUXILIARY
- HYDRAULIC PUMP PRESSURE - AUXILIARY
- HYDRAULIC SYSTEM OPERATING TEMPERATURES - MAXIMUM
- HYDRAULIC MOTORS
- HYDRAULIC VALVES
- HYDRAULIC FILTERS
- HYDRAULIC SYSTEM 3-DIGIT WUC
- HYDRAULIC SYSTEM 4-DIGIT WUC
- HYDRAULIC SYSTEM 5-DIGIT WUC
- PNEUMATIC POWER SOURCE
- PNEUMATIC CYLINDERS NUMBER
- NUMBER PNEUMATIC SYSTEM
- PNEUMATIC PRESSURE - MAX
- PNEUMATIC SYSTEM COMPONENTS

system to retrieve data from the ACDF. Procedures are given to retrieve data from each record, and for special functions that present data from multiple records. The manner in which the data are displayed on the CRT terminal screen for each record is also described in the Users Guide.

Programming Documentation

This 480-page document includes a description of each COBOL application program associated with the ACDF. Documentation on each program includes the program name, calling and called programs, copy code, VSAM or sequential files accessed, function of the program, and the methodology used. The source code for each program is also included.

ACDF RECORD CONTENTS

The records described in the DED are listed in Table 5. The ACDF would contain information in each one of those records about each aircraft's MDS. A brief description of the contents of these records is presented next.

TABLE 5. ACDF RECORDS FOR EACH AIRCRAFT MDS

SYSTEM RECORDS	SUBSYSTEM RECORDS
AIRCRAFT GENERAL	AIRFRAME
MISSION	AVIONICS
BASIC MISSION PERFORMANCE	CREW STATION
SYSTEM DESIGN AND PERFORMANCE	ELECTRICAL POWER
ENGINE	ENVIRONMENTAL CONTROL
SYSTEM UTILIZATION	FLIGHT CONTROL
SYSTEM FEATURES	FUEL
SYSTEM R&M/COST	HYDRAULIC POWER
OPERATIONAL R&M/COST	LANDING GEAR
NATIONAL STOCK NUMBER	POWER PLANT INSTALLATION

AIRCRAFT RECORD

This record is basically header information that provides a top level description of a particular aircraft weapon system.

MISSION RECORD

This record contains narrative information from the Air Force Guide (AFG-2) briefly describing the primary and secondary missions of an aircraft MDS.

BASIC MISSION PERFORMANCE RECORD

This record contains information from the AFG-2 for the basic mission performance. The data elements and definitions are consistent with AFG-2. The record is designed to accommodate differences in AFG-2 data between aircraft MDS.

SYSTEM DESIGN AND PERFORMANCE RECORD

This record contains information about top-level system design and operational performance characteristics of an aircraft MDS. The information includes dimensions, weights, thrust, speeds, range, rate of climb, and altitudes. It also provides the total number of 2-, 3-, 4-, and 5-digit WUC items associated with an aircraft MDS.

ENGINE RECORD

This record contains AFG-3 design and performance information about engines used in operational aircraft MDS. The data elements and definitions are consistent with AFG-3. The record is designed to accommodate differences in AFG-3 data between engine types and models.

SYSTEM UTILIZATION RECORD

This record contains information about the fleet utilization of an aircraft MDS. It includes the active inventory, base level flying time and sorties, average sortie length, and other relevant fleet information.

SYSTEM FEATURES RECORD

This record contains information about top-level system design features incorporated on an aircraft MDS. The features include weight class, number of aircrew personnel, type crew escape system, type engines, number of engines, type engine installation, wing geometry, type flight controls, type and number of electrical and hydraulic systems, type avionics installed, built-in-test units, and many other features.

AVIONICS SYSTEMS RECORD

This record contains information that identifies avionics equipment, by standard equipment nomenclature (SEN), that is installed on an aircraft MDS. For each SEN the record specifies whether or not built-in-test provisions are incorporated.

SYSTEM R&M COST RECORD

This record contains top system level R&M and cost information for an aircraft MDS. The information includes unit fly-away cost, system level support costs, base and depot level maintenance manhours, base level maintenance manhours per flying hour (MMH/FH) and sortie, and overall MMH/FH.

OPERATIONAL SUPPORT AND COST RECORD

This record contains detailed R&M and support cost information for a weapon system. There are five sub-records, all of which will be useful to those responsible for LSA/LSAR activity on new system acquisition programs.

Aircraft Level/AFR 800-18 Format 4

This sub-record provides system level R&M data in the format and content specified by Air Force Regulation (AFR) 800-18, "Reliability and Maintainability Program" (formerly AFR 80-5). This record breaks out preventive and corrective maintenance into all the required categories addressed in LSAR, and provides standard R&M parameter terms for each category.

Work Center by Aircraft

This sub-record groups R&M data by work centers associated with an aircraft MDS. For a large aircraft MDS, this record could contain data for approximately thirty (30) work centers.

Support Cost by WUC

This sub-record contains support cost information that may be retrieved at the 5-digit WUC level, or summarized at the 2-, 3-, or 4-digit WUC levels. The machine stores only the 5-digit WUC data, and internal programs calculate summarized values on request by users. The data elements and definitions in this record are consistent with VAMOSC data elements related to cost.

R&M Data by WUC

This sub-record contains R&M parameter data at the lower levels of WUC indentures. The data are expressed in terms compatible with those required for detailed levels of LSA/LSAR for new system acquisition programs.

Maintenance Action by WUC

This sub-record contains summary data by WUC, sorted by standard Air Force maintenance "action taken," "how malfunctioned," and "type how malfunctioned" codes. The reader may recognize that provisions on the B- and D-Sheets of the ALSAR will relate to this sub-record in the ACDF.

NATIONAL STOCK NUMBER RECORD

This record contains information that enables users to cross-reference a National Stock Number (NSN) to a part number, determine each aircraft MDS that uses the NSN, and determine the WUC assigned to the NSN on a given aircraft MDS. In addition, the record contains cost and weight information about an NSN.

SUBSYSTEM RECORDS

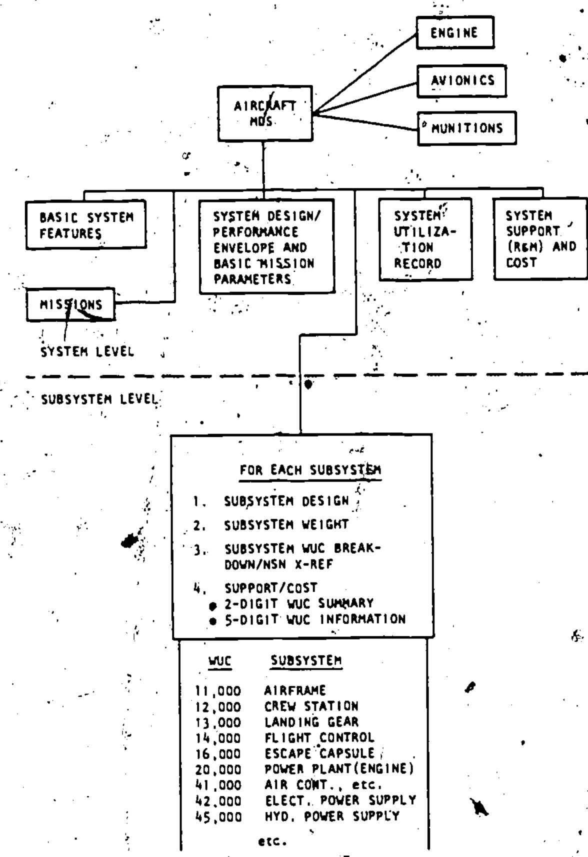
There are nine individual subsystem records in the ACDF. These include airframe, crew station, environmental control, electrical power, flight controls, fuel, hydraulics, landing gear, and power plant. The Avionic Systems Record was discussed earlier. Each subsystem record contains design, weight, and WUC/NSN cross-reference information.

Designers and logisticians could use the subsystem records throughout the design and development activity for a new system acquisition program. The WUC/NSN cross-reference could be used in conjunction with the NSN and Operational Support/Cost Records to evaluate the performance of equipment in various aircraft MDSs.

ON-LINE SYSTEM

The on-line interactive system is designed to permit users to request information selectively and have it displayed on remote CRT terminal screens. The ACDF database is actually structured in accordance with the records in Table 5. Functionally the database may be viewed in a manner similar to that shown in Figure 18. The database is designed to facilitate retrieval of all or part of the information in the database about a particular aircraft MDS.

The ACDF provides design and weight information for each subsystem record. It also provides WUC/NSN cross-reference information. The WUC can then be used to retrieve desired R&M and support cost information about the subsystem.



FUNCTIONAL DISPLAY OF ACDF DATABASE

FIGURE 18

RECORD COMMANDS

Once the user is logged on and "READY" appears on the screen, typing the "ACDF" command will retrieve the menu screen shown in Figure 19. The user may then select and enter the CODE for the desired RECORD NAME shown in Figure 19. When the desired record code is entered, the machine will prompt the user to enter the aircraft MDS of interest. When the appropriate MDS is entered, the ACDF will display the requested information on the CRT terminal screen. If the user desires all of the information in the ACDF about a particular MDS, the user would enter "ALL" rather than the code for one record. The system will then display the information in all of the ACDF records for the aircraft MDS specified.

```
WELCOME TO THE AIRCRAFT CHARACTERISTIC DATA BASE

PLEASE ENTER CODE FOR RECORD NAME DESIRED

CODE   RECORD NAME                          CODE   RECORD NAME
---    -----------------                    ---    -----------------
ACF    AIRCRAFT                             HPR    HYDRAULIC AND PNEUMATIC
AFR    AIRFRAME SUBSYSTEM                   LGR    LANDING GEAR SUBSYSTEM
AVS    AVIONICS SYSTEMS                     MDR    MISSION AND DESCRIPTION
BMR    BASIC MISSION                        NSN    NATIONAL STOCK NUMBER
CSF    CREW STATION & FUSELAGE DATA         OSC    OPR SUPPORT/COST
ECS    ENVIRONMENTAL CONTROL SUBSYSTEM      PPS    POWER PLANT SUBSYSTEM
ENG    ENGINE DATA                          SDP    SYSTEM DESIGN & PERFORMANCE
EPS    ELECTRICAL POWER SUPPLY              SRM    SYSTEM R & M COST
FCR    FLIGHT CONTROL SUBSYSTEM             UTI    SYSTEM UTILIZATION
FEA    SYSTEM FEATURES
FSR    FUEL SUBSYSTEM                       END    TO END THIS JOB
--------------------------------------------------------------------------
PLEASE ENTER CODE FOR INQUIRY MODE DESIRED

CODE          INQUIRY MODE
---           ------------
LAC       LIST ALL AIRCRAFT MDS AND SRD
LAV       LIST ALL AVIONICS EQUIPMENT SRD
LDE       LIST DATA ELEMENTS WITH RECORD CODE
LEN       LIST ALL ENGINE MODEL NUMBERS
SEL       SELECT ALL AIRCRAFT WITH A SYSTEM FEATURE
SEL LIST  DISPLAY A LIST OF SELECTABLE FEATURES WITH INDEX VALUES
```

ACDF RECORD SELECTION DISPLAY SCREEN

FIGURE 19

QUERY COMMANDS

The interactive ACDF system enables the user to query the system for selected information. The CODE for each of several INQUIRY MODES is listed at the bottom of the RECORD SELECTION DISPLAY screen shown in Figure 19.

LAC Command

When the user enters this command, the MDS and Standard Reporting Designator (SRD) will be displayed for each aircraft weapon system for which data exist in the ACDF.

LAV Command

When the user enters this command, the Standard Equipment Nomenclature (SEN) will be displayed for all avionics equipment in the ACDF.

LDE Command

When the user enters the LDE command, an alphabetical listing of all the data elements in the ACDF is displayed showing the record in which it is used. This feature would be particularly useful when the user is interested in one or more specific data elements, but does not know how to retrieve them.

LEN Command

When the user enters the LEN command, a list of all engine model numbers in the Engine Record is displayed.

SEL List Command

The System Features (FEA) record contains data elements that describe basic characteristics of an aircraft weapon system. When the user enters the FEA command, the machine will prompt for the desired aircraft MDS. When the MDS is entered, the machine will display all of the system features that are incorporated on that MDS.

The SEL LIST command, when entered, will display a list of all of the data elements in the System Features Record, along with an Index Number for each feature as shown in Table 6. In addition, the machine will prompt the user to enter the Index Number of interest. When this is accomplished, the machine will display all of the aircraft MDSs that have the selected features.

Some of the system features will require additional information, which the machine will prompt the user to provide. For example, when the user wants to find all aircraft MDSs that have two engines embedded in the fuselage, Index Number 10 is to be entered by the user. The machine would then prompt the user to enter the number of engines. When "2" is entered, the system would display all aircraft MDSs that have two engines embedded in the fuselage.

TABLE 6. SYSTEM FEATURES RECORD

INDEX VALUES OF SYSTEM FEATURES AVAILABLE FOR INQUIRY

INDEX	FEATURE
1	MANUFACTURER
2	AIRCRAFT TYPE
3	PRIMARY MISSION
4	WEIGHT CLASS
5	AIRCRAFT DENSITY
6	NUMBER AIRCREW
7	CREW ESCAPE
8	TYPE ENGINE
9	TOTAL NUMBER OF ENGINES
10	NO OF ENGINES IN FUSELAGE
11	NO OF ENGINE ON FUSELAGE PODS
12	NO OF ENGINE IN WINGS
13	NO OF ENGINE ON WING PODS
14	TYPE ENGINE INSTALLATION
15	ENGINE AUGUMENTED
16	VARIABLE GEOMETRY INLETS
17	THRUST REVERSER
18	WING LOCATION
19	VARIABLE WING GEOMETRY
20	WINGS WITH INTERNAL FUEL TANKS
21	HIGH TECHNOLOGY WING
22	BOUNDARY LAYER CONTROL
23	INDEPENDENT FLIGHT CONTROL
24	FLY-BY-WIRE CONTROL SYSTEM
25	STABILITY/CONTROL SYSTEM
26	ELECTRICAL MULTIPLEX
27	INDEPENDENT ELECTRICAL POWER
28	AUXILLARY POWER UNITS
29	INDEPENDENT HYDRAULIC POWER
30	HYDRAULIC SYSTEM PRESSURE
31	HYDRAULIC DEPENDENT SUBSYSTEMS
32	HF COMMUNICATION SYSTEM
33	VHF COMMUNICATION SYSTEM
34	UHF COMMUNICATION SYSTEM
35	FM COMMUNICATION SYSTEM
36	RADIO NAVIGATION SYSTEM
37	RADAR NAVIGATION SYSTEM
38	A/A RADAR
39	IR NAVIGATION SYSTEM
40	ELECTRO - OPTICAL

INDEX	FEATURE
41	A/A MISSILES
42	A/G MISSILES
43	CRUISE MISSILES
44	RFS
45	HUD
46	ECM
47	INTERNAL GUNS
48	ON-BOARD MAINTENANCE RECORDER
49	LANDING GEAR TYPE
50	NUMBER OF LANDING GEARS
51	NUMBER OF WHEELS/TIRES
52	DE-ICING
53	ANTI-ICING
54	BLEED AIR SYSTEM
55	TYPE OF OXYGEN
56	AUTO PILOT SYSTEM
57	AUTO PILOT/ILS COUPLED
58	TERRAIN FOLLOWING/TERRAIN AVOIDANCE (TF/TA)
59	AUTO PILOT COUPLED TO TF/TA
60	AUTO PILOT COUPLED TO WEAPON DELIVERY SYSTEM
61	FLIGHT DIRECTOR
62	WEAPON CONTROL SYSTEM
63	EXTERNAL STORE STATIONS
64	CAMERAS ON BOARD
65	AIR-TO-AIR REFUELING
66	WINDSHIELD RAIN REMOVAL
67	AIR TURBINE MOTORS
68	AVIONICS EQUIPMENT COOLING
69	RADAR ALTIMETER
70	CRASH DATA RECORDER
71	EMERGENCY RADIO BEACON
72	COMMAND/CONTROL EQUIPMENT
73	FIRE SUPPRESSION SYSTEM
74	LANDING GEAR KNEELING
75	LANDING GEAR CASTERING/STEERING
76	TAIL BUMPER
77	BUILT-IN-TEST SYSTEMS
78	STRUCTURAL COMPOSITE MATERIAL
79	AVIONICS/WEAPON CONTROL COMPUTER SYSTEM

AVS Versus Equipment

If the user wants to know the avionics equipment installed on a given aircraft MDS, the user would enter AVS and the MDS. If the user wants to know all of the MDS that use a particular piece of avionics equipment, the user would enter AVS and the SEN for the equipment.

Engine Data

Using the Engine Record (ENG), special prompts are available that permit the user (a) to obtain all the data associated with the engine installed on a given aircraft MDS, (b) to find all aircraft MDSs that use a particular engine, and (c) to obtain all the information available about a particular engine.

National Stock Number Data

Using the National Stock Number Record (NSN), special prompts are available (a) to find all aircraft MDSs that use a particular NSN in a specified major subsystem, (b) to find all aircraft MDSs that use a particular manufacturer's part number (MPN) in a specified major subsystem, (c) to find all the major subsystems on a particular aircraft MDS that utilize a specified NSN, and (d) to find all data for a particular NSN installed in a specified major subsystem and aircraft MDS.

ON-LINE CRT SCREENS

Data retrieved from the ACDF system will be displayed on remote CRT terminal screens. Many of the screens for the ACDF records are included in Appendix B. The data would be displayed exactly as shown for each record. When all of the available data will not fit on a screen image, the continued data would automatically wraparound to the next screen.

HARD COPY DATA

The on-line system permits users to request hard copy printouts of ACDF data. The ACDF Users Guide provides instructions for requesting batch printouts. The outputs will be displayed in the same form and content as shown in Appendix B.

SECTION V

AFOTEC AND COMBAT DATA

GENERAL

The UDB development program effort covered in the previous sections was accomplished by Clemson University. Two additional efforts that were relatively small in scope were accomplished as part of the UDB development program. The first was a study of the OT&E requirements for a new weapon system, which was accomplished by the BDM Corporation. The second was a study of combat data sources, which was accomplished by the McDonnell-Douglas Astronautics Company

OT&E REQUIREMENTS

OBJECTIVES AND APPROACH

The objectives of this effort were, first, to investigate the data input and output requirements of the Air Force Operational Test and Evaluation Center (AFOTEC) during an aircraft OT&E suitability assessment and, second, to determine the extent to which the prototype UDB would satisfy these needs. Two major tasks were undertaken to satisfy these objectives. The first was to identify and evaluate all of the data input requirements and data output products of the standard AFOTEC computer programs used in an aircraft OT&E suitability assessment. The second task was to compare the ALSAR and ACDF capabilities of the UDB with the results of the first task.

AFOTEC INPUTS AND OUTPUTS

Table 7 lists the primary systems used by AFOTEC. The data elements required for input to each one of these systems were defined. Similarly, the output products of each one of these systems were defined, and the individual data elements of each product were identified. A matrix was developed for both input requirements and output products, showing individual data elements by source and system used.

TABLE 7. AFOTEC SYSTEMS USED

INPUT REQUIREMENTS	OUTPUT PRODUCTS	SYSTEM USED	
X		D056	- AFLC Product Performance System
X		MDCS	- Maintenance Data Collection System
X		SEDS	- System Effectiveness Data System
X		MILAP	- Maintenance Information Logically Analyzed and Presented
X		MMICS	- Maintenance Management Information and Control System
X		CDEP	- Common Data Extraction Programs
X	X	MISEDS	- Machine Independent Systems Effectiveness Data System
X	X	OMNIVORE	- AFTEC Data Base Access and Analysis System
X	X	COO	- Cost of Ownership Model
X	X	LCOM	- Logistics Composite Model
X	X	MCSP	- Mission Completion Success Probability Model

UDB CAPABILITY

Using the matrices developed in the task above, a comprehensive list of data elements was prepared to define the specific input and output requirements of AFOTEC. This list was compared with the ALSAR and ACDF system capability of the prototype UDB. As a result, approximately 80 data elements were identified that could not be supported by the existing UDB.

OT&E RESULTS

The results of the OT&E requirements effort were documented by the BDM Corporation and delivered to the Air Force in April 1982. The objectives of this effort were fully satisfied, and the results will be used in future UDB development efforts.

COMBAT REQUIREMENTS

OBJECTIVES AND APPROACH

The objective of this effort was to investigate the feasibility of a combat unified retrieval system and its incorporation into the UDB system. The approach included tasks (a) to investigate and identify all significant sources of data on maintenance and logistics support in combat environments and also to identify available combat data retrieval and generating technologies, (b) to collect a representative sample of combat data from available identified sources, (c) to analyze potential approaches and design requirements, including software, necessary for the Air Force to obtain, store, and access this combat information, and (d) to outline corresponding detailed design requirements, for a combat database, that are compatible with the prototype UDB, and that will allow for combat information retrieval.

SUMMARY OF RESULTS

The results of this effort were documented by McDonnell-Douglas Astronautics Company and delivered to the Air Force in March 1983. The report provides a discussion of available combat data sources and related information, and provides sample combat data that could be included in a Combat Unified Retrieval System (CURS).

The report concluded that it would be possible to use the UDB system as the baseline for the development of a CURS. The detailed design requirements for a CURS and UDB interface were not defined.

SECTION VI

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE DEVELOPMENT

CONCLUSIONS

The UDB will satisfy many of the objectives discussed in Section II and shown in Figure 1. Progress to date has demonstrated that it is technically feasible to achieve all of the objectives of the conceptual closed-loop UDB system. While much development work remains to be accomplished, the ALSAR and ACDF systems provide a solid foundation on which future development efforts can build.

The ALSAR is a fully automated and advanced system that is being used in a production mode to support the defensive avionics portion of the B-1B program. Since this is its first application, the system has not yet been validated. The ALSAR has performed satisfactorily to date, and numerous problems in the system have been corrected. As the B-1B program progresses, the ALSAR system will be increasingly validated.

The ACDF system has been initially developed, but is far behind the ALSAR in terms of verification testing. All of the ACDF features covered in Section IV are available in the prototype, but additional development work will be needed before it is ready to be implemented by the Air Force.

FUTURE RESEARCH AND DEVELOPMENT

Future UDB development efforts should include tasks necessary to fully achieve the closed-loop UDB objectives discussed in Section II and shown in Figure 1. In addition, work to enhance the overall UDB system should be accomplished in future efforts. Specific recommendations for future R&D work are presented in the following paragraphs.

ALSAR

Production Support and Software Maintenance

Production support to the B-1B, and possibly other development programs, should continue using the existing ALSAR system. Until such time that the existing ALSAR is fully validated, this effort will require software maintenance support to fix problems when they are discovered. If program users are operating remotely from the host ALSAR facility, production support will be required from the host.

From the standpoint of the UDB development program, continued support to programs using the existing ALSAR is necessary to validate the advanced features of the system. From the standpoint of Air Force acquisition programs, the existing ALSAR system fully satisfies current Air Force and DOD requirements and is available now as Government property.

Redesign to Support MIL-STD-1388-2A

The ALSAR was designed and developed using DARCOMP 750-16 as the baseline. When MIL-STD-1388-2A is approved, the ALSAR system should be redesigned to support this new MIL-STD, while retaining the advanced features currently available in the system. This is a major task that will require significant redesign of the database architecture, with corresponding ripple effects throughout the on-line system, batch system, reporting system, and documentation.

Transportability

The ALSAR Is currently designed to utilize the Integrated Database Management System (IDMS) developed by Cullinet Corporation. As a result, the ALSAR system is transportable only to locations that have a compatible operating hardware and software environment.

Future UDB development efforts should include an investigation of the technical and economic advantages and disadvantages of system transportability. The effort should consider alternatives that range from maximum to minimum transportability, and evaluate the global impact of basic changes in requirements by the Government, standardization desired by the Government, achieving closed-loop UDB objectives, and other relevant factors.

Word-Processing Capability

The need exists for an ALSAR word-processing capability for narrative data in the LSAR database. Future UDB efforts should include a task to investigate and develop an optimal and generic interface capability between the ALSAR and currently available word-processing systems. This capability would be a useful and cost-effective tool for those responsible for accomplishing LSA/LSAR on any acquisition program.

Functional Users Guide

There is a critical need for a detailed manual to instruct functional area users on the use of the ALSAR in the LSA process for any given weapon system or equipment program. While the DED, DEI, and Users Guide were developed for the ALSAR, a much more detailed LSA manual is needed. Although MIL-STD-1388-2A provides an enormous amount of useful information, it does not adequately address this specific need. The Naval Air Systems Command (NAVAIR) 00-25-401, "Maintenance Planning and Analysis Program Guide," is an excellent example of what is needed.

ACDF

The ACDF system described in Section IV has been initially developed and tested, but has not been validated. The system represents a good start, but additional development work is needed to satisfy objectives 1, 2, 3 and 8 shown in Section II, Figure 1.

Load Data

In future UDB efforts, the ACDF should be loaded with actual data for several aircraft MDSs. If the Air Force plans to use the UDB in the future to support a specific new aircraft weapon system acquisition program, the ACDF should be loaded with data about similar aircraft MDSs that are currently operational.

Interface Programs

The capability is needed to enable users to identify a BCS in the ACDF and to have the system automatically produce a BCS output tape in ALSAR format. This capability addresses Objective 3 shown in Figure 1 and discussed in Section II. The programs required to achieve this capability would also satisfy Objective 7 shown in Figure 1. Future UDB development efforts should include this important work. In addition, continued work is needed to refine and test the interface programs to process and load D056E and VAMOSC data.

Trend Data Graphics

Although the on-line retrieval and display capabilities discussed in Section IV have been developed, there is a need for the capability for on-line retrieval and display of R&M trend data with graphics.

OT&E INTERFACE

The prototype UDB effort included an investigation of AFOTEC requirements for aircraft suitability testing during OT&E. Future UDB development efforts should implement the findings of this effort. Specifically, the ALSAR and ACDF should be modified to provide, as a minimum, the additional data elements identified in the investigation of AFOTEC requirements.

INSTALL AND DEMONSTRATE UDB

In future UDB development efforts the current ALSAR and ACDF systems should be installed, tested, and demonstrated in a Government computer facility at Wright-Patterson AFB, Ohio. Subsequently, modifications and enhancements should be installed, tested, and demonstrated. Software maintenance should also be provided throughout the UDB development effort.

COMPUTER-AIDED DESIGN (CAD)

The ACDF and ALSAR system of the UDB represent significant computer tools to aid in the design and systems engineering process. The UDB does not accomplish the function of modern CAD systems used to explore alternatives and to establish the actual design of (a) airframe structure, mold lines, compartments, and assemblies, (b) electronic circuit boards and components, and (c) the many other uses for primary hardware, support equipment, and facility design.

In future UDB efforts it is recommended that R&D be conducted to investigate alternative approaches for developing a generic interface between the UDB and various CAD systems currently available. The purpose of such an interface would be to provide an improved mechanism whereby useful R&M and logistics support related information is provided to the design engineer such that logistics factors may influence design activity and decisions that occur in the early planning and throughout the design process. Following this effort, the development of promising alternatives should be pursued.

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ABBREVIATIONS

ACDF	–	Aircraft Characteristics Data File
ADP	–	Automated Data Processing
AFB	–	Air Force Base
AFG	–	Air Force Guide
AFHRL	–	Air Force Human Resources Laboratory
AFLC	–	Air Force Logistics Command
AFR	–	Air Force Regulation
AFOTEC	–	Air Force Operational Test and Evaluation Center
ALSAR	–	Automated Logistics Support Analysis Record
ANSI	–	American National Standard Institute
BCS	–	Baseline Comparison System
CAD/CAM	–	Computer-Aided Design/Computer-Aided Manufacturing
CER	–	Cost Estimating Relationship
CMRS	–	Calibration and Measurement Requirements Summary
COBOL	–	Common Business Oriented Language
CRT	–	Cathode Ray Tube
CSEL	–	Consolidated Support Equipment List
DARCOM	–	U.S. Army Materiel Development and Readiness Command
DARCOMP	–	DARCOM Pamphlet
DED	–	Data Element Description
DEI	–	Data Entry Instructions
DID	–	Data Item Description
DOD	–	Department of Defense

DODD - Department of Defense Directive

FMECA - Failure Modes, Effects, and Criticality Analysis

HDR - Historical Data Repository

How Mal - How Malfunctioned

IDMS - Integrated Database Management System

ILS - Integrated Logistics Support

LCOM - Logistics Composite Model

LRU - Line Replaceable Unit

LSA - Logistics Support Analysis

LSACN - Logistics Support Analysis Control Number

LSAR - Logistics Support Analysis Record

MDCS - Maintenance Data Collection System

MDS - Mission, Design, and Series

MIL-STD - Military Standard

MMH/FH - Maintenance Manhours per Flying Hour

MOD-METRIC - AFLC Spares Provisioning Model

MPN - Manufacturer's Part Number

MRSA - DARCOM Materiel Readiness Support Activity

NRLA - Network Repair Level Analysis

NSN - National Stock Number

O&S - Operation and Support

OT&E - Operational Test and Evaluation

PER - Parametric Estimating Relationship

PMD - Program Management Directive

PPFS	-	Product Performance Feedback System
PPL	-	Provisioning Parts List
R&M	-	Reliability and Maintainability
SEN	-	Standard Equipment Nomenclature
Seq. No.	-	Line Sequence Number
SERD	-	Support Equipment Recommendations Document
SRD	-	Standard Reporting Designator
SRU	-	Shop Replaceable Unit
SSC	-	Skill Specialty Code
TSO	-	Time Sharing Option
UC	-	Update Code
UDB	-	Unified Database
VAMOSC	-	Visibility and Management of Operational Support Costs
VSAM	-	Virtual Storage Access Method
WBS	-	Work Breakdown Structure
WUC	-	Work Unit Code

APPENDIX A

ALSAR DATA SHEETS

This appendix contains the data sheets used by the ALSAR system. Much of the discussion in Section III refers to these sheets.

DATA SHEET A: OPERATIONS AND MAINTENANCE REQUIREMENTS

DATE ____ PAGE ____ OF ____

SUBMITTED BY ____ EXT. ____

CARD NUMBER | 1 LSACN EGC/WBS/WUC | 2 END ITEM ACRONYM CODE | 4 FSCM | 8 DWG CLASS | 9 SERIAL NUMBER EFFECTIVITY: FROM / TO | 10 DATE: YR / MO | UPDATE CODE

A01

CARD NUMBER | LSACN | 1 ITEM NAME | 2 ITEM DESIGNATOR CODE: TYPE / MODEL / SERIES / SUFFIX DESIGNATOR | 3 CONVERSION FACTOR | UPDATE CODE

A02

CARD NUMBER | LSACN | 1 MFR PART NUMBER | LRNC | 2 FSCM | 3 DRAWING NUMBER | LRNC | 4 FSCM | UPDATE CODE

A03A

A03B

MEASUREMENT BASE

CARD NUMBER | LSACN | 1 ANNUAL OPERATING REQUIREMENTS | MEAS BASE | ANNUAL OPERATING REQUIREMENTS | MEAS BASE | ANNUAL OPERATING REQUIREMENTS | MEAS BASE | 2 ANNUAL NUMBER OF MISSIONS | ANNUAL OPERAT DAYS 3 | 4 MEAN MISSION DURATION | MEAS BASE | 5 MODE OF TRANSPORT | 6 MISSION COMPLETION SUCCESS PROBABILITY: REQUIRED / ACHIEVED | UC

A04

ORGANIZATIONAL MAINTENANCE/ON EQUIPMENT MAINTENANCE - AIR FORCE/AVUM - ARMY | 1 MAINTENANCE REQUIREMENTS (RECORD TO TENTHS OF HOURS)

CARD NUMBER | LSACN | A NUMBER OF SYSTEMS SUPP | B DAILY INSP: MEAN ELAPSED TIME / MEAN MAN HRS | C PREOPERATIVE INSP: MEAN ELAPSED TIME / MEAN MAN HRS | D POST OPERATIVE INSP: MEAN ELAPSED TIME / MEAN MAN HRS | E HOME STATION CHECK: MEAN ELAPSED TIME / MEAN MAN HRS | F INTERMEDIATE INSP: MEAN ELAPSED TIME / MEAN MAN HRS | UC

A05

CARD NUMBER | LSACN | G PERIODIC INSP: MEAN ELAPSED TIME / MEAN MAN HRS | H UNSCHEDULED MAINT: MEAN ELAPSED TIME / MEAN MAN HRS | I TURNAROUND: MEAN ELAPSED TIME / MEAN MAN HRS | J MISSION PROFILE CHANGE: MEAN ELAPSED TIME / MEAN MAN HRS | K M/H PER HOUR: SCHEDULED / UNSCHEDULED | L ANNUAL MAINT M/H: SCHEDULED / UNSCHEDULED | UPDATE CODE

A06

INTERMEDIATE/DIRECT SUPPORT MAINTENANCE AFLOAT/THIRD ECHELON/OFF EQUIPMENT - AIR FORCE/AVIM - ARMY | 1 MAINTENANCE REQUIREMENTS (RECORDED TO TENTHS OF HOURS)

CARD NUMBER | LSACN | A NUMBER OF SYSTEMS SUPP | B HOME STATION CHECK: MEAN ELAPSED TIME / MEAN MAN HRS | C INTERMEDIATE INSP: MEAN ELAPSED TIME / MEAN MAN HRS | D PERIODIC INSP: MEAN ELAPSED TIME / MEAN MAN HRS | E M/H PER HOUR: SCHEDULED / UNSCHEDULED | F ANNUAL MAINT M/H: SCHEDULED / UNSCHEDULED | UC

A07

DEPOT MAINTENANCE | 1 MAINTENANCE REQUIREMENTS (RECORD TO TENTHS OF HOURS)

CARD NUMBER | LSACN | A NUMBER OF SYSTEMS SUPP | B M/H PER HOUR: SCHEDULED / UNSCHEDULED | C ANNUAL MAINT M/H: SCHEDULED / UNSCHEDULED | UC

A08

CARD NUMBER | LSACN | 1 SYSTEM/END ITEM AVAILABILITY (RECORD IN PERCENT): A PARTIAL MISSION CAPABLE (PMC): 1 REQUIRED / 2 PREDICTED / 3 MEASURED | B PMC MAINTENANCE (PMCM): ALLOCATED / 2 PREDICTED / 3 MEASURED | C PMC SUPPLY (PMCS): ALLOCATED / 2 PREDICTED / 3 MEASURED | D PMC BOTH MAINT & SUPPLY: 1 ALLOCATED / 2 PREDICTED / 3 MEASURED | UC

A09

CARD NUMBER | LSACN | 1 SYSTEM/END ITEM AVAILABILITY (CONTINUED): A ... / MEASURED | B MAINT ... PER SORTIE ...: REQUIRED / PREDICTED / MEASURED | 2 NOT MISSION CAPABLE (NMC): A NOT MISSION CAPABLE: PREDICTED / 2 MEASURED | B NMC MAINTENANCE: 1 PREDICTED / 2 MEASURED | C NMC SUPPLY: 1 PREDICTED / 2 MEASURED | D NMC BOTH: 1 PREDICTED / 2 MEASURED | UC

A10

DATA SHEET A1: SUPPLEMENTAL OPERATIONS AND MAINTENANCE REQUIREMENTS

DATE: ________ PAGE ____ OF ____

SUBMITTED BY: ________ EXT ____

CARD NUMBER A 1 1 A — LSACN (cols 5–15)
- 2 ESTIMATED UNIT COST (FLYAWAY): A NON-RECURRING (16–25); B RECURRING (26–35)
- 3 ACTUAL UNIT COST (FLYAWAY): A NON-RECURRING (36–45); B RECURRING (46–55)
- 4 ESTIMATED O & S COST (ANNUAL) (56–65)
- 5 ACTUAL O & S COST (ANNUAL) (66–75)
- 6 BASE YEAR (76–77)
- U.C. (80)

CARD NUMBER A 1 2 A — LSACN
- 2 INITIAL SUPPORT EQUIPMENT COST: A COMMON S.E.; B PECULIAR S.E.
- 3 INITIAL AND REPLENISHMENT SPARES COST: A. INITIAL SPARES; B REPLENISHMENT SPARES
- 4 BASE MATERIAL COST
- 5 BASE PETROLEUM, OIL AND LUBRICANTS (POL) COST
- 6 BASE YEAR
- U.C.

CARD NUMBER A 1 3 A / A 1 3 B — LSACN
- BASE LEVEL (CARD A13A) / DEPOT LEVEL (CARD A13B)
- 2 TECHNICAL PUBLICATIONS COST AND QUANTITY: A TOTAL COST; B NUMBER OF PAGES; C NUMBER OF ILLUSTRATIONS
- 3 TRAINING COST: A. PERSONNEL; B MATERIAL/EQUIPMENT
- 4 NUMBER OF PEOPLE TRAINED
- 5 NUMBER OF NEW/MOD SKILLS
- 6 BASE YEAR
- U.C.

CARD NUMBER A 1 4 A — LSACN
- 2 PROGRAMMED DEPOT MAINTENANCE COST (PDM)
- 3 COMPONENT REPAIR/OVERHAUL COST
- 4 INITIAL DEPOT SUPPORT EQUIPMENT COST
- 5 DEPOT FACILITIES COST
- 6 BASE LEVEL FACILITIES COST
- 7 BASE YEAR
- U.C.

CARD NUMBER A 1 5 A — LSACN
- 2 SUPPORT GENERAL MMH/FH: A ORGANIZATIONAL LEVEL (1 ALLOC, 2 PRED, 3 MEAS); B INTERMEDIATE LEVEL (1 ALLOC, 2 PRED, 3 MEAS)
- 3 SCHEDULED AND SPECIAL INSPECTIONS (03 & 04) MMH/FH: A ORGANIZATIONAL LEVEL (1 ALLOC, 2 PRED, 3 MEAS); B INTERMEDIATE LEVEL (1 ALLOC, 2 PRED, 3 MEAS)
- U.C.

CARD NUMBER A 1 6 A — LSACN
- 2 PREVENTIVE MMH/FH: A ORGANIZATIONAL LEVEL (1 ALLOC, 2 PRED, 3 MEAS); B INTERMEDIATE LEVEL (1 ALLOC, 2 PRED, 3 MEAS)
- 3 CORRECTIVE MMH/FH: A ORGANIZATIONAL LEVEL (1 ALLOC, 2 PRED, 3 MEAS); B INTERMEDIATE LEVEL (1 ALLOC, 2 PRED, 3 MEAS)
- U.C.

CARD NUMBER A 1 7 A — LSACN
- 2 TOTAL BASE LEVEL MMH/FH: A ORGANIZATIONAL LEVEL (1 ALLOC, 2 PRED, 3 MEAS); B INTERMEDIATE LEVEL (1 ALLOC, 2 PRED, 3 MEAS)
- 3 MEAN MANHOURS TO REPAIR (MMHTR): 1 ALLOC, 2 PRED, 3 MEAS
- 4 MAXIMUM TIME TO REPAIR (ELAPSED TIME): A ORGANIZATIONAL LEVEL (1 ALLOC, 2 PRED, 3 MEAS); B INTERMEDIATE LEVEL (1 ALLOC, 2 PRED, 3 MEAS)
- U.C.

CARD NUMBER A 1 8 A — LSACN
- 2 DEPOT MMH/FH: A PROGRAMMED DEPOT MAINTENANCE (1 ALLOC, 2 PRED, 3 MEAS); B COMPONENT REPAIR/OVERHAUL (1 ALLOC, 2 PRED, 3 MEAS)
- 3 MISSION RECONFIGURATION TIME: A MEAN ELAPSED TIME (1 REQUIRED, 2 PREDICTED, 3 MEASURED); B 90TH PERCENTILE (1 REQUIRED, 2 PREDICTED, 3 MEASURED); C MEAN CREW SIZE
- U.C.

CARD NUMBER A 1 9 A — LSACN
- 2 ANALYTICAL CONDITION INSPECTION (ACI): A MEAN ELAPSED TIME; B MEAN MANHOURS
- 3 QUICK TURNAROUND TIME: A ELAPSED TIME (MINUTES) (1 REQUIRED, 2 PREDICTED, 3 MEASURED); B MAINTENANCE MANMINUTES (1 REQUIRED, 2 PREDICTED, 3 MEASURED); C CREW SIZE; D AIRCREW MANMINUTES (1 REQUIRED, 2 PREDICTED, 3 MEASURED)
- U.C.

Card columns: 1 2 3 4 5 6 7 8 9 10 … 80

DATA SHEET B: ITEM RELIABILITY(R) AND MAINTAINABILITY(M) CHARACTERISTICS

DATE ______ PAGE ____ OF ____

SUBMITTED BY ______ EXT ______

ALTERNATE LSACN

Card Number	LSACN	Fields
CARD NUMBER (1 2 3 4)	1 LSACN (FGC/WBS/WUC) (5–15)	2 END ITEM ACRONYM CODE (16–25); SERVICE DESIG. (26); 4 FSCM (27–31); ALTERNATE ACTION (32); REV CODE (33); DATA STATUS (34); 8 DWG CLASS (35–37); 9 SERIAL NUMBER EFFECTIVITY – FROM (38–47) [illegible] (48–57); 10 DATE – YR (58–59) MO (60–61) DA (62–63); (64–79); UPDATE CODE (80)
B 0 1		
CARD NUMBER	LSACN	1 ITEM NAME; 2 ITEM DESIGNATOR CODE – TYPE, MODEL, SERIES, SUFFIX; 3 CONVERSION FACTOR; U/C
B 0 2		
Card Number	LSACN	1 MFR PART NUMBER (16–31); [illegible] (32); 2 FSCM (33–37); 3 DRAWING NUMBER (38–53); [illegible] (54); 4 [illegible]; U/C
B 0 3 A		
B 0 3 B		
CARD NUMBER	LSACN	1 MAINTAINABILITY CONSIDERATIONS A-ADEQUATE, N-NOT ADEQUATE: STANDARD, ACCESSABILITY, MAINT. EASE, SAFETY, TEST POINTS, SKILLS, TRAINING, COMP. REMOVAL, PKG / TRANS, FAULT ISOLATION, LABELING, SELF-PROTECT, CORROSION / RUST CONT., EQUIPMENT REQUIRED, TOOLS, FACILITIES; MAINT. CONCEPT IMPACT (TYPES 1–4); 2 BUILT IN TEST (BIT) / CENTRAL INTEGRATED TEST SYSTEM (CITS) / AOE [illegible]: A FAULT DETECTION (%) – 1 REQUIRED, 2 PREDICTED, 3 MEASURED; B FAULT ISOLATION (%) – 1 REQUIRED, 2 PREDICTED, 3 MEASURED; C [illegible] – 1 R[illegible]; 3 G S C O C; 4 I C C; 5 L R U / S R U; U/C
B 0 4 A		
CARD NUMBER	LSACN	1 RELIABILITY: A MEAN TIME BETWEEN REMOVALS – MTBR – 1 ALLOCATED, 2 PREDICTED, 3 MEASURED; B MEAN TIME BE[illegible] [illegible]VE MAINTENANCE – MTBM – 1 ALLOCATED, [illegible], 3 MEASURED; C INHERENT MA[illegible] – TYPE 1 MTBM – 1 ALLOCATED, 2 PREDICTED, 3 MEASURED; [illegible]; U/C
B 0 4 B		
CARD NUMBER	LSACN	1 RELIABILITY (CONTINUED): A INDUCED MALFUNCTION – TYPE 2 MTBM – 1 PREDICTED, 2 MEASURED; B NO DEFECT – TYPE 6 MTBM – 1 PREDICTED, 2 MEASURED; C PREVENTIVE (SCHEDULED REMOVAL) MTBM – 1 PREDICTED, 2 MEASURED; [illegible]; 2 MEAN TIME [illegible] MAINTENANCE ACTIONS [illegible]; 3 RATIO OF MAINTENANCE AC[illegible] TO MAINTENANCE EVENTS; U/C
B 0 4 C		
CARD NUMBER	LSACN	1 FAILURE ANALYSIS: A FAILURE MODE; [illegible]; B FAILURE SYMPTOMS; C FAILURE, EFFECT AND CRITICALITY; D % OR MTBM; E MTTR ALLOCATED; F TASK CODE; U/C
B 0 5 A		
CARD NUMBER	LSACN	1 RELIABILITY CENTERED MAINTENANCE ANALYSIS (APPENDIX C): A LOGIC RESULTS (FIGURE C-2) 1–20; B DISPOSITION; C TASK ANALYSIS DOCUMENTATION – RAC / WBS / WUC, TASK CODE; U/C
B 0 6 A		
Card Number	LSACN	1 ITEM FUNCTION; SEQ NO
B 0 7 A		
Card Number	LSACN	1 QUALITATIVE AND QUANTITATIVE MAINTAINABILITY REQUIREMENTS (NUCLEAR HARDENED CHARACTERISTICS, FAIL SAFE ENVIRONMENTAL, ETC); SEQ NO
B 0 8 A		
Card Number	LSACN	1 MAINTENANCE CONCEPT; SEQ NO
B 0 9 A		
Card Number	LSACN	1 REMARKS / RECOMMENDATIONS / JUSTIFICATION
B 1 0 A		

Card columns 1–80 are numbered along the rows.

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DATA SHEET B: ITEM RELIABILITY(R) AND MAINTAINABILITY(M) CHARACTERISTICS (SUPPLEMENTAL DATA AT THE TWO DIGIT WORK UNIT CODE LEVEL)

DATE: ______ PAGE ____ OF ____

SUBMITTED BY ______ EXT: ____

CARD NUMBER	LSACN	1 BASE LEVEL MAINTENANCE MANHOURS PER FLIGHT HOUR													UPDATE CODE
		A ORGANIZATIONAL LEVEL (ON-EQUIPMENT)						B INTERMEDIATE LEVEL (OFF-EQUIPMENT)							
		1 PREVENTIVE			2 CORRECTIVE			1 PREVENTIVE			2 CORRECTIVE				
		A ALLOC	B PRED	C MEAS	A ALLOC	B PRED	C MEAS	A ALLOC	B PRED	C MEAS	A. ALLOC	B. PRED	C MEAS		
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19	20 21 22 23	24 25 26 27	28 29 30 31	32 33 34 35	36 37 38 39	40 41 42 43	44 45 46 47	48 49 50 51	52 53 54 55	56 57 58 59	60 61 62 63	64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79	80
B 1 A															

CARD NUMBER	LSACN	1 BASE LEVEL MAINTENANCE MANHOURS PER FLIGHT HR (CON'T)						2. BASE LEVEL					3. DEPOT MAINTENANCE MANHOURS PER FLIGHT HOUR			4 MEAN TIME TO REPAIR (MTTR)		UC
		A TOTAL BASE LEVEL MMH/FH						A. MEAN MAINTENANCE MANHOURS										
		1 PREVENTIVE			2 CORRECTIVE			1 PREVENTIVE		2. CORRECTIVE								
		A ALLOC	B PRED	C MEAS	A ALLOC	B PRED	C MEAS	A PRED	B. MEAS	A ALLOC	B PRED	C. MEAS.	A ALLOC	B PRED	C MEAS	A PRED	B MEAS	
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19	20 21 22 23	24 25 26 27	28 29 30 31	32 33 34 35	36 37 38 39	40 41 42 43	44 45 46 47	48 49 50 51	52 53 54 55	56 57 58 59	60 61 62 63	64 65 66 67	68 69 70 71	72 73 74 75	76 77 78 79	80
B 2 A																		

CARD NUMBER	LSACN	1 FAILURE CAUSE	SEQ. NO	UC
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76	77 78 79	80
B A				

CARD NUMBER	LSACN	1 FAILURE DETECTION METHOD	SEQ NO	UC
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76	77 78 79	80
B 4 A				

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

DATA SHEET C: TASK ANALYSIS SUMMARY

DATE ______ PAGE ______ OF ______

SUBMITTED BY: ______ EXT ______

CARD NUMBER	1 LSACN (FGC/WBS/WUC)	2 END ITEM ACRONYM CODE	3 SERVICE DES CD	4 FSCM	5 ALTERN ACTION	6 REV CODE	7 DATA SH STATUS	8 DRAWING CLASS	9 SERIAL NUMBER EFFECTIVITY FROM	TO	10 DATE YR	MO	DA		UPDATE CODE
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23 24 25	26	27 28 29 30 31	32	33	34	35 36 37	38 39 40 41 42 43 44 45 46 47	48 49 50 51 52 53 54 55 56 57	58 59	60 61	62 63	64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79	80
C 0 1															

CARD NUMBER	LSACN	1 ITEM NAME	2. ITEM DESIGNATOR CODE TYPE	MODEL	SERIES	SUFFIX	3 CONVERSION FACTOR		U C
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34	35 36 37 38 39 40 41	42 43 44 45 46 47 48 49 50 51	52 53	54 55 56 57 58 59 60	61 62 63 64	65 66 67 68 69 70 71 72 73 74 75 76 77 78 79	80
C 0 2									

CARD NUMBER	LSACN	1 MANUFACTURER'S PART NUMBER	LRNC	2. FSCM	3. DRAWING NUMBER	LRNC	4. FSCM	5 NEXT HIGHER ASSEMBLY PART NUMBER	LRNC		U C
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	32	33 34 35 36 37	38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53	54	55 56 57 58 59	60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75	76	77 78 79	80
C 0 3 A											
C 0 3 B											

TASK SUMMARY / PERSONNEL SUMMARY

CARD NUMBER	LSACN	1 TASK CODE (MAINTENANCE LEVEL)	2 TASK FREQUENCY TO (THOUSAND)	3 MEAS BASE	4 ELAPSED TIME (REC TO 100ths OF HRS) A ALLOCATED	B PREDICTED	C MEASURED	5 PR/O CAN	6 SKILL LEVEL	7 SKILL SPECIALTY CODE	8 SS EVAL	9 NO OF MEN PER TASK	10 MAN HOURS (REC TO 100ths OF HRS) A ALLOCATED	B PREDICTED	C MEASURED	11 REQMTS FOR FACILITY	TRN EQP	SUPPORT EQUIP GROUPING ID NO	TOOL CD	ATE	U C
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23	24 25 26 27 28 29	30	31 32 33 34 35	36 37 38 39 40	41 42 43 44 45	46	47	48 49 50 51 52 53 54	55	56 57	58 59 60 61 62	63 64 65 66 67	68 69 70 71 72	73	74	75 76 77	78	79	80
C 0 4 A																					
C 0 4																					
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23	24 25 26 27 28 29	30	31 32 33 34 35	36 37 38 39 40	41 42 43 44 45	46	47	48 49 50 51 52 53 54	55	56 57	58 59 60 61 62	63 64 65 66 67	68 69 70 71 72	73	74	75 76 77	78	79	80

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DATA SHEET D: MAINTENANCE AND OPERATOR TASK ANALYSIS

ALTERN ACTION | REV CODE | DATA IN STATUS

DATE: ______ PAGE ____ OF ____

SUBMITTED BY: ______ EXT: ____

TASK IDENTIFICATION

CARD NUMBER	1 LSA CONTROL NUMBER	2 TASK CODE	3 END ITEM ACRONYM	4 ITEM NAME	5 MANUFACTURERS PART NUMBER	6 FSCM	7 DATE YR MO DA	U.C.
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23	24 25 26 27 28 29 30 31 32 33	34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52	53 54 55 56 57 58 59 60 61 62 63 64	65 66 67 68 69	70 71 72 73 74 75 76 77 78 79	80
0 0 1								

CARD NUMBER	1 LSA CONTROL NUMBER	2 TASK CODE	3 TASK IDENTIFICATION	4 SHC	5 MEANS OF DETECTION	6 HOW MAL CODE	7 REFERENCE WORK UNIT CODE	8 SOURCE CODE (SRD)	U.C.
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23	24–63	64	65 66	67 68 69	70 71 72 73 74 75 76	77 78 79	80
0 0 2									

CARD NUMBER	1 SLN	2 SEQUENTIAL TASK DESCRIPTION	3 WORK AREA	4	5 MAN HOURS MINUTES	6 ELAPSED TIME MINUTES	U.C.
1 2 3 4	5 6 7	8–64	65 66 67 68	69	70 71 72 73 74	75 76 77 78 79	80
0 0 3 A							
0 0 3							
0 0 3							
0 0 3							
0 0 3							
0 0 3							

CARD NUMBER	1 SSC A	MAN-HOURS A MINUTES	2 SSC B	MAN-HOURS B MINUTES	3 SSC C	MAN-HOURS C MINUTES	4 SSC D	MAN-HOURS D MINUTES	5 SSC E	MAN-HOURS E MINUTES	6 TOTAL ELAPSED TIME		U.C.
1 2 3 4	5 6 7 8 9 10 11	12 13 14 15 16	17 18 19 20 21 22 23	24 25 26 27 28	29 30 31 32 33 34 35	36 37 38 39 40	41 42 43 44 45 46 47	48 49 50 51 52	53 54 55 56 57 58 59	60 61 62 63 64	65 66 67 68 69	70 71 72 73 74 75 76 77 78 79	80
0 0 4 A													

DATA SHEET DI: ADDITIONAL MAINTENANCE AND OPERATOR TASK INFORMATION

DATE: ______ PAGE ____ OF ____

SUBMITTED BY ______ EXT ____

CARD NUMBER	1 LSA CONTROL NUMBER	2 TASK CODE	3 TASK IDENTIFICATION	4 SMC	5 MEANS OF DETEC-TION	6 NOR-MAL CODE	7 REF. WUC	8 SRC	UPDATE CODE
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23	24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63	64	65 66	67 68 69	70 71 72 73 74 75 76	77 78 79	80
0 0 2									

CARD NUMBER	1 LSA CONTROL NUMBER	2 TASK CODE	3 MANUFACTURERS PART NUMBER	4 FSC	5 ITEM NAME	6 QTY/TASK	UC
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23	24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55	56	57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75	76 77 78 79	80
0 0 5 A							
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23	24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55	56	57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75	76 77 78 79	80
0 0 5							
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23	24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55	56	57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75	76 77 78 79	80
0 0 5							
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23	24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55	56	57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75	76 77 78 79	80
0 0 5							

CARD NUMBER	1 LSA CONTROL NUMBER	2 TASK CODE	3 SSC	4 TASK COND.	5 PERF STANDARDS	6 TR REC	7 TRAINING RATIONALE	8 TRAINING LOCATION RATIONALE	9 CRIT TASK	10 EST. NO. OF WEEKS	11 NO OF T.O. PAGES	12 NO. OF T.O ILLUSTR	13 TRAINING COST		UPDATE CODE
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23	24 25 26 27 28 29 30	31 32	33 34 35	36	37 38 39 40	41 42 43 44	45	46 47 48	49 50 51	52 53 54	55 56 57 58 59 60 61 62 63 64	65 66 67 68 69 70 71 72 73 74 75 76 77 78 79	80
0 0 6 A															
0 0 6 B															
0 0 6 C															
0 0 6 D															
0 0 6 E															
0 0 6 F															
0 0 6 G															

DATA SHEET E: SUPPORT AND TEST EQUIPMENT OR TRAINING MATERIAL DESCRIPTION AND JUSTIFICATION

DATE: ________ PAGE ____ OF ____

SUBMITTED BY: ________ EXT: ____

ALTERNATE LSACN

Card E01 (CARD NUMBER E 0 1): 1 LSACN (FGC/WBS/WUC) | 2 END ITEM ACRONYM CODE | 4 FSCM | 8 DWG CLASS | 9 SERIAL NUMBER EFFECTIVITY (FROM, TO) | 10 DATE (YR, MO, DA) | 11 TEST SET LSACN

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

Card E02 (CARD NUMBER E 0 2): LSACN | 2 ITEM NAME | 3 ITEM DESIGNATOR CODE (TYPE, MODEL, SERIES, SUFFIX) | 4 CONVERSION FACTOR | 8 ITEM NUMBER | UC

Card E03A / E03B (CARD NUMBER E 0 3 A, E 0 3 B): LSACN | 2 MFR PART NUMBER | 3 FSCM | 4 DRAWING NUMBER | 5 FSCM | 6 CONTRACT NUMBER | UC

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

Card E04 (CARD NUMBER E 0 4): LSACN | 2 TYPE ITEM CODE | 3 OPERATING (A LENGTH, B WIDTH, C HEIGHT, D UNIT MEAS, E WEIGHT, F UNIT MEAS) | 4 STORAGE (A LENGTH, B WIDTH, C HEIGHT, D UNIT MEAS, E WEIGHT, F UNIT MEAS) | 5 PRE POSITION CODE | UC

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

Card E05 (CARD NUMBER E 0 5): LSACN | ITEM CAT CODE | 3 UNIT COST (NONRECURRING) | UPM | 4 UNIT COST (RECURRING) | UPM | 5 TOTAL QUANTITY REC | 6 EXTENDED UNIT PRICE | 7 SUP EQUIP GP ID NO | 9 TEL CHANGE CODE | UC

TEST MEASUREMENT AND DIAGNOSTIC EQUIPMENT

Card E06 (CARD NUMBER E 0 6): LSACN | 2 PARAMETERS MEASURED OR SIGNAL PROVIDED (TMDE) | 3 RANGE (FROM) (VALUE, MEASUREMENT TERM) | 4 RANGE (TO) (VALUE, MEASUREMENT TERM) | UC

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

Card E07 (CARD NUMBER E 0 7): LSACN | 5 TOLERANCE PLUS (+) (VALUE, MEASUREMENT TERM) | 6 TOLERANCE MINUS (-) (VALUE, MEASUREMENT TERM) | 7 No. Of Ranges | 8 REMARKS | UC

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

Card E08 (CARD NUMBER E 0 8): LSACN | 2 JUSTIFICATION (INCLUDE REASON "CRITICAL" DESIGNATION, CARD E02, BLOCK 6) | SEQUENCE NUMBER | UC

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

Card E09 (CARD NUMBER E 0 9): LSACN | 2 DESCRIPTION OF OPERATION/FUNCTION | SEQUENCE NUMBER | UC

Card E10 (CARD NUMBER E 1 0): LSACN | 2 CHARACTERISTICS/NARRATIVE DESCRIPTION | SEQUENCE NUMBER | UC

Card E11 (CARD NUMBER E 1 1): LSACN | 2 ADDITIONAL SKILL, SPECIAL TRAINING REQUIREMENTS | SEQUENCE NUMBER | UC

Card E12 (CARD NUMBER E 1 2): LSACN | 2 INSTALLATION FACTORS | SEQUENCE NUMBER | UC

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

DATA SHEET E1: ADDITI[illegible] [illegible]DE FOR REGISTRATION AND PROCU[illegible] [illegible]PPROVAL

DATE: ______ PAGE ______ OF ______

SUBMITTED BY: ______ EXT: ______

TMDE ITEM DATA

POWER REQUIRED

CARD NUMBER	1 LSACN	2 OPERATING VOLTAGE RANGE	3 FR[illegible]	[illegible]	5 WATTS	6 OTHER FACILITIES	CC
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21	22 23 [illegible]	28	29 30 31 32	33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79	80
E 1 1 3							

CARD NUMBER	1 LSACN	2 CAL INT	3 LIFE CYCLE STATUS	4. MFR MODEL NO	5. MFR NAME	6 O & S COST	CC
E 1 1 4							

CARD NUMBER	1 LSACN	2 MANAGING CMD/AGC[illegible]	3 OTHER USING CMDS/AGCYS	4. PROPONENT	5. OPERATORS MANUALS	CC
E 1 1 5						

CARD NUMBER	1 LSACN	2 NSN	3 LINE ITEM NO	4. SKILL SPECIALTY CODE	5 SELF TEST	6 [illegible]	7 [illegible]	8 MTBF	9 MTBMA	10 [illegible]	11 MTTR	CC
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23 [illegible] 27 28 29 30 31 32 33 34 35	36 37 38 39 40 41	42 43 44 45 46 47 48	49 50 51 52 53 54	55	56	57 58 59 60 61 62	63 64 65 66 67 68	69	70 71 72 73 74 75 76 77 78 79	80
E 1 1 6												

CARD NUMBER	1 LSACN	2 METHOD OF AQUIRING [illegible]EST SIGNAL	SEQ NO	CC
E 1 1 7				

CARD NUMBER	1 LSACN	2 STANDARDS FOR COMPARISON	SEQ NO	CC
E 1 1 8				

TMDE REQUIREMENTS DATA

POWER AVAILABLE TO OPERATE TMDE

CARD NUMBER	1 LSACN	2 VOLTAGE	3 FREQUENCY	4 [illegible]	5 WATTS	6 % MAX RIPPLE	7 OTHER FACILITIES	CC
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21	22 23 24 25 26 27	28	29 30 31 32	33 34 35 36 37	38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79	80
E 1 1 9								

CARD NUMBER	1 LSACN	2 FGC/WBS/WUC	3 TASK CODE	4 PARAMETERS TO BE MEASURED (UUT)	5 RANGE (FROM) VALUE	MEAS TERM	SEQ NO	CC
E 1 2 0								

CARD NUMBER	1 LSACN	6 RANGE (TO) VALUE	MEAS TERM	7 TOLERANCE PLUS (+) VALUE	MEAS TERM	8 TOLERANCE MINUS (−) VALUE	MEAS TERM	9 REMARKS REF START	END	10 TEL ITEM NUMBER	SEQ NO	CC
E 1 2 1												
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23	24 25 26 27 28 29 30 31	32 33 34 35 36 37 38 39	40 41 42 43 44 45 46 47	48 49 50 51 52 53 54 55	56 57 58 59 60 61 62 63	64 65 66	67 68 69	70 71 72 73 74 75 76	77 78 79	80

CARD NUMBER	1 LSACN	2 [illegible]	3 LIFE SPAN	4 [illegible]	5 AUTHORITY FOR MOD CHANGE	6 IDENTIFY SOURCE OF PLANNED OR ESTAB. TRAINING	SEQ NO	CC
E 1 2 2								

CARD NUMBER	1 LSACN	2 [illegible]	3 IF NO, EXPLAIN TEST IF YES, EXPLAIN HOW SIGNAL IS OBTAINED	SEQ NO	CC
E 1 2 3					

CARD NUMBER	1 LSACN	2 [illegible]	3 INTERFACE ADPT./SIG COND REQUIRED, ENTER "Y" OR "N" & EXPLAIN	SEQ NO	CC
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16	17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76	77 78 79	80
E 1 2 4					

CARD NUMBER	1 LSACN	2 [illegible]	3 TMDE REG. INDEX NO.	4 [illegible]	5 TECH DATA PKG AVAILABLE, ENTER "Y" OR "N" & EXPLAIN	SEQ NO	CC
E 1 2 5							

CARD NUMBER	1 LSACN	2 EC ANAL	3 IF ECONOMIC ANALYSIS WAS PERFORMED, ATTACH COPY, IF NOT EXPLAIN	SEQ NO	CC
E 1 2 6					

CARD NUMBER	1 LSACN	2 INITIAL QTY TMDE	3 DATE REQUIRED (YR/MO/DAY)	4 EST TOTAL QTY	5 DATE REQUIRED (YR/MO/DAY)	6 NEAREST PREFERRED ITEM INDEX	7 NEAREST REGISTER ITEM INDEX	8 QUANTITY	LOCATION	CC
E 1 2 7										

CARD NUMBER	1 LSACN	2 QUANTITY	LOCATION	3 QUANTITY	LOCATION	4 QUANTITY	LOCATION	CC
E 1 2 8								

CARD NUMBER	1 LSACN	2 REMARKS	SEQ NO	CC
E 1 2 9				
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76	77 78 79	80

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DATA SHEET E: SUPPORT & TEST EQUIPMENT OR TRAINING MATERIAL DESCRIPTION & JUSTIFICATION (SUPPLEMENTAL DATA)

DATE: ______ PAGE ______ OF ______

SUBMITTED BY: ______ EXT: ______

CARD NUMBER	1 LSACN	2 STATUS CODE	3 USABLE ON CODE	4. T.O. TYPE	5. MRC	6 MATCH IND CODE	7. INSTL	8 ESTIMATED DATE OF FIRST ARTICLE	9 PLT	10 RECOMMENDED QUANTITY FACTOR	11. SUPERCEDES LSACN	12 MMF		UPDATE CODE
1–4	5–15	16–35	36–39	40–43	44	45–47	48	49–52	53–54	55–59	60–70	71	72–79	80
E 3 0 A														

CARD NUMBER	1 LSACN	2 REASON FOR DELETION / SUPERSEDURE DATA	3 GOVERNMENT TYPE DESIGNATION	4 PRIME CONTRACTOR'S PART NUMBER (WHEN DIFFERENT FROM THE MANUFACTURER'S PART NUMBER)	UC
1–4	5–15	16–51	52–62	63–79	80
E 3 1 A					

CARD NUMBER	1 LSACN	2 SYSTEM NUMBER	3 END ITEM SPECIFICATION (EIS)	4 RRPL / GAPL	5 SPARE FACTOR	6 SMR CODE	7 ALLOWANCE / MAINTENANCE LEVEL FUNCTION	8 BASIS OF ISSUE: 1-4	5-8	9-12	13-16	17-24	25-32	33-64	65-125	126-250	251-450	EXT RANGE	REVISION CODE		UC
1–4	5–15	16–21	22–28	29–32	33–36	37–42	43–51	52–53	54–55	56–57	58–59	60–61	62–63	64–65	66–67	68–69	70–71	72	73	74–79	80
E 3 2 A																					

CARD NUMBER	1 LSACN	2 TRUE VENDOR PART NUMBER	3 TRUE VENDOR NAME	4 FSCM		UC
1–4	5–15	16–48	49–66	67–71	72–79	80
E 3 3 A						

CARD NUMBER	1 LSACN	2 LSACN (ITEM SUPPORTED)	3 T.O. DESIGNATION	4 T.O. CHG NO.	5 IND. CD	6 T.O. FIGURE NUMBER	7 T.O. ITEM NUMBER	8 T.O. DATE YR	MO.	DA.	9 LEAD TIME MO.		UC
1–4	5–15	16–26	27–46	47–48	49	50–53	54–57	58–59	60–61	62–63	64–65	66–79	80
E 3 4 A													

CARD NUMBER	1 LSACN	2 NO OF COMP	3 TMDE COMPONENT LSACN	4 TMDE COMPONENT LSACN	5 TMDE COMPONENT LSACN	6 TMDE COMPONENT LSACN	7 TMDE COMPONENT LSACN		8 SEQ NO	UC
1–4	5–15	16–17	18–28	29–39	40–50	51–61	62–72	73–76	77–79	80
E 3 5										

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DATA SHEET F: FACILITY DESCRIPTION AND JUSTIFICATION

DATE ____________ PAGE ______ OF ______

SUBMITTED BY: ____________ EXT ______

CARD NUMBER	1 LSACN (FGC/WBS/WUC)	2 END ITEM ACRONYM CODE	3 SERVICE DES CODE	4 FSCM	5 ALTERN ACTION CD	6 REV CODE	7 DATA SHEET STATUS	8. DWG-CLASS	9 ITEM NAME (FACILITY)	10 DATE YR	MO	DA	11. FACILITY CAT CODE	12 FACILITY TYPE		13 UPDATE CODE
1 2 3 4	5–15	16–25	26	27–31	32	33	34	35–37	38–56	57–58	59–60	61–62	63–68	69	70–79	80
F 0 1 A																

CARD NUMBER	1 LSACN (FGC/WBS/WUC)	2 FACILITIES COST	3 UPM	4 FACILITY AREA	5 UNIT OF MEAS.	6 FACILITIES LEAD TIME A. TEST	B OPS	C DEPOT	D TRNG		UC
1 2 3 4	5–15	16–25	26	27–32	33–34	35–36	37–38	39–40	41–42	43–79	80
F 0 1 B											

CARD NUMBER	LSACN (FGC/WBS/WUC)	FUNCTIONS TO BE PERFORMED, C & D SHEETS: 1 LSACN (FGC/WBS/WUC)	2 TASK CODE	1 LSACN (FGC/WBS/WUC)	2 TASK CODE	1 LSACN (FGC/WBS/WUC)	2 TASK CODE		SEQ NO	UC
F 0 2 A										
F 0 2 B										
1 2 3 4	5–15	16–26	27–34	35–45	46–53	54–64	65–72	73–76	77–79	80

CARD NUMBER	LSACN	1.	SEQ NO	UC
F 0 3		FACILITIES REQUIREMENTS		
F 0 4		FACILITIES DESIGN CRITERIA		
F 0 5		FACILITIES INSTALLATION LEAD TIMES		
F 0 6		TYPE OF CONSTRUCTION		
F 0 7		UTILITIES REQUIREMENTS		
F 0 8		FACILITY UTILIZATION		
F 0 9		FACILITY UNIT COST RATIONAL		
F 1 0		JUSTIFICATION		
1 2 3 4	5–15	16–76	77–79	80

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DATA SHEET G: SKILL EVALUATION AND JUSTIFICATION

DATE : ______________ PAGE ______ OF ______

SUBMITTED BY : ______________ EXT : ______

Card G01

- CARD NUMBER
- 1 LSACN (FGC/WBS/WUC)
- 2 END ITEM ACRONYM CODE
- 3 SERVICE DES CD
- 4 FSCM
- 5 ALTERN ACTION
- 6 REV CODE
- 7 DATA STATUS
- 8 DWG CLASS
- 9 SERIAL NUMBER EFFECTIVITY: FROM, TO
- 10 DATE: YR, MO, DAY
- UPDATE CODE

G 0 1

Card G02

- CARD NUMBER
- LSACN
- 1 DUTY POSITION REQUIRING A NEW OR REVISED SKILL
- 2 SSC NUMBER ASSIGNED NEW DUTY POSITION
- UC

G 0 2

Card G03

- CARD NUMBER
- LSACN
- 1. (SKILL SPECIALTY FROM WHICH PERSONNEL CAN BE OBTAINED): SSC NUMBER, SSC NUMBER
- 2. TEST SCORE
- 3 SECURITY CLEARANCE
- 4 RECOMMENDED RANK/RATE/GRADE: MILITARY RANK/RATE, CIVILIAN GRADE
- UPDATE CODE

G 0 3

Card G04

- CARD NUMBER
- LSACN
- FUNCTIONS TO BE PERFORMED, C & D SHEETS
  - 1. LSACN (FGC/WBS/WUC), 2. TASK CODE
  - 1. LSACN (FGC/WBS/WUC), 2. TASK CODE
  - 1. LSACN (FGC/WBS/WUC), 2. TASK CODE
- UC

G 0 4 A

G 0 4 B

Card G05

- CARD NUMBER
- LSACN
- 1 ADDITIONAL SKILL REQUIREMENT: (SKILL REQUIRING A NEW OR REVISED SKILL CODE)
- Sequence Number
- UC

G 0 5 A

G 0 5

Card G06

- CARD NUMBER
- LSACN
- 1 PHYSICAL AND MENTAL REQUIREMENTS:
- Sequence Number
- UC

G 0 6 A

G 0 6

Card G07

- CARD NUMBER
- LSACN
- 1. EDUCATIONAL QUALIFICATIONS (ACADEMIC SUBJECTS, SPECIALIZED SUBJECTS, SPECIALIZED DEGREE AND LICENSES, ETC.)
- Sequence Number
- UC

G 0 7 A

G 0 7

Card G08

- CARD NUMBER
- LSACN
- 1. JUSTIFICATION
- Sequence Number
- UC

G 0 8 A

G 0 8

Card G09

- CARD NUMBER
- LSACN
- 1. ADDITIONAL TRAINING REQUIREMENTS
- Sequence Number
- UC

G 0 9 A

G 0 9

DATA SHEET H: SUPPLY SUPPORT REQUIREMENTS

DATE: ______________ PAGE ______ OF ______

SUBMITTED BY: ______________________ EXT: ______

CARD NUMBER	Fields
H 0 1 A	1 MANUFACTURER'S PART NUMBER; 2 RNCC; 3 RNVC; 4 FSCM; 5 ITEM NAME; 6 UOC; 7 QTY/EI; 8 TYPE OF ITEM; 9; 10; 11; 12; 13 TOTAL QTY REC.; 14 SERVICE CODE; 15 DATE (YR, MO, DAY); CRC /PMC; 16
H 0 1 B	1 MANUFACTURER'S PART NUMBER; 2 MFG PART NUMBER OVERFLOW; 3 SOC; 4 LENGTH; 5 WIDTH; 6 HEIGHT; 7 UM; 8 WEIGHT; 9 UM; 10; 11 UI; 12 UI PRICE; 13 CONV. FAC.; 14 IMPC
H 0 1 C	1 MANUFACTURER'S PART NUMBER; 2 PACKAGING REQUIREMENTS CODE; 3 MAT'L FINISH; 4 HAZARDOUS CHARACTERISTICS CODE; 5 ECONOMIC ORDER QTY.; 6; 7 MATCH INDICATOR CODE
H 0 2 A, H 0 2 B, H 0 2 C, H 0 2 D	1 MANUFACTURER'S PART NUMBER; 2 ADDITIONAL REFERENCE NUMBERS; 3 RNCC; 4 RNVC; 5 FSCM; 6 MAOT; 7; 8 UNIT PRICE; 9 QUP
H 0 3	1 MANUFACTURER'S PART NUMBER; 2 NATIONAL STOCK NUMBER; 3 PSPC; 4 SHC; 5 SPC; 6 PCI; 7 CON TAT; 8 TAT (REP CYCLE) ORG, OSU, GSU, OEP; 9 REPL TASK DIST ORG, OSU, GSU, PCS, OEP; 10 RIC
H 0 4 A	1 MANUFACTURER'S PART NUMBER; 2 BASIS OF ISSUE (QUANTITY, BOI END ITEM); 3 BASIS OF ISSUE (QUANTITY, BOI END ITEM); 4 BASIS OF ISSUE (QUANTITY, BOI END ITEM); 5 SIC; 6 BILL QTY.
H 0 5 A	1 MANUFACTURER'S PART NUMBER; 2 LSA CONTROL NUMBER; 3 SMR; 4 SMR STATUS CODE; 5 FAIL FACTOR I (MAINTENANCE FACTOR (M/F)); MAX; 6 FAIL FACTOR II (O/M %, BCR %); 7 FAIL FACTOR III (NRTS %, DCR %); 8 ING. CODE; 9 QTY. /ASSY; 10 REMARKS
H 0 5 B	1 MANUFACTURER'S PART NUMBER; 2 LSA CONTROL NUMBER; 3 SEC; 4 MAINT TECH FACTOR I; 5 MAINT TECH FACTOR II; 6 MAINT TECH FACTOR III; 7 MAINT. TECH. FACTOR IV; 8 MAINT. TECH FACTOR V; 9 MAINT TECH. FACTOR VI; 10 MAINT. TASK DIST. (ORG., DSU, GSU, OEP, R/R)
H 0 6	1 MANUFACTURER'S PART NUMBER; 2 LSA CONTROL NUMBER; 3 PLISN; 4 NHA PLISN; 5 SAME AS PLISN; 6 PRIOR ITEM PLISN; 7 PRIOR ITEM PCCN; 8 PCCN; 9 SCC; 10; 11 TEL CHANGE CODE
H 0 7 A, H 0 7 B	1 MANUFACTURER'S PART NUMBER; 2 LSA CONTROL NUMBER; OHL/KIT/SET 3 PLISN; 4 OHL/QTY; 5 REFERENCE DESIGNATION; 6 DOC; 7 RC
H 0 8	1 MANUFACTURER'S PART NUMBER; 2 LSA CONTROL NUMBER; 3 USABLE ON CODE; 4 TRUE VENDOR PART NUMBER; 5 FSCM
H 0 9 A, H 0 9 B	1 MANUFACTURER'S PART NUMBER; 2 LSA CONTROL NUMBER; 3 TO DESIGNATION; 4 TO CHG; 5; 6 TO FIGURE NO; 7 ITEM NO; 8 TO DATE (YR, MO, DA); 9 TO LEAD TIME
H 1 0 A, H 1 0 B	1 MANUFACTURER'S PART NUMBER; 2 LSA CONTROL NUMBER; 3 CHANGE AUTHORITY NUMBER; 4 IC; 5 SERIAL NUMBER EFFECTIVITY (FROM, TO); 6 PCC; 7 TIC; 8 REP OR SUP PLISN
H 2 0 A, H 2 0 B	1 MANUFACTURER'S PART NUMBER; 2 LSA CONTROL NUMBER; 3 CHANGE AUTHORITY NUMBER; 4 QTY SHIPPED; 5 QTY PROCURED; 6 PRORATED FROM; 7 PRORATED QTY; 8 PRORATED TO ELIN; 9
H 3 0 A, H 3 0 B	1 MANUFACTURER'S PART NUMBER; 2 LSA CONTROL NUMBER; 3 PROVISIONING NOMENCLATURE; NA; 9

Card columns 1–80 (card number in columns 1–4; manufacturer's part number in columns 5–20).

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DATA SHEET H: SUPPLY SUPPORT REQUIREMENTS – SUPPLEMENTAL

DATE: ________ PAGE ____ OF ____

SUBMITTED BY: ________ EXT: ____

CARD NUMBER	1 MANUFACTURER'S PART NUMBER	2 LRNC	3 FSCM	4 NEXT HIGHER ASSEMBLY PART NUMBER	5 LRNC	6 FSCM	7. NEXT HIGHER RECOVERABLE ASSEMBLY OR ATTACH TO PART NUMBER	8 LRNC	9 FSCM	ICC		U.C.
1 2 3 4	5–20	21	22–26	27–42	43	44–48	49–64	65	66–70	71	72–79	80
H 4 0 A												
H 4 0 B												

CARD NUMBER	1 MANUFACTURER'S PART NUMBER	2. YEAR	3 DESTINATION (SRAN)	4 DELIVERY SCHEDULE A. JAN	B. FEB	C MAR	D APR	E. MAY	F JUN	G JUL		5. SEQ. NUMBER	U.C.
1 2 3 4	5–20	21–22	23–28	29–32	33–36	37–40	41–44	45–48	49–52	53–56	57–76	77–79	80
H 5 0 A													

CARD NUMBER	1 MANUFACTURER'S PART NUMBER	2. YEAR	3 DESTINATION (SRAN)	4 DELIVERY SCHEDULE H. AUG	I. SEP.	J. OCT	K. NOV.	L. DEC.	5. PRORATED FROM ELIN	6 REQUISITION NUMBER		7. SEQ NUMBER	U.C.
1 2 3 4	5–20	21–22	23–28	29–32	33–36	37–40	41–44	45–48	49–54	55–71	72–76	77–79	80
H 5 0 B													

INSERT CARD NUMBER AND HEADINGS AS REQUIRED (ADDITIONAL H30 CARDS FOR EXAMPLE)

CARD NUMBER	1 MANUFACTURER'S PART NUMBER		U.C.
1 2 3 4	5–20	21–79	80

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DATA SHEET 1: AUTOMATIC TESTING EQUIPMENT/TEST PROGRAM SET DESCRIPTION

DATE: ______ PAGE ______ OF ______

SUBMITTED BY: ______ EXT: ______

CARD NUMBER | 1 LSACN (FGC/WSB/WUC) | 2 END ITEM ACRONYM CODE | 4 FSCM | 8 DWG CLASS | 9 SERIAL NUMBER EFFECTIVITY FROM / TO | 10 DATE YR MO DA

1 0 1

Card Number | LSACN | 2 ITEM NAME | 3 TYPE | MODEL | SERIES | SUFFIX | 4 TRD NUMBER

1 0 2

Card Number | LSACN | 2 MFR PART NUMBER | 3 FSCM | 4 DRAWING NUMBER | 5 FSCM

1 0 3 A

1 0 3 B

CARD NUMBER | LSACN | 2 ITEM NAME | 3 AUTOMATIC TEST EQUIPMENT IDENTIFICATION: TYPE | MODEL | SERIES | SUFFIX

1 0 4

Card Number | LSACN | 2 MFR. PART NUMBER | 3 FSCM | 4 DRAWING NUMBER | 5. FSCM

1 0 5 A

1 0 5 B

AUTOMATIC TEST EQUIPMENT

CARD NUMBER | LSACN | 2 GENERAL SPECIFICATIONS | SEQ NUMBER

1 0 6 A

Card Number | LSACN | 2 STIMULUS PARAMETERS RANGE AND TOLERANCE | SEQ. NUMBER

1 0 6 B

Card Number | LSACN | 2 REQUIREMENTS PARAMETERS RANGE AND TOLERANCE | SEQ NUMBER

1 0 6 C

TEST PROGRAM

CARD NUMBER | LSACN | 2 MFR. PART NUMBER | 3 FSCM | 4 UNIT COST: A. NON-RECURRING | B. RECURRING

1 0 7 A

CARD NUMBER | LSACN | 2. OTP MFR. PART NUMBER | 3. FAULT ISOLATION: A. AMB GRP | % DET FAULTS | B. AMB GRP | % DET FAULTS

1 0 7 B

TEST PROGRAM INSTRUCTION

CARD NUMBER | LSACN | 2. MFR. PART NUMBER | 3 FSCM | 4 UNIT COST: A. NON-RECURRING | B RECURRING | 5 OTPI MFR. PART NUMBER | 6 FSCM

1 0 8

INTERCONNECTION DEVICE (S)

CARD NUMBER | LSACN | 2. ITEM NAME | 3 MFR. PART NUMBER | 4 FSCM | 5. APPORTIONED UNIT COST: A. NON-RECURRING | B RECURRING | COMMON UUTS

1 0 9

FAULT ISOLATED REPLACABLE UNITS

CARD NUMBER | LSACN | 2. LSACN | 3 ITEM NAME | 2. LSACN | 3 ITEM NAME

1 1 0

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DATA SHEET J: TRANSPORTABILITY ENGINEERING CHARACTERISTICS

REV CODE | DATA SH STATUS

DATE: ______ PAGE ______ OF ______

SUBMITTED BY ______ EXT ______

CARD NUMBER	Fields
J 0 1 A	1 LSA CONTROL NUMBER; 2 END ITEM ACRONYM; 3 ITEM NAME; 4 FSCM; 5 DRAWING NUMBER; 6 DATE (YR, MO, DA); UPDATE CODE
J 0 1 B	
J 0 2	1 DWG CLASS; 2; 3 MODE OF TRANSPORT; 4 SPECIFIC MODE REQUIREMENTS; UC
J 0 3	1 OPERATIONAL LENGTH; 2 OPERATIONAL WIDTH; 3 OPERATIONAL HEIGHT; 4 SHIPPING LENGTH; 5 SHIPPING WIDTH; 6 SHIPPING HEIGHT; 7 UM; 8 ITEM WEIGHT; 9 MAX SHIPPING WEIGHT; 10 UM; 11 QLP FRONT; 12 QLP CENTER; 13 QLP REAR; UC
J 0 4	1 CGL LENGTH; 2 CENTER OF GRAVITY LENGTH DATUM REFERENCE LOCATION; 3 CGL WIDTH; 4 CENTER OF GRAVITY WIDTH DATUM REFERENCE LOCATION; 5 CGL HEIGHT; 6 CENTER OF GRAVITY HEIGHT DATUM REFERENCE LOCATION; 7 UM; UC
J 0 5	1; 2 T/L LOCATION LENGTH; 3 LENGTH DATUM REFERENCE LOCATION; 4 T/L LOCATION LENGTH; 5 WIDTH DATUM REFERENCE LOCATION; 6 T/L LOCATION LENGTH; 7 HEIGHT DATUM REFERENCE LOCATION; 8 UNIT OF MEASURE; UC
J 0 6	1 PS/C FLP; 2 PS/C CLP; 3 PS/C RLP; 4 UM; 5 QTP FRONT; 6 QTP CENTER; 7 QTP REAR; 8 PS/C FT; 9 PS/C CT; 10 PS/C RT; 11 UM; 12 QSS; 13 HAZARDOUS CHARACTERISTICS CODE; UC
J 0 7	1 S & VF VERTICAL; 2 S & VF LATERAL; 3 S & VF LONGITUDINAL; 4 MEASUREMENT TERM; 5 RESONANCES; UC
J 0 8	1 VTC; 2 FOOTPRINT AREA; 3 UM; 4 FRONT OVERHANG LENGTH; 5 REAR OVERHANG LENGTH; 6 GCH; 7 WHEELBASE LENGTH; 8 UM; 9 AA; 10 CA; 11 AD; 12 MINIMUM SPEED; 13 MAXIMUM SPEED; 14 UM; 15 TRL; 16 UM; 17 TIRE PRESSURE; 18 TGP; 19 UM; 20 INTERAXLE LENGTH; 21 INTERAXLE LENGTH; 22 INTERAXLE LENGTH; 23 INTERAXLE LENGTH; UC
J 0 9	1 WHEELED VEHICLE TYPE CODE; 2 AXLE LOAD AND TRACK WIDTH DATA; 3 AXLE LOAD AND TRACK WIDTH DATA; 4 AXLE LOAD AND TRACK WIDTH DATA; 5 AXLE LOAD AND TRACK WIDTH DATA; 6 AXLE LOAD AND TRACK WIDTH DATA; 7 UM; 8 UM; 9 TIRE SIZE REF; UC
J 1 0	SPECIALIZED ENVIRONMENTAL CONSIDERATIONS; SEQUENCE NUMBER; UC
J 1 1	SPECIALIZED EQUIPMENT; SEQUENCE NUMBER; UC
J 1 2	REMARKS; SEQUENCE NUMBER; UC

Card columns 1–80

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APPENDIX B

ACDF ON-LINE DATA SCREENS

In Section IV the ACDF records are listed in Table 5, and the on-line menu screen used to retrieve these records is shown in Figure 19. This appendix contains the CRT terminal screens for several ACDF records. The information will be presented in the order shown for each record. Since all of the information in a record may not fit on a single screen, the system will instruct the user when additional information is avaiable in a record. The user would then hit the ENTER key on the terminal to display the "next page" of information.

SYSTEM DESIGN/PERFORMANCE RECORD

Display Format:

```
 AFG-2 DATE  XXXXX   -1 T.O. DATE XXXXX    REPORT DATE 99/99/99

---------------------------- AIRCRAFT RECORD -------------------------------
AIRCRAFT MDS  XXXXX   XXXXXXXXXXXXXXXXX     AIRCRAFT SRD   XXX
 MANUFACTURER  XXXXXXXXXXXXXXXXX

-------------------- SYSTEM DESIGN / PERFORMANCE RECORD -------------------
 VERTICAL HEIGHT             99.9 FT     FUSELAGE LENGTH           999.9 FT
 FUSELAGE VOLUME           999999 CUFT   MISSION PAYLOAD VOLUME  999999 CUFT
 MAX PAYLOAD LENGTH         999.9 FT     MAX PAYLOAD WIDTH          99.9 FT
 WING AREA                   9999 SQ FT
 WING SPAN - MAX            999.9 FT     WING SWEEP - MAX             99 DEG
 WING SPAN - MIN            999.9 FT     WING SWEEP - MIN             99 DEG
 WING INCIDENCE - ROOT          9 DEG    WING INCIDENCE - TIP          9 DEG
 WING DIHEDRAL                  9 DEG
 TREAD WIDTH                 99.9 FT

 AIRCRAFT EMPTY WEIGHT  9999999 LBS   BASIC WEIGHT             9999999 LBS
 DESIGN WEIGHT          9999999 LBS   COMBAT WEIGHT            9999999 LBS
 MAX T.O. GROSS WEIGHT  9999999 LBS   MAX EXTERNAL WEIGHT        99999 LBS
 MAX FUEL WEIGHT-INTERNAL 99999 LBS   MAX LANDING WEIGHT        999999 LBS
 PAYLOAD WEIGHT          999999 LBS   MISSION PAYLOAD WT.       999999 LBS

OPERATION AND PERFORMANCE.........................
 TOTAL THRUST - MAX     999999 LBS    TOTAL THRUST - MIL        999999 LBS
 TAKE OFF DISTANCE        9999 FT     TAKE OFF SPEED               999 KTS
 STALL SPEED - MAX WT      999 KTS
 RATE OF CLIMB - MAX      9999 FT/MIN RATE OF CLIMB - MIL       9999 FT/MIN
 SERVICE CEILING         99900 FT     SERVICE CEILING 1 EG OUT 99900 FT

 COMBAT CEILING          99900 FT
 TIME CLIMB 20000 FT-MIL  99.9 MIN    TIME CLIMB 20000 FT-MAX     99.9 MIN
 MAX SPEED SEA LEVEL MIL  9999 KTS    MAX SPEED SEA LEVEL MAX     9999 KTS
 STRUCTURAL SPEED         9999 KTS    AVERAGE SPEED - FERRY        999 KTS
 AVE SPEED @ COMBAT ALT   9999 KTS    AVE SPEED COMBAT @ SL        999 KTS
 FERRY RANGE              9999 NM     COMBAT RADIUS              99999 NM
 BASIC SPEED    99900 FT  9999 KTS
 LANDING DISTANCE         9999 FT     STALL SPEED @ LANDING WT     999 KTS
 LOAD LIMIT POSITIVE       9.9        LOAD LIMIT NEGATIVE          9.9
 MAX WING LOADING          999 LBS/SQ FT
 TOTAL 2 DIGIT WUCS         99        TOTAL 3 DIGIT WUCS          9999
 TOTAL 4 DIGIT WUCS      99999        TOTAL 5 DIGIT WUCS        999999
```


BASIC MISSION PERFORMANCE RECORD

Display Format:

```
 AFG-2 DATE  XXXXX   -1 T.O. DATE XXXXX    REPORT DATE 99/99/99

---------------------------- AIRCRAFT RECORD ---------------------
AIRCRAFT MDS  XXXXXXX XXXXXXXXXXXXXXXXXXXXXXX AIRCRAFT SRD   XXX
 MANUFACTURER  XXXXXXXXXXXXXXXXXXXXX

-------------------------- BASIC MISSION RECORD -----------------
 TAKE OFF GROSS WEIGHT         999999 LBS
 MISSION FUEL WEIGHT           999999 LBS
 PAYLOAD (XXXXXXXXXXXXXXX) WT  999999 LBS
 PAYLOAD (XXXXXXXXXXXXXXX) WT  999999 LBS
 WING LOADING                    9999 LBS/SQ FT
 STALL SPEED(POWER OFF)           999 KTS
 TAKE OFF GROUND RUN SL          9999 FT
 TAKE OFF TO CLEAR 50 FT         9999 FT

 RATE OF CLIMB AT SL AT BASIC MISSION LOAD (BML)      9999 FT/MIN
 RATE OF CLIMB AT SL AT BML WITH ONE ENGINE OUT       9999 FT/MIN

 TIME TO CLIMB TO    99000 FT.  99.9 MIN
 TIME TO CLIMB TO    99000 FT.  99.9 MIN

 SERVICE CEILING AT MAX AIRCRAFT WEIGHT (MAW)            99999 FT
 SERVICE CEILING WITH ONE ENGINE OUT AT MAW              99999 FT

 COMBAT RADIUS                   9999 NM
 AVERAGE CRUISING SPEED           999 KTS
 INITIAL CRUISING ALT           99999 FT
 TARGET SPEED                     999 KTS
 TARGET ALTITUDE                99999 FT
 FINAL CRUISING ALT             99999 FT
 TOTAL MISSION TIME              99.9 HOURS
 COMBAT WEIGHT                 999999 LBS
 COMBAT ALTITUDE                99900 FT
 COMBAT SPEED                   999.9 KTS
 COMBAT CEILING                 99000 FT
 MAX RATE OF CLIMB-SL(BM)       99999 FT/MIN

 SERVICE CEILING  AT COMBAT WEIGHT                        99900 FT
 SERVICE CEILING WITH ONE ENGINE OUT AT COMBAT WEIGHT     99900 FT

 MAXIMUM SPEED      99000 FT    9999 KTS
 BASIC SPEED        99000 FT    9999 KTS
 LANDING WEIGHT               999999 LBS
 GROUND ROLL AT SL              9999 FT
 GROUND ROLL SL - AUX BRAKES    9999 FT
 TOTAL DISTANCE 50 FT           9999 FT
 TOTAL DISTANCE - AUX. BRAKES   9999 FT
```

SYSTEM FEATURES RECORD

Display Format:

```
AFG-2 DATE  XXXXX   -1 T.O. DATE XXXXX    REPORT DATE 99/99/99

---------------------------- AIRCRAFT RECORD ----------------------------
AIRCRAFT MDS   XXXXXXX XXXXXXXXXXXXXXXXXXXX  AIRCRAFT SRD   XXX

MANUFACTURER   XXXXXXXXXXXXXXXXXXXXX

--------------------- SYSTEM FEATURES RECORD ----------------------
TYPE AIRCRAFT               XXXXXXXXXX
PRIMARY MISSION             XXXXXXXXXXXXXXXXX
WEIGHT CLASS                999K < WT <= 999K
DENSITY                     999.9
NUMBER AIRCREW              99
AIRCREW ESCAPE SYSTEM       XXXXXXXXXXXXXXXX
------------------------------------------------------------------------
ENGINE - TYPE  XXXXXXXX       MODEL NUMBER  XXXXXXXXXX     SRD  XXX
TOTAL ENGINES  99
   IN FUSELAGE          9      FUSELAGE PODS  9
   IN WINGS             9      WINGS PODS     9
   INSTALLATION           XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
   ENGINES AUGMENTED      XXX
   VARIABLE GEOMETRY INLETS  XXX
   THRUST REVERSER        XXX
------------------------------------------------------------------------
WING LOCATION                                          XXXXXXXXXXXXX
VARIABLE WING GEOMETRY                                 XXX
DOES THE AIRCRAFT WINGS
                      CARRY INTERNAL FUEL.............. XXX
                      INCORPORATE HIGH TECHNOLOGY LIFT. XXX
                      UTILIZE BOUNDARY LAYER CONTROL... XXX
NUMBER OF INDEPENDENT FLIGHT CONTROL SYSTEM...........   9
INCORPORATE "FLY BY WIRE" CONTROL SYSTEM.............. XXX
INCORPORATE STABILITY/CONTROL SYSTEM.................. XXX
UTILIZE ELECTRICAL MULTIPLEX SYSTEMS.................. XXX
NUMBER OF INDEPENDENT ELECTRICAL POWER SUPPLY SYSTEMS.  99
ONE OR MORE AUXILLARY POWER UNITS..................... XXX
NUMBER OF INDEPENDENT HYDRAULIC POWER SUPPLY SYSTEMS..   9
HYDRAULIC SYSTEM PRESSURE .............. XXXXXXXXXXXXXXXXXXXXXXXXXXX
NUMBER OF HYDRAULIC DEPENDENT SUBSYSTEMS .............   9
------------------------------------------------------------------------
DOES THE AIRCRAFT HAVE......
 HF  COMMUNICATIONS.....  XXX        VHF COMMUNICATIONS..  XXX
 UHF COMMUNICATIONS.....  XXX        FM  COMMUNICATIONS..  XXX
 RADIO NAVIGATION.......  XXX        RADAR NAVIGATION....  XXX
 A/A RADAR..............  XXX        IR NAVIGATION.......  XXX
 ELECTRO-OPTICAL SYSTEM.  XXX        HEADS-UP DISPLAY....  XXX

INTERNAL GUNS..........  XXX         A/A MISSILES........  XXX
A/G MISSILES...........  XXX         CRUISE MISSILES.....  XXX
RADIO FREQUENCY SURVEILLANCE EQUIPMENT.... XXX
ELECTRONIC COUNTER MEASURES EQUIPMENT..... XXX
ON BOARD MAINTENANCE RECORDER............. XXX
LANDING GEAR TYPE..XXXXXXXXXXXXXXXXXXXXXXXX
NUMBER OF LANDING GEARS..  9          NUMBER OF WHEELS/TIRES 99
DE-ICING...............  XXX          ANTI-ICING..........  XXX
TYPE OF OXYGEN.........  XXXXXXX      BLEED-AIR...........  XXX
AUTO PILOT.............  XXX          AUTO PILOT / ILS....  XXX
TERRAIN FOLLOWING/TERRAIN AVOIDANCE(TF/TA).XXX
AUTO PILOT COUPLED TO TF/TA...............XXX
AUTO PILOT COUPLED TO WEAPON DELIVERY SYS..XXX
FLIGHT DIRECTOR...........................XXX
WEAPON CONTROL SYSTEM.....................XXX
EXTERNAL STORE STATIONS................... 99
CAMERAS ON BOARD...TYPE  .................XXXXXXXXXXXXXXXXXXXXXXXXX
CAMERAS ON BOARD...PURPOSE  ..............XXXXXXXXXXXXXXXXXXXXXXXXX
AIR TO AIR REFUELING.......  .............XXX
AIR TO AIR REFUELING  TYPE  ..............XXXXXXXXXXXXXXXX
WINDSHIELD RAIN REMOVAL ..................XXX
AIR TURBINE MOTORS .......................XXX
AVIONICS EQUIPMENT COOLING ...............XXX
AVIONICS EQUIPMENT COOLING AGENT..........XXXXXXX
RADAR ALTIMETER...........................XXX
CRASH DATA RECORDER ON BOARD..............XXX
EMERGENCY RADIO BEACON ...................XXX
COMMAND / CONTROL EQUIPMENT INSTALLED.....XXX
FIRE SUPPRESSION SYSTEM...................XXXXXXXXXXXXXXXXXXXXXXXXXX
LANDING GEAR KNEELING.....................XXX
LANDING GEAR CASTERING/STEERING...........XXX
TAIL BUMPER...............................XXX
BUILT IN TEST (BIT).......................XXX
EQUIPMENT/SYSTEM          WUC
XXXXXXXXXXXXXXXXXXXXX  XXXXX
XXXXXXXXXXXXXXXXXXXXX  XXXXX
XXXXXXXXXXXXXXXXXXXXX  XXXXX
XXXXXXXXXXXXXXXXXXXXX  XXXXX
STRUCTURAL COMPOSITE MATERIAL ............XXX
AVIONICS/WEAPON CONTROL COMPUTER SYSTEM....XXXXXXXXXXX
```

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ELECTRICAL POWER SUPPLY SUBSYSTEM RECORD

Display Format:

ELECTRICAL POWER SUPPLY DESIGN DATA
FOR AIRCRAFT XXXXXXX (SRD XXX)

ELECTRICAL POWER SUPPLY 3-DIGIT WUC	99
ELECTRICAL POWER SUPPLY 4-DIGIT WUC	999
ELECTRICAL POWER SUPPLY 5-DIGIT WUC	9999
GENERATORS - ENGINE	9
GENERATORS - HYDRAULIC	9
KVA @ GENERATOR	999
KVA - TOTAL	9999
GENERATOR RPM	99999
TYPE GENERATOR DRIVE MECHANISM	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
GENERATOR DRIVE TEMPERATURE	999
GENERATOR - TEMPERATURE	999
INVERTERS - INSTRUMENTS	9
INVERTERS - OTHER THAN INSTRUMENT	9
VOLTAGE, A-C, INSTRUMENT INVERTER	999
CONVERTERS	99
CIRCUIT BREAKERS RATINGS	
LOWEST AMPS	99
HIGHEST AMPS	99
CIRCUIT BREAKERS - TOTAL	999
VOLTAGE, A-C, THREE PHASE	999
VOLTAGE, A-C, SINGLE PHASE	999
VOLTAGE, A-C, CYCLES	999
AMPERES - MAXIMUM	99
BATTERY TYPE	XXXXXXXXXXXXXXXX
BATTERY - NUMBER	9
BATTERY - VOLTAGE	99
BATTERY - AMPERE HOURS	99
VOLTAGE, D-C, AIRCRAFT	99
ELECTRICAL DISTRIBUTION METHOD	XXXXXXXXXXXXXXXX

HARDWIRE TERMINATION METHODS

LRU NOMENCLATURE	XXXXXXXXXXXXXXXXXXXXXX
LRU CONNECTOR WUC	XXXXX
LRU TERMINATION METHOD	XXXXXXXXXXXXXXXXXXXXXX
BUS NOMENCLATURE	XXXXXXXXXXXXXXXXXXXXXX
BUS WUC	XXXXX
BUS TERMINATION METHOD	XXXXXXXXXXXXXXXXXXXXXX

HARDWIRE TERMINATION METHODS

LRU NOMENCLATURE	
LRU CONNECTOR WUC	XXXXX
LRU TERMINATION METHOD	XXXXXXXXXXXXXXXXXXXXXX
BUS NOMENCLATURE	XXXXXXXXXXXXXXXXXXXXXX
BUS WUC	XXXXX
BUS TERMINATION METHOD	XXXXXXXXXXXXXXXXXXXXXX

HARDWIRE TERMINATION METHODS

LRU NOMENCLATURE	XXXXXXXXXXXXXXXXXXXXXX
LRU CONNECTOR WUC	XXXXX
LRU TERMINATION METHOD	XXXXXXXXXXXXXXXXXXXXXX
BUS NOMENCLATURE	XXXXXXXXXXXXXXXXXXXXXX
BUS WUC	XXXXX
BUS TERMINATION METHOD	XXXXXXXXXXXXXXXXXXXXXX
FUSE RATINGS	
LOWEST AMPS	99
HIGHEST AMPS	99
MINIMUM FREQUENCY	999
MAXIMUM FREQUENCY	999
D-C BUSES	9
POWER DISTRIBUTION BOXES - A-C	99
CONNECTORS, ELECTRICAL - TOTAL	9999
TRANSFORMERS, ELECTRICAL - TOTAL	99
MULTIPLEX TERMINALS	99
A-C BUSES	9
EXTERNAL POWER RECEPTACLES - ELECTRICAL	9
TRANSFORMER/RECTIFIER, ELECTRICAL TOTAL	99
CONDUIT LENGTH	9999
HARDWIRE - LENGTH	9999.9
A-C POWER SUPPLY COMPONENTS	999
D-C POWER SUPPLY COMPONENTS	999
A-C AND D-C COMPONENTS	999

ELECTRICAL POWER SUPPLY SUBSYSTEM WEIGHT

ELECTRICAL GROUP	GROUP WEIGHT....................	9999
ELECTRICAL GROUP	A-C VOLTAGE SYSTEM..............	9999
ELECTRICAL GROUP	D-C VOLTAGE SYSTEM..............	9999

ELECTRICAL POWER SUPPLY WORK UNIT CODES

WORK UNIT CODES	NOMENCLATURE	NATIONAL STOCK NUMBER
42000	ELECTRICAL POWER SUPPLY	
42XXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXX
42XXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXX

ENGINE RECORD

Display Format:

```
SOURCE FOR THIS DATA IS FROM AFG-3 DATED JUN 59
 ENGINE: TYPE TURBOJET       MODEL NUMBER J57-P-43W
ENGINE MANUFACTURER PRATT & WHITNEY        150-HR-QUAL-TEST    MAR56
PRODUCTION STATUS: OUT OF PRODUCTION
NUMBER OF ENGINE PRODUCED  741 AT AN AVERAGE COST OF $  205,135
COMPRESSOR TYPE IS COMPOUND, TWO-SPOOL AXIAL     WITH 16 STAGES.
TYPE OF FAN
     COMPRESSOR STAGES - LP ROTOR  9
                       - LP FAN    0
                       - HP ROTOR  7
NOMINAL PRESSURE RATIO            0.0
NOMINAL BY PASS RATIO            0.00:1.
MAX DESIGN PRESSURE RATIO OVERALL 12.00:1.
                        FAN        .00:1.

                        LP ROTOR   .00:1.
                        HP ROTOR   .00:1.
MAX ALLOWABLE BLEED AIR          0.0 %
MAX RATED AIR FLOW               180 LB/SEC.
MAX RATED AIR FLOW - FAN           0 LB/SEC.
MAX RATED AIR FLOW - COMP          0 LB/SEC.
COMBUSTION CHAMBER TYPE  ANNULAR OUTER / 8 FLOW THROUGH CAN-ANNULAR INNER CHAMB
TURBINE TYPE             AXIAL - DUAL ROTOR
TURBINE TOTAL STAGES             3
       LP ROTOR STAGES           2
       HP ROTOR STAGES           1
MAX RATED TURB INLET TEMP/SLS    1600 DEGREES F
MAX ALLOWABLE TURB INLET TEMP/SLS   0 DEGREES F
TURBINE COOLING                  NONE.
EXHAUST NOZZLE TURBINE           FIXED AREA.
AFTERBURNER TYPE                 NONE
MAX EXHAUST EXIT TEMP / SLS         0 DEGREES F
TYPE OF IGNITION                 LOW TENSION, HIGH FREQUENCY GLA. TYPE ACD2, 2
ACCESSORY DRIVE PROVISION        0
THRUST TO WEIGHT RATIO           0.00:1.
LENGTH - OVERALL                 167.3 IN.
DIAMETER - NOMINAL                38.9 IN.
AFTERBURNER DIAMETER NOMINAL       0.0 IN.
ENGINE WEIGHT (DRY)              3870 LB.
ENGINE WEIGHT (WET)                 0 LB.
GUARANTEED RATINGS AT STATIC SEA LEVEL STANDARD CONDITIONS.
             (LB)      (LP/HP)  (LB/HR/LB) MAX   (LB/SEC)
   MAXIMUM  11200   06400/09650   0.775      0        0
   MILITARY 11200   06400/09650   0.775      0        0
   NORMAL    9500   06100/09350   0.765      0        0
ABSOLUTE ALTITUDE       55,000 FT.
LIMITING MACH NR AT SL  0.8


THE AIRCRAFT(S) USING THIS ENGINE ARE

 AIRCRAFT SRD      ENGINE   SRD
  B-52F   ABF    J57-P-43W   XBY
  B-52G   ABG    J57-P-43W   XB1
  KC-135A ACX    J57-P-43W   XJD
```

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HYDRAULIC & PNEUMATIC POWER SUPPLY SUBSYSTEM RECORD

Display Format:

HYDRAULIC & PNEUMATIC POWER SUPPLY DATE 99/99/99
FOR AIRCRAFT XXXXXXX (SRD XXX)

HYDRAULIC SYSTEM DESIGN

HYDRAULIC SYSTEM 3-DIGIT WUC	99
HYDRAULIC SYSTEM 4-DIGIT WUC	999
HYDRAULIC SYSTEM 5-DIGIT WUC	9999
HYDRAULIC SYSTEMS - TOTAL	9
HYDRAULIC SYSTEMS - ENGINE DRIVEN	9
HYDRAULIC SYSTEMS - ELECTRICAL DRIVEN	9
HYDRAULIC PUMPS - TOTAL	99
HYDRAULIC PUMPS - ENGINE	99
HYDRAULIC PUMPS - ELECTRICAL	99
HYDRAULIC SUPPORTED SUBSYSTEM	99
HYDRAULIC PUMP FLOW - ENGINE	99
HYDRAULIC PUMP PRESSURE - ENGINE	999
HYDRAULIC PUMP FLOW - ELECTRICAL	99
HYDRAULIC PUMP PRESSURE - ELECTRICAL	999
HYDRAULIC TANKS CAPACITY	999
NUMBER OF HYDRAULIC TANKS	99
HYDRAULIC SYSTEM PRESSURE - MAX	999
HYDRAULIC PUMP RPM - ENGINE RATIO	.999
HYDRAULIC TANK PRESSURE	99
HYDRAULIC PUMP RPM - ELECTRICAL	9999
HYDRAULIC PUMP - AUXILLARY	9
HYDRAULIC PUMP FLOW - AUXILLARY	99
HYDRAULIC PUMP PRESSURE - AUXILLARY	999
HYDRAULIC SYSTEM OPERATING TEMPERATURE - MAX	999
HYDRAULIC MOTORS HOURS	99
HYDRAULIC VALVES	999
HYDRAULIC FILTERS	999
PNEUMATIC POWER SOURCE	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
PNEUMATIC CYLINDERS - NUMBER	9
PNEUMATIC SYSTEM - NUMBER	9
PNEUMATIC PRESSURE - MAXIMUM	9999
PNEUMATIC SYSTEM COMPONENTS	99

HYDRAULIC & PNEUMATIC SUBSYSTEM WEIGHT

HYDRAULIC & PNEUMATIC GROUP WEIGHT....................		9999
HYDRAULIC SUBSYSTEM WEIGHT...........................	9999	
PNEUMATIC SUBSYSTEM WEIGHT...........................	9999	

HYDRAULIC AND PNEUMATIC SUPPLY WORK UNIT CODES

WORK UNIT CODES	NOMENCLATURE	NATIONAL STOCK NUMBER
45000	HYDRAULIC AND PNEUMATIC POWER	
45XXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXX
45XXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXX
45XXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXX
45XXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXX
45XXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXX
45XXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXX

OPERATIONAL SUPPORT/COST RECORD

CODE: OSC
RECORD NAME: OPERATIONAL SUPPORT/COST

Additional Input Requirements
The user will be prompted for the aircraft MDS and then for the code for the desired sub-record as follows:

CODE		SUB-RECORD NAME
1	-	AIRCRAFT LEVEL/AFR 800-16, FORMAT 4 DATA
2	-	WORK CENTER BY AIRCRAFT DATA
3	-	SUPPORT COST BY WUC DATA
4	-	R&M BY WUC DATA
5	-	MAINTENANCE ACTION BY WUC DATA

1. AIRCRAFT LEVEL/AFR 800-16, FORMAT 4 DATA

When code 1 is entered, the data elements listed below for this sub-record will be displayed as shown in the display format.

Display Format:

FOR AIRCRAFT MDS XXXXXXX

FLYING HOURS 999999 SORTIES 99999 LANDINGS 99999

FROM DAY 999 OF 9999 (YEAR) TO DAY 999 OF 9999 (YEAR)

	MMH/FH ON-EQUIP	MMH/FH SHOP	MMH/FH TOTAL	MMH/SORTIE ON-EQUIP	MMH/SORTIE TOTAL
PREVENTIVE MAINTENANCE					
PREVENTIVE	999.9	999.9	999.9	999.9	999.9
01 GENERAL SUPPORT	999.9	999.9	999.9	999.9	999.9
02 GENERAL SUPPORT	999.9	999.9	999.9	999.9	999.9
05 GENERAL SUPPORT	999.9	999.9	999.9	999.9	999.9
06 GENERAL SUPPORT	999.9	999.9	999.9	999.9	999.9
07 GENERAL SUPPORT	999.9	999.9	999.9	999.9	999.9
09 GENERAL SUPPORT	999.9	999.9	999.9	999.9	999.9
SUBTOTAL - GENERAL SUPPORT	999.9	999.9	999.9	999.9	999.9
03 SCHEDULE INSPECTIONS	999.9	999.9	999.9	999.9	999.9
04 SPECIAL INSPECTIONS	999.9	999.9	999.9	999.9	999.9
SUBTOTAL - INSPECTIONS	999.9	999.9	999.9	999.9	999.9
TOTAL	999.9	999.9	999.9	999.9	999.9
CORRECTIVE MAINTENANCE					
INHERENT MALFUNCTIONS	999.9	999.9	999.9	999.9	999.9
INDUCED MALFUNCTIONS	999.9	999.9	999.9	999.9	999.9
OTHER MALFUNCTIONS	999.9	999.9	999.9	999.9	999.9
SUBTOTAL ALL MALFUNCTIONS	999.9	999.9	999.9	999.9	999.9
NO DEFECT	999.9	999.9	999.9	999.9	999.9
TOTAL CORRECTIVE MAINT	999.9	999.9	999.9	999.9	999.9
PRODUCTION IMPROVEMENT (TCTO)	999.9	999.9	999.9	999.9	999.9
TOTAL BASE LEVEL MAINTENANCE	999.9	999.9	999.9	999.9	999.9

2. WORK CENTER BY AIRCRAFT DATA

When code 2 is entered, the data elements listed below for this sub-record will be displayed as shown in the display format. A display for each applicable work center will be presented.

Display Format:

```
     WORK CENTER DATA FOR AIRCRAFT MDS XXXXXXX

     FLYING HOURS 999999     SORTIES 99999     LANDINGS 99999

     FROM DAY 999 OF 9999 (YEAR) TO DAY 999 OF 9999 (YEAR)
------------------------------------------------------------------------

 WORK CENTER   TOTAL MANHOURS   TOTAL ELAPSED TIME   MAINTENANCE ACTIONS MTBMA
   H2112         999999.9          999999.9              999999        9999.9

               MEAN MAN HOURS/ACTION   MEAN ELAPSE TIME/ACTION   MEAN CREW SIZE
                    9999.9                   9999.9                   99.9

                                        OFF-EQUIPMENT
 WORK CENTER   TOTAL MANHOURS   TOTAL ELAPSE TIME   MAINTENANCE ACTIONS
   H2112         999999.9          999999.9              999999

               MEAN MAN HOURS/ACTION   MEAN ELAPSE TIME/ACTION   MEAN CREW SIZE
                    9999.9                   9999.9                   99.9

------------------------------------------------------------------------
------------------------------------------------------------------------

                                        ON-EQUIPMENT
 WORK CENTER   TOTAL MANHOURS   TOTAL ELAPSED TIME   MAINTENANCE ACTIONS MTBMA
   K2100           892.0            682.0                  20             4.6

               MEAN MAN HOURS/ACTION   MEAN ELAPSE TIME/ACTION   MEAN CREW SIZE
                     44.6                    34.1                      1.3

                                        OFF-EQUIPMENT
 WORK CENTER   TOTAL MANHOURS   TOTAL ELAPSE TIME   MAINTENANCE ACTIONS
   K2100           202.0            178.0                  14

               MEAN MAN HOURS/ACTION   MEAN ELAPSE TIME/ACTION   MEAN CREW SIZE
                     14.4                    12.7                      1.1
------------------------------------------------------------------------
```

NOTE: The first work center example shows field sizes (9's) for the data elements. The second shows actual data from a C-5A work center.

OPERATIONAL SUPPORT/COST RECORD

3. SUPPORT COST BY WUC DATA

When code 3 is entered, machine prompts user to enter WUC of interest. When entered, the data elements listed below for this sub-report will be displayed as shown in the display format. The user may enter a 2, 3, 4, or 5 digit WUC.

Display Format:

```
OPERATIONAL AND SUPPORT COST DATA                      DATE 99/99/99

REPORTING PERIOD FROM 99-99 THRU 99-99

AIRCRAFT MDS XXXXXXX  WUC XXXXX    XXXXXXXXXXXXXXXXXXXX

NEXT HIGHER ASSEMBLY WORK UNIT CODE XXXXX

NATIONAL STOCK NUMBER       XXXXXXXXXXXXXXX

QUANTITY PER APPLICATION              999    RESPONSIBLE ALC CODE    X

-------------------------------------------------------------------------

COST                                   BASE        DEPOT
   CONDEMNATION SPARES              $9,999,999    $999,999
   DIRECT MATERIAL                  $9,999,999    $999,999
   EXCHANGEABLE MOD  CLASS IV       $9,999,999    $999,999
   EXCHANGEABLE MOD  CLASS  V       $9,999,999    $999,999
   EXCHANGEABLE REPAIR              $9,999,999    $999,999
   MATERIAL MANAGEMENT OVERHEAD     $9,999,999    $999,999
   OFF EQUIPMENT LABOR              $9,999,999
   OFF EQUIPMENT OVERHEAD           $9,999,999
   ON EQUIPMENT LABOR               $9,999,999
   ON EQUIPMENT OVERHEAD            $9,999,999
   SUPPLY MANAGEMENT OVERHEAD       $9,999,999
   DEPOT LABOR COST                               $999,999
   DEPOT LABOR HOURS                              $999,999
   DEPOT NUMBER OF OPERATIONS                     $999,999
   DEPOT OTHER COST                               $999,999
   2ND DEST. TRANSPORTATION         $9,999,999
   TOTAL WORK UNIT CODE           $999,999,999  $9,999,999

NUMBER OF PARTS CONDEMNED             999,999
-------------------------------------------------------------------------
```

4. R&M BY WUC DATA

When code 4 is entered, the machine prompts the user to enter the WUC of interest. When entered, the data elements listed below for this sub-record will be displayed as shown in the display format. The user may enter a 2, 3, 4, or 5 digit WUC.

Display Format:

```
    R&M DATA BY WUC
    REPORTING PERIOD FROM (MONTH/YEAR) TO (MONTH/YEAR)
    AIRCRAFT MDS XXXXXXX  WUC XXXXX    XXXXXXXXXXXXXXXXXXX
    NEXT HIGHER ASSEMBLY WORK UNIT CODE XXXXX
    NATIONAL STOCK NUMBER      XXXXXXXXXXXXXXX
    QUANTITY PER APPLICATION               999   RESPONSIBLE ALC CODE    X
-----------------------------------------------------------------------------
  REPAIRABLE THIS STATION            999,999
  NOT REPAIRABLE THIS STATION        999,999

MEAN TIMES BETWEEN MAINTENANCE (MTBM)

                 MTBM      STANDARD DEVIATION
 INDUCED         99999            99.999
 INHERENT        99999            99.999
 NO DEFECT       99999            99.999
 OTHER           99999            99.999
 PREVENTIVE      99999            99.999

OFF EQUIPMENT
    INDUCED MANHOURS              999,999
    INHERENT MANHOURS             999,999
    NO DEFECT MANHOURS            999,999
    OTHER MANHOURS                999,999
    PREVENTIVE MANHOURS           999,999
    TOTAL MANHOURS              9,999,999   MAINTENANCE ACTIONS 999,999
    MEAN CREW SIZE                   99.9   STANDARD DEVIATION   99.999

    MEAN MANHOURS TO REPAIR      99,999.9   STANDARD DEVIATION   99.999
    MEAN ELAPSED TIME TO REPAIR  99,999.9   STANDARD DEVIATION   99.999

ON EQUIPMENT
    INDUCED EVENTS                999,999   INDUCED MANHOURS     999,999
    INHERENT EVENTS               999,999   INHERENT MANHOURS    999,999
    NO DEFECT EVENTS              999,999   NO DEFECT MANHOURS   999,999
    OTHER EVENTS                  999,999   OTHER MANHOURS       999.999
    PREVENTIVE EVENTS             999,999   PREVENTIVE MANHOURS  999,999
                                            TOTAL MANHOURS     9,999,999
    MEAN CREW SIZE                   99.9   STANDARD DEVIATION   99.999
    MEAN ELAPSED TIME TO REPAIR  99,999.9   STANDARD DEVIATION   99.999
    MEAN MANHOURS TO REPAIR      99,999.9   STANDARD DEVIATION   99,999
    OPERATING TIME                999,999   STANDARD DEVIATION   99.999
-----------------------------------------------------------------------------
```

NOTE: Standard Deviation provided if available.

5. MAINTENANCE ACTION BY WUC DATA

When code 5 is entered, the machine prompts the user to enter the WUC of interest. When entered, the data elements listed below for this sub-record will be displayed as shown in the display format. A display will be presented for each set of Action Taken, How Malfunctioned, and Type How Malfunctioned Codes reported. A summary of all the displays is presented at the end for the WUC selected. The user may enter a 2, 3, 4, or 5 digit WUC.

Display Format:

```
MAINTENANCE ACTION DATA

AIRCRAFT MDS XXXXXXX        WUC XXXXX
FLYING HOURS 999999     SORTIES  99999   LANDINGS 99999
FROM (DAY/YEAR)  TO  (DAY/YEAR)

--------------------------------------------------------------------------------
  WORK UNIT CODE:  XXXXX   ACTION TAKEN: X  HOW MAL CODE: 999  TYPE HOW MAL: 9
** UNSCHEDULED MAINTENANCE **

              MAINTENANCE                          MEAN    MAINTENANCE
  MTBMA         MANHOURS       ELAPSED TIME     CREW SIZE    ACTIONS
  9999.9         9999.9           999.9           99.9        9999

** SCHEDULED MAINTENANCE **
              MAINTENANCE                          MEAN    MAINTENANCE
  MTBMA         MANHOURS       ELAPSED TIME     CREW SIZE    ACTIONS
  9999.9         9999.9           999.9           99.9        9999
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------

  WORK UNIT CODE:  65ABO   ACTION TAKEN: Q  HOW MAL CODE: 799  TYPE HOW MAL: 6
** UNSCHEDULED MAINTENANCE **

              MAINTENANCE                          MEAN    MAINTENANCE
  MTBMA         MANHOURS       ELAPSED TIME     CREW SIZE    ACTIONS
    .0              .7              .7            1.0          0

** SCHEDULED MAINTENANCE **
              MAINTENANCE                          MEAN    MAINTENANCE
  MTBMA         MANHOURS       ELAPSED TIME     CREW SIZE    ACTIONS
    .0              .0              .0             .0          0
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------

---- SUMMARY OF MAINTENANCE DATA ----
AIRCRAFT MDS   C-5A     WORK UNIT CODE 65AB
** UNSCHEDULED MAINTENANCE **

              MAINTENANCE                          MEAN    MAINTENANCE
  MTBMA         MANHOURS       ELAPSED TIME     CREW SIZE    ACTIONS
   93.2            1.4             1.4            1.0          1

** SCHEDULED MAINTENANCE **
              MAINTENANCE                          MEAN    MAINTENANCE
  MTBMA         MANHOURS       ELAPSED TIME     CREW SIZE    ACTIONS
    .0              .0              .0             .0          0
--------------------------------------------------------------------------------
```

NOTE: The first example shows the field sizes for the maintenance action data elements. The second example is actual C-5A data. The third example shows a summary of maintenance actions from actual C-5A data.

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