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VOLUME 7
CALS Draft Baseline
Architecture analysis Of
Weapon System Technical
Information Air Force

Office of the Secretary of Defense
Computer-aided Acquisition &
Logistic Support (CALS)
Policy Office

September 1989

Draft

Baseline Architecture Analysis of Weapon System Technical Information – Air Force

Prepared By

U. S. Department of Transportation
Research and Special Programs
Administration
Transportation Systems Center
Cambridge, MA 02142

Baseline Architecture Analysis of Weapon System Technical Information – Air Force

Preface

In August 1988, the Deputy Secretary of Defense issued a memorandum directing new weapon systems acquisitions and related major equipment items to routinely include the use of Computer-aided Acquisition and Logistic Support (CALS) standards. The CALS Office of the Secretary of Defense (OSD) is taking a lead role in planning the successful implementation of the CALS program throughout DoD. A key activity in this planning process is developing a CALS architecture. The CALS architecture will be described in the DoD Architecture Guidelines which will provide guidance to the Services and the Defense Logistics Agency (DLA) for the planning and execution of their respective CALS programs. The Guidelines will outline the evolutionary steps from the present paper-intensive weapon system lifecycle processes to a highly automated, paper-free technical environment.

The guidelines will be derived from studies of the current environment within each of the Services and DLA. The results of each study have been documented in a baseline architecture report titled Baseline Architecture Analysis of Weapon System Technical Information. There are four reports which present the baseline architecture for the Army, Navy, Air Force and DLA. The four studies are presented in a standard structure which will ease the task of cross service comparisons and other evaluations.

The work was performed under the direction of Dr. Robert Smith of the Information Integration Division at the Transportation Systems Center (TSC). TSC has drawn upon the skills and knowledge of several consultants. This has enabled the development of a multi-faceted team of experts each of whom has made a vital contribution. TSC would like to extend its gratitude to the following organizations: CACI, INC.-FEDERAL, Coopers & Lybrand, EG&G DYNATREND Inc., and UNISYS Inc.

This attached study identifies a baseline for the development of an automation plan to receive, store, use, and disseminate digital technical information in the Air Force. It describes how the Air Force currently plans, controls and executes processes which either create, manage or use weapon system technical information.

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Section I

INTRODUCTION

INTRODUCTION

PURPOSE

This effort was performed to define a common baseline for analysis and planning of CALS initiatives across the military services, leading to the future development of the DoD Architecture Guidelines.

SCOPE

This study addresses the management of technical information in the Air Force. It describes how technical information is created, managed and used as related to Product Definition (PD) and Logistics Support (LS). It identifies a means of migration from the current environment to a highly automated environment through the application of information technologies. This study provides the background information necessary for subsequent analytical efforts in the development of the DoD Architecture Guidelines.

METHODOLOGY

The methodology developed by the Transportation Systems Center for the Air Force was used by other contractors building similar documents for the Army, Navy and DLA, facilitating comparison of similar activities in all services.

This document uses a series of matrices to present a high-level baseline architecture of the process, data, and organizations which the United States Air Force employs to manage technical aspects of product definition and logistics support. A total of six matrices are presented, three (process, data, organization) for each of these two technical data areas.

The matrices are designed to mirror the "Anthony Model", a model built on the premise that every organization must **plan**, **control** and **execute** processes in order to accomplish its mission. Each process produces data, each process is unique, and each process is the responsibility of at least one organizational entity.

For each of the technical information areas (PD and LS), the matrix analysis is augmented by: 1) an Air Force organizational structured view of the major players in each area; 2) a list of high level findings and conclusions focused on process, organizational, and data issues; and 3) a table describing how the Air Force might apply technology in the short, mid, and long term timeframes to evolve to target capabilities, and the improvements that could result from doing so. In addition, two diagrams provide a dynamic view of data to complement the static view portrayed in the matrices.

The content of this document was developed using Air Force source documents, such as regulations and pamphlets, and recent technology assessment forecasts done for the Air Force. It relied heavily upon current environment reports and other key reports prepared by TSC for the CALS Management Integration Office (MIO) at Headquarters Air Force Systems Command (HQ AFSC). Verification of the current environment was accomplished through past and present MIO strategic planning efforts conducted by TSC.

THE FLOW OF TECHNICAL INFORMATION

In completing the analysis, a Context Diagram and Level 0 Diagram were created to represent the flow of weapon system technical information within the Air Force and between the Air Force and its business environment. This is depicted at a high level in the two charts which follow this introduction.

Treating the management of weapon system technical information as a single process, the Context Diagram portrays the major information exchange between the Air Force and organizations in its business environment. A significant amount of technical information is interchanged between the Air Force and the other military services and DLA and, to a lesser extent, between the Air Force and non-DoD agencies such as GSA and foreign military organizations.

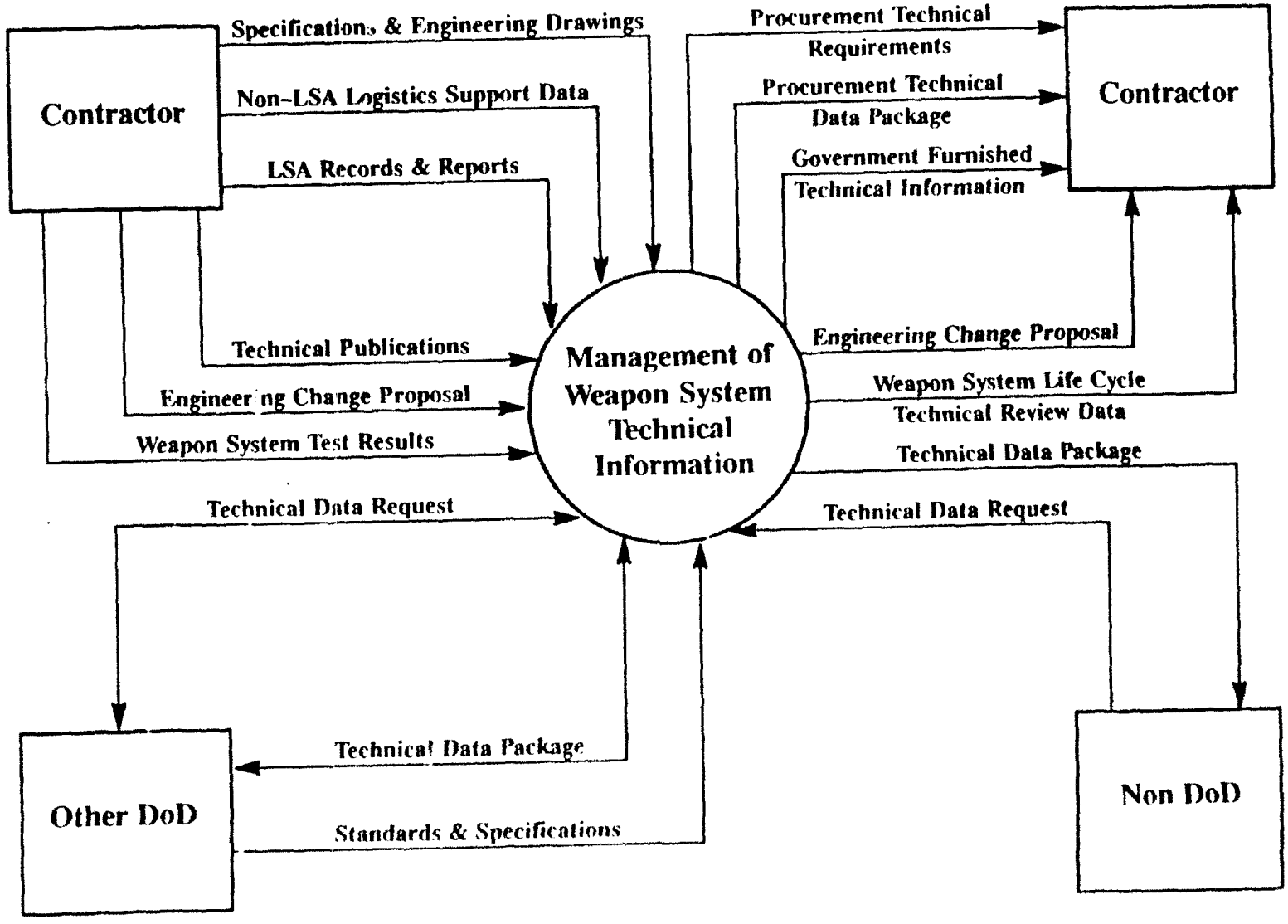
In the Level 0 Diagram, we look into the single large process of the Context diagram to examine how the Air Force creates, manages, and uses weapon system technical information. The *create* process includes sub-processes in the Air Force associated with managing technical information during the weapon system acquisition cycle: *specifying* requirements; *reviewing* contractor deliverables; and actually *acquiring* the final products specified in the contract.

The *manage* process includes those Air Force sub-processes associated with on-going management of acquired technical information: *controlling* the update process through configuration management and other means; *maintaining* Air Force files and manuals of technical information; and *distributing* existing technical information, both within the Air Force and outside it.

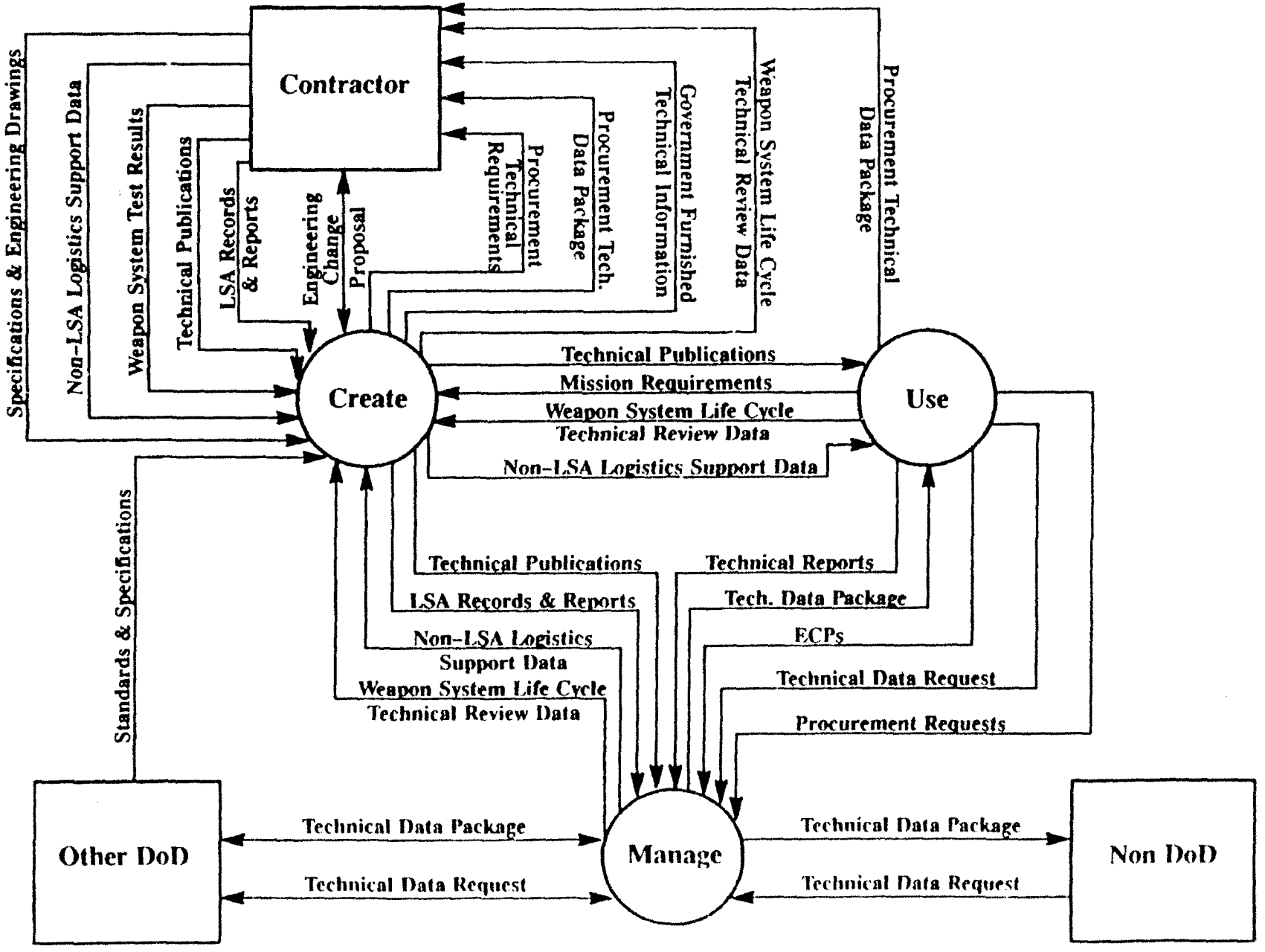
Finally, the *use* process includes those Air Force sub-processes which make direct, mission area use of existing technical information. *Use* processes include *maintenance* of equipment, *supplying* the users with materiel, and *reprocuring* additional stocks of existing types of materiel.

The information flows which appear in these two diagrams describe major categories of information, the contents of which appear in the data matrices in following sections on Product Definition and Logistics Support.

Weapon System Technical Information - Air Force
Context Diagram



Weapon System Technical Information - Air Force
Level 0 Diagram



Section II

PRODUCT DEFINITION

PRODUCT DEFINITION INTRODUCTION

The Product Definition (PD) matrices, which immediately follow this summary of their content, describe the process and the organizations involved in the collection, preparation and consolidation of weapon system technical information for product definition.

PD data is originated in system and program management documentation and is contained in materiel, decision, and program documents such as: Program Management Plan (PMP), Acquisition Plan, Configuration Management Plan (CMP), Integrated Logistics Support Plan (ILSP), etc. These documents contain selected technical information and guide the development of PD for a weapon system.

During acquisition, the System Program Office (SPO), which resides within the AFSC Product Divisions, is responsible for defining the requirements and levels of PDD for a weapon system. The SPO conducts program reviews, acceptance testing reviews, and performs other business functions such as accepting deliverables, financial tracking, and schedule tracking.

During the concept exploration phase, the system specification is prepared to establish the functional baseline which defines mission and technical requirements. System Requirements Reviews (SRR) are conducted to ensure that system requirements have been completely and properly identified. Throughout the demonstration/validation phase, development specifications are developed to establish the allocated baseline. "Candidate Configurations" and any supplementary analyses are then reviewed by the SPO at the System Design Review (SDR). After the demonstration/validation phase, the system specification is refined and updated to reflect the current definition of the system. During full scale development, draft development specifications are updated and verified, and Preliminary Design Reviews (PDR) are performed. The PDR allows the SPO to perform a formal technical review of enhanced designs to select the configuration which provides the best overall use of technology and resources for meeting system requirements. The PDR represents approval to begin detailed design. Detailed drawings and a complete engineering package are the source data for conducting the Critical Design Review (CDR). A specific configuration item (CI), along with actual design criteria, is reviewed by the SPO at the CDR. Once this design is verified, a Product Specification (Type C) is generated to be used by the Contractor to perform production.

To validate that the development requirements have been achieved and that the product configuration has been identified, configuration audits are performed. The three separate types of acceptance measures are the Functional Configuration Audit (FCA), the Physical Configuration Audit (PCA), and the Formal Qualification Review (FQR).

Several events occur throughout the technical progression of the systems engineering and design process such as Configuration Management, Test Support, and In-Process Reviews.

Configuration management is performed by the SPO during the acquisition phase and the Air Logistics Centers' (ALC) System Program Manager (SPM) throughout the life cycle of the weapon system. It identifies and controls system elements (i.e., configuration items), and allows for points of control, review, and distribution for changes to the system. The tracking function provides for Configuration Status Accounting (CSA). Configuration control is established via a governing body called the Configuration Control Board (CCB) whose role is to review incoming Engineering Change Proposals (ECPs) and provide approval or rejection.

Test Support, usually identified early in the acquisition process in the Test and Evaluation Master Plan (TEMP), provides data in such areas as fatigue, fracture, and component failure to assist in determination of the active life cycle of components. In addition, this data is required for determining spares provisioning. Depending on system requirements, testing can be carried out by the contractor, or by testing agencies within the Air Force.

The In-Process Review (IPR) is a requirement within the contract which provides the Air Force with a periodic review of the format of engineering drawings. The IPR identifies to the contractor any problems and deficiencies in generating the drawings.

During production, Program Management Responsibility Transfer (PMRT) planning takes place. Until PMRT takes place, the SPO maintains close coordination with the production contractor, and prepares the ALC SPM for delivery of engineering data and receipt of the system.

Post-PMRT the ALCs become the primary users of PDD for supporting the weapon system. Once the PDD is accepted by the SPM, it is stored in Engineering Data Service Centers (EDSCs) for retrieval for various post-production activities throughout the weapon system life cycle.

The ALCs and Major Commands (MAJCOMs) are responsible for local manufacturing, reprocurement of spares, and performing repairs and modifications in support of weapon system depot and base level activities.

The ALCs and MAJCOMs manufacture parts locally to support depot and base level maintenance. The ALCs remanufacture spares that cannot be reprocured based on the cost and urgency of the requirement. The Using Commands are responsible for the local manufacture of parts for items authorized as "base-manufacture" and in situations when the ALCs cannot meet the Using Commands' needs due to maintenance schedules and cost constraints. Two and three dimensional drawings, process specifications and materiel specifications are the support data used for local manufacture.

The ALCs are responsible for periodically purchasing Items/Economic Order Quantity (EOQ) and as needed replacement parts from contractors on a competitive basis. For first time reprocurements, the ALCs assemble bid sets using engineering drawings, specifications and lists. For subsequent reprocurements, procurement requests are initialized.

Repairs are performed by ALCs and MAJCOMs to support depot and base level maintenance. The ALCs and MAJCOMs refer to engineering drawings, parts lists, specifications, and analysis data when the Technical Order (TO) does not provide sufficient information to support the repair process.

Modifications may be initiated by the Using Commands identifying deficiencies cited by deficiency reports, or by HQ USAF defining a new operational capability due to Reliability and Maintainability (R&M), safety of flight problems, or a change in mission requirements. The ALC/SPM is responsible for performing an engineering analysis of the deficiency report findings. Once a deficiency has been identified, an ECP is developed by the ALC or contractor defining the tasks and requirements to perform the modification. Analysis models, product specifications and engineering data are used to support the development of the modification kits.

PROCESS (PRODUCT DEFINITION) - AIR FORCE

Plan	• Define SON/SORD (Using Cmds.) • Define System Rqmts. (AFSC) • Develop PMP/ EDMP (AFSC) • Develop CMP (AFSC) • Develop CRLCMP (AFSC)	• Determine Content of Design Package (AFSC/SPO) • Conduct Engineering Guidance Conference (AFSC/SPO/ EDMO)	• Define Test Plan (AFSC/ SPO)	• Establish Configuration Control Practices/ Procedures (AFLC/ SPM,CCB)	• Develop ECPs (AFLC/ALCs, Using Cmds.)	• Specify Product Data Requests (AFLC/ ALCs, AGMC, MAJCOMs)	• Collect Modification Requirements (AFLC/ALCs/ MM) • Initiate Deficiency Reports (MAJCOMs, AFLC/ALCs)	• Establish Need for Interchangea-bility and Review (AFLC/ ALCs, Using Cmds.)	• Initiate Spares Request (AFLC/ ALCs/MM, Using Cmds.) • Identify Spares Requirements (AFLC/ALCs/ MM,MAJCOMs)
Control	• Transmit Data Call Response (AFLC,Using Cmds,Test Wings, Labs) • Evaluate Data Call (AFSC/ SPO) • Evaluate Rqmts. & Tailoring of DIDs (AFSC)	• Monitor Eng. Data Design (AFSC/SPO, AFPRO/DCAS, DPML) • Manage IPRs (AFSC/SPO, AFLC/ALCs, AFPRO/DCAS, CASC)	• Review/ Approve Deviations/ Waivers (CCB) • Review/ Approve ECP/ OCP (AFSC/ SPO,AFLC/ SPM,CCB) • Manage ECO (AFLC/SPM, AFSC/SPO)	• Assess Regulations and Publications (AFLC/ALCs/ MM)	• Coordinate ECP efforts (AFLC/ ALCs,CCB, MAJCOMs)	• Evaluate Product Data Request (AFLC/ ALCs/MM)	• Evaluate Deficiency Reports (AFLC/ ALCs/MM) • Manage Mod. Development (AFLC/ALC/MM)	• Evaluate Interchangea-bility of Parts (AFLC/ALCs, Using Cmds.) • Manage Parts Break-out (AFLC/ALCs, Using Cmds.)	• Screen Data Package (AFLC/ALCs/ CR)
Execute	• Perform Data Call (AFSC/ SPO) • Release to Internal Contracting (AFSC/SPO)	• Perform Design Reviews (AFSC/SPO, AFLC/SPM, AFPRO/DCAS) • Perform Config. Audits (AFSC/SPO, AFLC/SPM, AFPRO/DCAS)	• Inspect/ Accept Engineering Data (AFSC/ SPO,AFLC/ ALCs,AFPRO, CCB)	• Analyze and Accept Configuration Changes (CCB)	• Update Eng. Data (AFLC/ ALCs) • Inspect/Accept Updtd Eng. Data (AFLC/ALCs, Using Cmds) • Maintain Repositories/Dist List (AFLC/ ALC,MAJCOMs) • Enter Drawings into EDCARS (AFLC/ALCs)	• Reproduce/ Assemble Bid Sets/Product Data (AFLC/ ALC/MM,CR) • Distribute (New/Updated) Technical Data Packages (AFLC/ALCs/ MM)	• Assemble Engineering Data Package (AFLC/ALCs/ MA,CR) • Design Modification/ Repair (AFLC/ ALC/MM) • Test & Validate Mods. (AFOTEC, AFFTC,prime ALC)	• Implement Interchangea-bility of Parts (AFLC/ALCs, Using Cmds.)	• Assemble Bid Sets (AFLC/ ALCs/MM)
	SPECIFY	**REVIEW**	**ACQUIRE**	**CONTROL**	**MAINTAIN**	**DISTRI-BUTE**	**MAINTE-NANCE**	**SUPPLY**	**REPRO-CUREMENT**
	CREATE			**MANAGE**			**USE**		

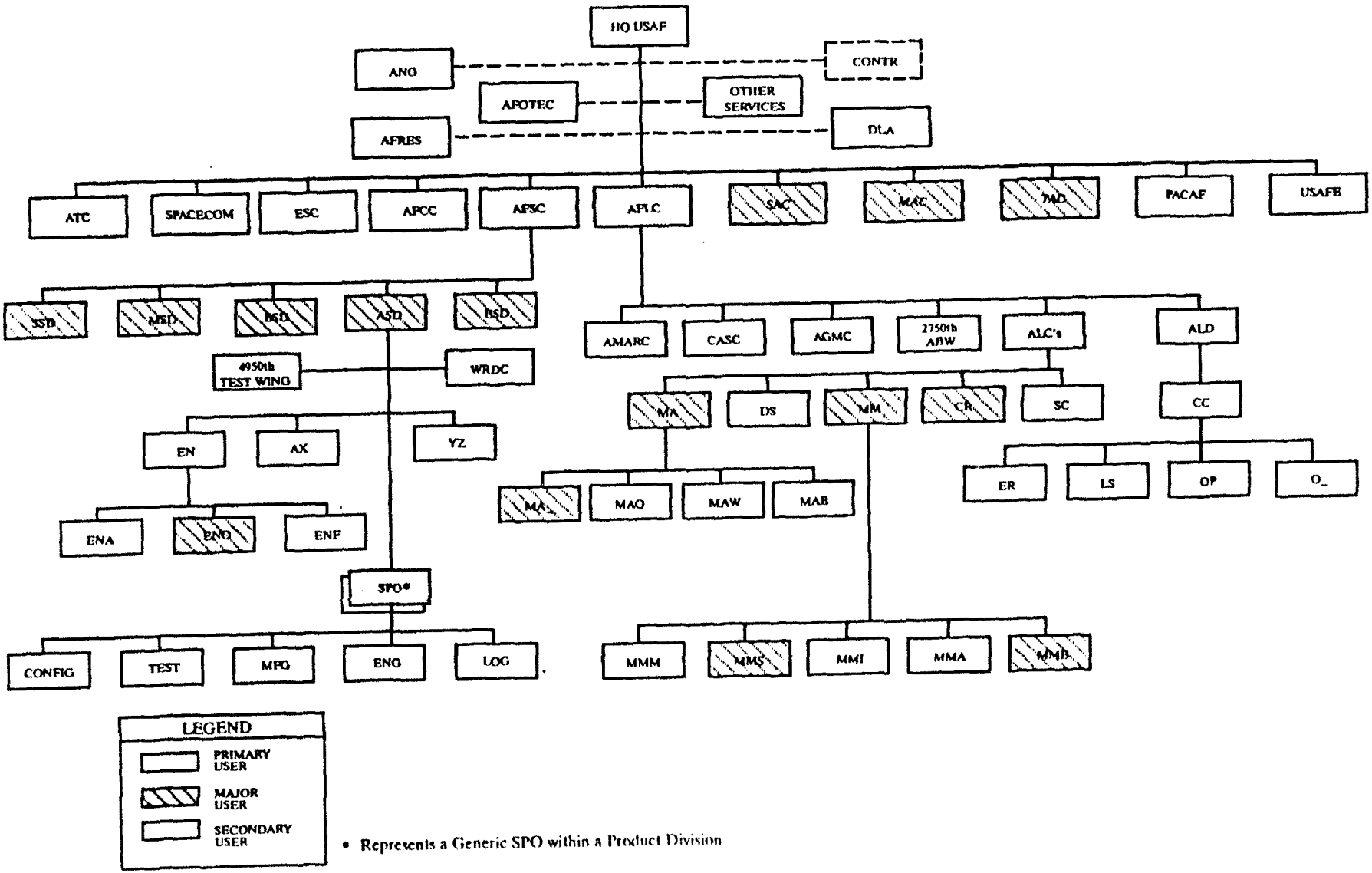
DATA (PRODUCT DEFINITION) - AIR FORCE

	SPECIFY	REVIEW	ACQUIRE	CONTROL	MAINTAIN	DISTRI-BUTE	MAINTE-NANCE	SUPPLY	REPRO-CUREMENT
Plan	• SON • SORD • Requirements • Specifications • PMP • EDMP • EDARF • ILSP • CMP • CRLCMP	• Engineering Data Requirements	• Test Requirements • TEMP	• Configuration Item Data • Configuration Baseline • Configuration Control Practices/Procedures	• ECPs	• Engineering Data Request	• Work Control Document • Specifications • Engineering Drawings • Lists • Deficiency Reports	• Specifications • Parts Lists	• Spares Request • Engineering Data Request • Spares Requirements
Control	• Data Call Response • Engineering Data Requirements • DIDs	• Engineering Drawings • Revised Engineering Data • Specifications • Associated Lists	• Deviations/ Waivers • ECP/OCP Documents • ECO • NORs • Engineering Data	• Regulations and Publications	• ECPs • DCRs • NORs • ECOs • Interface Documentation	• Request for Reproduction of Engineering Data (AFLC Form 4753) • Distribution List	• Structural Damage Data • Q/A Data • Engineering Drawings • Engineering Analysis Data • Specifications • Deficiency Reports	• Specifications • Parts Lists	• Screening/ Analysis Data • Test Data • Engineering Drawings • Parts Lists • Specifications
Execute	• RFP • SOW • CDRLs • DiDs • Regulations • Standards	• Level 2,3 Engineering Drawings • Specifications • Analysis Models • Test Data • Technical Reports • ICDs	• Level 3 Eng. Data Packages • Tech. Reports • Specs. (Type A-E) • Analysis/Design Data • Associated Lists • Test Data/Results • Standards	• Configuration Control Data • Technical Documentation • Configuration Status Accounting Data	• New/Revised Engineering Data • Configuration Management Data • Distribution List	• Bid Sets/Engineering Data Packages • Distribution List Update	• Specifications • Engineering Drawings • Engineering Analysis Data • Q/C Data • Q/A Data • Test Data • Test Plan • Mod. Kits • Updated Drawings	• Specifications • Parts Lists	• Bid Sets
	CREATE			MANAGE			USE		

ORGANIZATION (PRODUCT DEFINITION) - AIR FORCE

	SPECIFY	REVIEW	ACQUIRE	CONTROL	MAINTAIN	DISTRI-BUTE	MAINTE-NANCE	SUPPLY	REPRO-CUREMENT
Plan	• Using Cmds. • AFSC	• AFSC/SPO	• AFSC/SPO	• AFLC/SPM • CCB	• AFLC/ALCs • Using Cmds.	• AFLC/ALCs • AGMC • MAJCOMs	• AFLC/ALCs/ MM • MAJCOMs	• AFLC/ALCs • Using Cmds.	• AFLC/ALCs/ MM • MAJCOMs
Control	• AFSC/SPO • AFLC • Using Cmds. • Test Wings • Labs	• AFSC/SPO • AFPRO/ DCAS • DPML • CASC • AFLC/ALCs	• AFLC/ALC/ MM/CCB • AFSC/SPO • AFLC/SPM	• CCB	• AFLC/ALCs • CCB • MAJCOMs	• AFLC/ALCs/ MM	• AFLC/ALCs/ MM,CR,MA	• AFLC/ALCs • Using Cmds.	• AFLC/ALCs/ MM,CR
Execute	• AFSC/SPO	• AFSC/SPO • AFLC/SPM • AFPRO/ DCAS	• AFSC/SPO • AFLC/ALCs • AFPRO • CCB	• AFLC/ALCs/ MM • CASC • AGMC • MAJCOMs	• AFLC/ALCs • Using Cmds.	• AFLC/ALCs/ MM,CR	• AFLC/ALCs/ MM • AFOTEC • AFFTC • Prime ALC	• AFLC/ALCs • Using Cmds.	• AFLC/ALCs/ MM,PM,DS
	CREATE			MANAGE			USE		

MAJOR PD "PLAYERS" – AIR FORCE



* Represents a Generic SPO within a Product Division

FINDINGS – PRODUCT DEFINITION

ORGANIZATION

- While performing IPRs, EDMOs review drawings predominantly for format rather than technical content due to the large volume of drawings and the lack of technical training.
- Many SPO Program Managers and EDMOs at Product Divisions feel that it is not necessary to purchase all engineering data for a weapon system. In most situations, the ALCs feel that all available data should be purchased by the Air Force.
- The turnaround time required by the ALCs to perform maintenance does not always meet the scheduled requirements of the MAJCOMs.
- There is an increasing trend towards MAJCOMs using engineering data to maintain high mission status rates.

PROCESS

- It is nearly impossible for the SPO to review all of the engineering drawings for a weapon system during the IPRs due to the number of drawings and the complexity of the weapon system. Therefore, EDMOs within a SPO use a "random" sampling method to select drawings for review.
- Engineering data packages are accepted with missing or incomplete information.
- The functional use of engineering data for a weapon system changes as the system grows older. In newer weapon systems (under 7 years old) engineering data is primarily for reprocurement of spare parts, while in older systems (over 7 years old) the data required is for support of modifications, repair, and/or local manufacture.

DATA

- Most information at an EDSC is stored, managed, and retrieved from manual repositories. Because most of the engineering data is still managed manually, problems occur during filing, handling, or use of this information. Engineering data can be lost, damaged, or destroyed resulting in incomplete data packages/ stores.
- Incomplete engineering data packages, weapon system changes, modifications and unauthorized drawing stores contribute to existing configuration management problems.
- Level 3 engineering data is required to reduce the long term costs of weapon system support through competitive reprocurements. However, necessary level 3 engineering data may not always be acquired to support engineering requirements.

CONCLUSIONS – PRODUCT DEFINITION

ORGANIZATION

- Interactive communications between required participants prior to and during IPRs is necessary to ensure technical accuracy and adequacy of the engineering data to support post-production applications.
- Establish engineering data requirements between MAJCOMs to define data required for post-production applications.
- MAJCOMs help maintain high mission status rates by performing local manufacturing which necessitates the availability of engineering data at base level.

PROCESS

- During the acquisition of a weapon system, only a limited review process is possible due to vast numbers of drawings, limited time, and lack of engineering data requirements. IPRs do not adequately reflect the technical adequacy, correctness, and completeness of engineering data packages.
- The importance of maintaining engineering data has increased due to extending existing systems beyond their projected life cycle through major modification programs, and limiting the number of new weapon system acquisitions.

DATA

- The inadequate tracking of data acquired at the SPO and EDSC can result in duplicate data purchases. In some instances the acquisition of duplicate data has cost thousands of dollars.
- Currently, there is no configuration management system for engineering data.
- A viable feedback loop to enhance post-production applications is required to support acquisition and engineering.

What Information Technologies Could Enhance the Logistic Processes? (PD)

3-5 Years	7-10 Years	10-20 Years
• Enhance raster scanning capabilities through EDCARS • EDCARS data base at all ALCs • Initial development of PDES • Use of CASE tools becomes common place • Relational data base management systems • Standardized communications protocols in use • Parallel processing mainframes • Usable s/w to support data dictionaries	• Standard EDI format allows digital PD from Contractors to Government • Tech data available on viable optical disc storage systems • Interfaced data base system allows multiple-user access to PD data • PD drawings, specs and manuals, enhanced by graphics workstations • Joint Government-Industry standards for tech data/graphics in final testing (PDES prototype) • Configuration Locator for all iterations of tech data • Expert Systems for validation and verification • "Paper-less" computer environment • Electronic offices • Flexible modular structure • User-friendly interface to heterogeneous DBs in various formats • Large strides in computer graphics, 3-D • Object-oriented databases • Interactive on-line process	• PD data created once; capable of being used many times by Government or Industry • PDES provides foundation for interactive simulation and modeling; concurrent engineering • Integrated voice, data, image and Artificial Intelligence improve interfaces to computing • Super computing capability resides in desktop PCs • Knowledge-based systems for specific applications • Uniform user interface

What PD Process Improvements are Posssible Through the Application of Information Technology?

3–5 Years	7–10 Years	10–20 Years
• Automated procedures improve quality and continuity of PD requirements generation and review • On-line transaction-oriented support to: item accounting; accounting and finance; file maintenance; and management reporting • Improved access to configuration information • Enhanced integration of engineering drawing related activities • Increased interchange of information • Remote IPRs, Technical Reviews	• Interfaced DBs allow PD data to become "reusable" and shared with LS and Procurement DBs • Improved storage and distribution mechanisms through optical disc • Common data dictionary requirements implemented on contracts and standardized PD formats enhance quality and reduce time and costs in the acquisition cycle • Reduced on-site engineering support; better real time reviews available • Accurate and timely distribution of data at the end-user level • Efficient maintenance and management of PD	• Standard data elements reduce requirements for WS data sets; reduces reprocurement of existing or redundant PD data; and overall reduces costs • Digital storage and retrieval capability for all tech data means easier availability to all users and vast savings in time and money • Integrated CIM environment • Enhanced initialization of data structures

How can the Air Force Achieve These Logistic Process Improvements? (PD)

3–5 Years	7–10 Years	10–20 Years
• Promote PD Hardware and Software interoperability • Continue to resolve PD proprietary data rights, liability and warranty issues • Promote continued growth and usage of graphics terminal interfaces in the PD process • Further refine test requirements and graphics standards • Resolve ingrained organizational impediments or barriers to the modernization process • Continue to look for and use the most current technology available • Standardize organization structures • Adoption of interchange standards to store and retrieve PD at ALCs • Adoption of CMS	• Implement digital transfer of PD data between AFSC, AFLC and Using organizations • Implement expert systems to verify and validate PD data • Link PD and procurement DBs • Institute automated access to PD data from Contractors • Acquire enhanced PD workstations • Develop electronic libraries of TD • Implement multiple-user interfaced DBs • Use optical storage technology to the fullest extent • Develop vector capability • Completely utilize the capabilities of the PDD System Concept • Automate configuration management across technical information types	• Promote expert systems for maintenance functions • Allow PD data to serve as data base for interactive simulation and modeling of WS performance and logistics support • Use super computers to enhance integration of computer-aided diagnostics and the R&M processes • Complete implementation of digital transfer of PD data between AF organizations, other government agencies and Contractors • Promote the use of image and voice processing subsystems • Integrate PDES into AF operations • Implement data management systems

Section III

LOGISTICS SUPPORT

LOGISTICS SUPPORT INTRODUCTION

The Logistics Support (LS) matrices, which immediately follow this summary of their content, describe the process and the organizations involved in the collection, preparation and consolidation of weapon system technical data for logistics support.

LS data consists primarily of the Logistics Support Analysis (LSA) and Logistics Support Analysis Records (LSAR) data, and logistics data produced in the development, maintenance and support of an item or system. LS data is used in the planning, control and execution of the logistics process.

LSA is the selective application of a defined analytical process designed to achieve supportability objectives which is undertaken during the weapon system's acquisition, as part of the systems engineering and design process. The objectives of the LSA process are to integrate supportability requirements into the systems engineering and design process, optimize the support system, define the required operational support and resources, and develop an integrated data base of logistics information. Most LSA is performed by contractors; the Air Force is principally responsible for the review and management of LSA. Program management is primarily the responsibility of the System Program Office (SPO) through the Integrated Logistics Support Manager (ILSM) or Deputy Program Manager for Logistics (DPML).

LS data is originated in system and program management documentation and is contained in materiel, decision, and program documents such as: Program Management Plan (PMP), Configuration Management Plan (CMP), Integrated Logistics Support Plan (ILSP), etc. These documents contain selected technical information and guide the development of LS for a weapon system. The PMP and ILSP are living documents which reflect current program status and planned actions. They are updated throughout acquisition to reflect changes, updates and operational support requirements. The ILSP and the LSA process are the basic management tools of the Integrated Logistics Support (ILS) program for integrating support elements and achieving program objectives.

Most of the support data created by the contractor is delivered to the SPO for review and approval before acceptance. This data includes LSAR and LSAR Reports. Formal LSA Program reviews are scheduled regularly to ensure that supportability is an integral part of the design process.

LSAR reviews are generally scheduled quarterly. The contractor submits pertinent data for review to appropriate Air Force personnel. The DPML, Integrated Logistics Support Management Teams (ILSMTs), representatives of the MAJCOMs and the ALCs, Acquisition Logistics Division (ALD) and maintenance personnel review the data for accuracy in the LSA program.

In accordance with the Test and Evaluation Master Plan (TEMP), the Air Force Operational Test and Evaluation Center (AFOTEC) and other testing agencies conduct formal testing of new weapon systems to assess the achievement of support and performance parameters specified by contract. The contractor analyzes test results against predicted data to determine discrepancies. The analysis of test results against predicted data may result in the need for updates and modifications to both the system design and the logistics resource requirements.

Prior to PMRT, the acquisition process is focused on developing detailed requirements and a detailed design to meet the technical and supportability requirements of the weapon system. The major LS data requirements involve the LSAR, training, technical orders, provisioning, Package, Handling and Transportation (PH&T), human factors and Life-Cycle Cost data. Data is received and approved by the SPO. Applicable LS data is turned over to the AFLC SPM at PMRT.

Post-PMRT, LS data is used by the SPM in many applications. Some of these are in support of: Procuring items; updating technical orders; updating training requirements; developing future modifications; the deficiency reporting system; the Maintenance Data Collection (MDC) system; updating support equipment and facilities requirements; manpower, personnel and training; and Reliability and Maintainability programs. Overall, the data is used to maintain efficient and effective logistics support for weapon systems.

Changes to LS data are generated by many different AF users during the operation, maintenance and supply support process. Users generate deficiency reports which are reviewed and accepted by the CCB. Once a deficiency has been identified, an ECP is created and new logistics requirements and tasks are defined/redefined. Logistics Management Systems (LMS) are updated with new logistics data to support the weapon system.

PROCESS (LOGISTICS SUPPORT) - AIR FORCE

Plan	• Define SON/ SORD (Using Cmds.) • Establish Policies (AFSC) • Develop PMP & ILSP (AFSC,AFLC) • Develop "A" Record & Maint. Concept (AFSC,AFLC)	• Initiate LSA Guidance Conference (ILSMTs)	• Initiate OT&E (Test Wings, AFLC/ALCs, Using Cmds.) • Establish Supportability Plans (AFLC/ SPM, AFSC/ SPO)	• Establish Configuration Control Practices/Procedures (AFLC/ SPM, CCB)	• Develop ECP (AFLC/ALCs)	• Establish MDC Procedures (Using Cmds.)	• Project Maintenance Resource Rqmts. (AFLC/ALCs) • Specify Maintenance Rqmts. (AFLC/ALCs)	• Establish Supply Requirements (AFLC/MM,IM, ES)	• Initiate/Develop Spares Requirements (AFLC/MM/IM, ES) • Identify Common Item Requirements (AFLC/MM, IM, ES)
Control	• Transmit Data Call Response (AFLC) • Evaluate Data Call (AFSC) • Tailor LSA Tasks (AFSC, AFLC)	• Review Use Stud./Trade-off Analysis (AFSC, AFLC, ILSMTs) • Manage ILS Reviews (AFSC/ SPO, AFLC/ DPML, MAJCOMs, ILSMTs)	• Coordinate LSA Planning Tasks (ILSMTs) • Manage LSAR Reviews (AFSC/ SPO, ILSMTs) • Review ISP (AFSC/SPO, AFLC/DPML, CASC, ILSMTs) • Evaluate ILS Plans (AFSC,AFLC)	• Assess Regulations and Publications (CCB)	• Evaluate ECPs (CCB) • Evaluate Maintenance Stats vs. Projections (AFLC/ALCs) • Evaluate MDC Data (AFLC/ ALCs, Using Cmds.) • Alter SMR Coding/Parameters (ALCs/DS)	• Evaluate Distribution of MDC Data (AFLC/ALCs, Using Cmds.)	• Control Maintenance Procedures (AFLC/ ALCs)	• Monitor Consumption/Usage Rates (AFLC/ MM,IM, ES, PMS) • Control Inventory Management (AFLC/MM, MA, IM, Using Cmds.)	• Evaluate Requirements (AFLC/MM,IM, ES, PMS) • Monitor Spares Inventories (AFLC/MM, DS)
Execute	• Perform Data Call (AFSC/ SPO) • Release to Internal Contracting (AFSC/SPO)	• Perform Use Stud./Trade-off Analysis (AFSC) • Perform Tech. Reviews (AFSC/ SPO,AFLC/ DPML) • Perform Config. Audits (AFSC, AFLC) • Update Sys. Support Rqmts. (AFSC/SPO)	• Inspect/Accept LSAR/LS Data (AFSC/ SPO, AFLC/ DPML) • Update ILSP/ ISP (AFSC/SPO, AFLC/DPML)	• Implement LMS Systems (AFLC/SPM, DPML, AFSC/ SPO)	• Update TO (AFLC/MA, MM, IM, ES, ATC, Using Cmds.) • Update LS Resources (AFLC/ ALCs, ATC, Using Cmds.)	• Perform/Update MDC Reports (AFLC/ ALCs, Using Cmds.)	• Perform Maintenance Tasks (AFLC/ALCs, Using Cmds.)	• Update Supply Requirements (AFLC/ MM,IM, ES)	• Execute Procurement Request (AFLC/ ALCs/MM,PM) • Inspect Spares (AFLC/ALCs/DS)
	SPECIFY	**REVIEW**	**ACQUIRE**	**CONTROL**	**MAINTAIN**	**DISTRIBUTE**	**MAINTENANCE**	**SUPPLY**	**REPROCUREMENT**
	CREATE			**MANAGE**			**USE**		

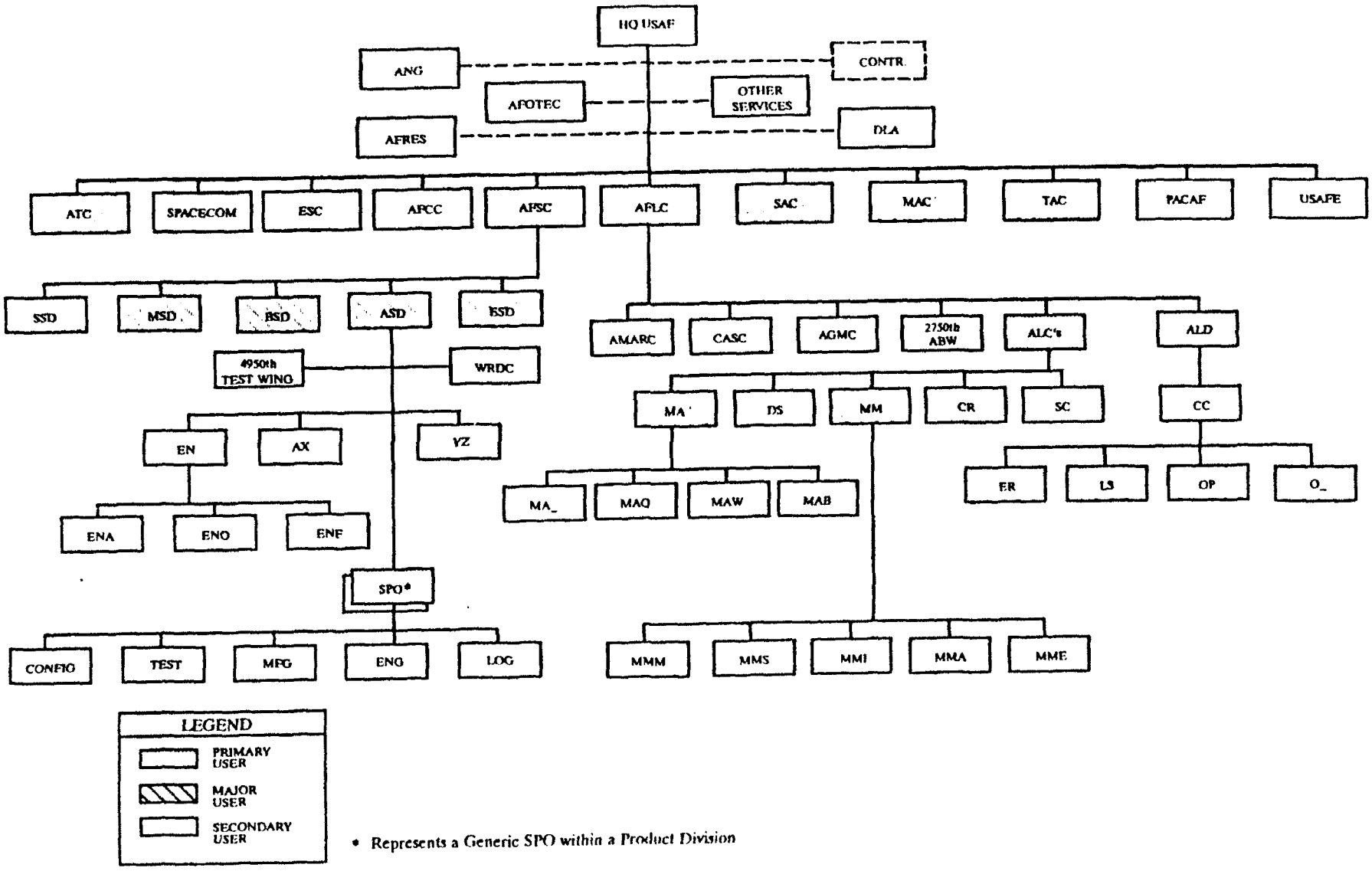
DATA (LOGISTICS SUPPORT) - AIR FORCE

	SPECIFY	REVIEW	ACQUIRE	CONTROL	MAINTAIN	DISTRI-BUTE	MAINTE-NANCE	SUPPLY	REPRO-CUREMENT
Plan	• SON • SORD • Standards • Requirements • Specifications • PMP • ILSP • CMP • "A" Record	• "A" Record • ILSP	• TEMP • Failure Rates • Supportability Plan	• Configuration Baseline • Configuration Control Practices/Procedures	• ECP	• MDC Procedures	• Maintenance Requirements • TOs • TCTOs • Maintenance Plan	• Supply Requirements • Consumption Rates • R&M Predictions • Stock Levels	• Part # • R&M Data • Spares Quantity • Inventory Level • Consumption/ Usage Reports • Historical Data
Control	• Data Call Response • Use Studies • Trade-off Analysis • Maintenance Concept • DIDs • SOW • CDRLs	• Trade-off Studies • LSAR • Equipment Specification • Use Studies • ILS Plans • ILSP	• Trade-off Studies • Use Studies • LSAR • ILSP • ISP • LSAR Reports • Provisioning Plan • Maintenance Plan • Training Plan • LSAP	• Publications • Regulations • LSAR • LSA Reports	• Interface Documentation • LS Requirements • Maintainability Statistics • R&M Data • SMR codes • MDC Data • Failure Rates • Consumption/ Usage Rates	• MDC Data • Failure Rates • Consumption/Usage Rates	• TOs	• R&M Data • Consumption/Usage Rates • Failure Rates • Stock Levels	• R&M Data • Spares Quantity • Inventory Level
Execute	• RFP • ITOs • SOW • CDRLs • Standards	• ILS Plans • LSAR • Trade-off Studies • Use Studies • System Support Requirements • ILSP • LSAP • Equipment Specification	• LSAR B-J • LSA Plans • TOs • ISP • ILSP • SERDs • LSA Standard Reports • PPLs	• LSA Reports • ILSP • ILS Plans	• TOs • ILS Data Lists • ILS Plans • R&M Data • Support Equipment Data • Facilities Data • Training Data	• MDC Reports	• Maintenance Plan • TOs	• Parts Lists	• PIO • Parts Lists • RFP
	CREATE			MANAGE			USE		

ORGANIZATION (LOGISTICS SUPPORT) - AIR FORCE

	SPECIFY	REVIEW	ACQUIRE	CONTROL	MAINTAIN	DISTRI-BUTE	MAINTE-NANCE	SUPPLY	REPRO-CUREMENT
Plan	• Using Cmds. • AFSC • AFLC	• ILSMTs	• Test Wings • AFLC/ALCs • Using Cmds. • AFLC/SPM • AFSC/SPO	• AFLC/SPM • CCB	• AFLC/ALCs	• AFLC/ALCs • Using Cmds.	• AFLC/ALCs	• IM • ES	• IM • ES
Control	• AFSC/SPO • AFLC/DPML • Using Cmds. • ATC • Labs • Test Wings • ILSMTs	• AFSC/SPO • AFLC/DPML • CASC • ILSMTs • MAJCOMs	• AFSC/SPO • AFLC/DPML • MAJCOMs • ILSMTs	• CCB • AFLC/ALCs	• CCB • AFLC/ALCs • MAJCOMs	• AFLC/ALCs • Using Cmds.	• AFLC/ALCs • Using Cmds.	• IM • ES • PMS • AFLC/MM, MA • Using Cmds.	• IM • ES • PMS
Execute	• AFSC/SPO	• AFSC/SPO • AFLC/DPML • CASC • MAJCOMs	• AFSC/SPO • AFLC/DPML • AFOTEC • ATC	• AFLC/SPM • AFLC/DPML • AFSC/SPO	• AFLC/MA, MM • IM • ES • ATC • Using Cmds.	• AFLC/ALCs • Using Cmds.	• AFLC/ALCs • Using Cmds.	• IM • ES	• AFLC/CR, DS • IM • ES • PMS
	CREATE			**MANAGE**			**USE**		

MAJOR LS "PLAYERS" – AIR FORCE



• Represents a Generic SPO within a Product Division

FINDINGS – LOGISTICS SUPPORT

ORGANIZATION

- The SPO must make tradeoffs that involve balancing time constraints, budget constraints, and supportability considerations. Long term supportability benefits may be sacrificed for short term time and budget requirements resulting in increased operations and supportability costs.
- The Air Force has expressed concern about the length of time required to develop the expertise to perform LSA. There is a shortage of AF personnel who understand the LSA process and who have the training and experience necessary to take full advantage of automated systems.
- A lack of knowledge or understanding of the tailoring process sometimes results in either insufficient or redundant information being acquired.

PROCESS

- The LSAR review process often requires manual processing of large volumes of paper. Errors and inconsistencies in the LSAR may not be discovered due to the cumbersome and labor-intensive nature of this paper-based process.
- In many cases, the contractor validates its own LSAR without using AF test results. Consequently, LSAR validation may be inadequate and incomplete.
- Contractor automated LSAR systems are usually not integrated or standardized, making the update and transfer of data between contractors and other organizations difficult. The accuracy and completeness of the LSAR delivered is suspect.

DATA

- Generally, AF Policy does not require the update of LSAR after acceptance. Updates made during acquisition program reviews, such as the Provisioning Conference and the Support Equipment Requirements Document (SERD) Review, are not reflected in the LSAR.
- In some accelerated acquisition programs, the LSAR is not completed in a disciplined or timely fashion, and is often backfilled from other sources such as TOs. Incomplete LSAR may indicate tasks have not taken place at the appropriate time or not at all.
- LSA started too late has a negligible effect on the design process and Weapon System supportability requirements may not be met or become very costly.
- LSA and LSAR data are very often inconsistent with the delivered weapon system configuration.

CONCLUSIONS – LOGISTICS SUPPORT

ORGANIZATION

- Since the AF must balance competing interests of cost and performance with supportability, in some cases, supportability may be sacrificed. A more effective LSA process would ensure that supportability is inherent in the design of Weapon Systems.
- Inadequate LSA education and training for AF and contractor personnel affects the accuracy, timeliness and effectiveness of LSA.
- An automated tailoring process will ensure a more effective and efficient acquisition of required technical data.

PROCESS

- The current paper-orientated LSA process is difficult and inefficient. There is no viable system for checking the accuracy of the review process.
- An automated system will provide a practical feedback loop which will allow the required AF entities to review contractors initial validation. It will in-turn provide the contractor with appropriate and essential AF inputs on a timely basis.
- Integrated development of LSAR is necessary for efficient and effective post-production support activities.

DATA

- Generally, LSAR is not maintained after acceptance by the Air Force.
- AF organizations which plan and provide Weapon System support are forced to acquire the data by other means, resulting in duplicate data purchases.
- Rigidly defined LSA start time(s) may have a serious impact on the efficiency and effectiveness of LSA. Weapon System design may not adequately reflect supportability requirements.
- Supportability suffers due to inconsistencies in weapon system configuration.

What Information Technologies Could Enhance the Logistic Processes? (LS)

3–5 Years	7–10 Years	10–20 Years
• Emergence of some expert systems in LS tailoring process • AF receives TOs in type "B" format • Relational LSAR data structure developed • Automated storage, allocation and movement of AFLC inventories • Integrate management of all depot repair functions into a cohesive entity • Concurrent engineering practices begin to be defined and "prototyped" in newer programs • Remaining Logistic Management Systems (LMS) are developed • PDES development includes logistics data • Implementation of relational data base management systems on government validated LSAR systems • Information Resources Dictionary Standard (IRDS) developed	• Optical distribution of TOs in AF TOMS type "B" format • Relational data structures become prevalent • Improvements in microelectronics • Fiber optics widely available • Standard digitized LS data format submitted by prime contractors via on-line EDI • Engineering workstations • Object-oriented data bases	• Type "C" TOs being used on common basis • AI and speech recognition built into "shells" • Natural language interfaces possible • Massive storage at negligible cost • Robotics widely used in precision manufacturing with limited speech and vision capability

What LS Process Improvements are Possible Through the Application of Information Technology?

3–5 Years	7–10 Years	10–20 Years
• Interactive LSA data records reduce SPO and SPM workload and provide AFSC, AFLC and Using Commands with timely access to data on development items • Facilitate IPR review through use of digital information • Maintenance personnel will have access to digital TOs • Upgraded management of ECPs • Supportability analyses are enhanced through automated data bases • Automated access to prior generation weapon systems' logistics data	• Feedback of operational data to improve LSAR • Enhanced availability to gather, store, transmit and use information through the interchange of logistics data • Enforcement of AFLC data dictionaries across LMS systems • Access between LSAR systems with contractor CAD/CAM systems	• Expert systems facilitate the implementation of concurrent engineering • Integration of change processes across technical information • Integrated availability of latest operational data • Integrated AF review system to encompass acquisition phase reviews: TOs, LSA reviews, IPRs, CDRs, etc.

How can the Air Force Achieve These Logistics Process Improvements? (LS)

3–5 Years	7–10 Years	10–20 Years
• Define linkages between LSAR, ILS and LMS systems • Continue to define and standardize LS data elements and data dictionaries • Promote use of expert systems in the LS process • Continue the integration of MIL-STD 1388-2B into AF operations • Adopt and integrate SGML standards • Stipulate on-line access to contractor LSAR data	• Automate linkages to promote shared LS data access AF wide (i.e. AFSC, AFLC, ATC, Using Cmds) • Promote use of relational data structures for LS data • Use storage devices with increased capacities • Integrate automated storage and distribution • Establish LS data dictionaries • Establish LS indexing systems • Provide access to engineering drawings/data	• Complete integration of LS data into heterogeneous processing environments • Implement expert systems for validation and verification of LS data • Establish automated feedback of operational data • Adoption of integrated maintenance systems

Appendix A

ACRONYMS AND ABBREVIATIONS

ACRONYMS AND ABBREVIATIONS

ABW	Air Base Wing
ACSN	Advanced Change/Study Notice
AF	Air Force
AFCC	Air Force Communications Command
AFFTC	Air Force Flight Test Center
AFLC	Air Force Logistics Command
AFPRO	Air Force Plant Representative Office
AFOTEC	Air Force Operational Test and Evaluation Center
AFRES	Air Force Reserve
AFSC	Air Force Systems Command
AFTOMS	Air Force Tech Order Management System
AGMC	Aerospace Guidance and Metrology Center
AI	Artificial Intelligence
ALC	Air Logistics Center
ALD	Acquisition Logistics Division
AMARC	Aerospace Maintenance and Regeneration Center
ANG	Air National Guard
ASD	Aeronautical Systems Division
ATC	Air Training Command
AX	Deputy for Avionics
BSD	Ballistic Systems Division
CAD	Computer-aided Design
CAM	Computer-aided Manufacturing
CAO	Contract Administration Officer

CALS	Computer-aided Acquisition and Logistic Support
CASC	Cataloging and Standardization Center
CASE	Computer Assisted Software Engineering
CCB	Configuration Control Board
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CI	Configuration Item
CIM	Computer Integrated Manufacturing
CMP	Configuration Management Plan
CMS	Configuration Management System
CR	Directorate of Competition Advocacy
CRLCMP	Computer Resources Life Cycle Management Plan
CSA	Configuration Status Accounting
DB	Data Base
DCAS	Defense Contract Administration Service
DCR	Design Change Revision
DID	Data Item Description
DLA	Defense Logistics Agency
DoD	Department of Defense
DPML	Deputy Program Manager for Logistics
DRRB	Data Requirements Review Board
DS	Directorate of Distribution
ECO	Engineering Change Order
ECP	Engineering Change Proposal
EDARF	Engineering Data Activity Record File

EDCARS	Engineering Data Computer-Assisted Retrieval System
EDI	Electronic Data Interchange
EDMO	Engineering Data Management Officer
EDMP	Engineering Data Management Plan
EDSC	Engineering Data Service Center
EOQ	Economic Order Quantity
EN	Deputy for Engineering
ENA	Directorate of Avionics Engineering
ENF	Directorate of Flight System Engineering
ENO	Engineering Operations Office
ER	Deputy for Engineering and Reliability
ES	Equipment Specialist
ESC	Electronic Security Command
ESD	Electronic Systems Division
FCA	Functional Configuration Audit
FQR	Formal Qualification Review
GDA	Government Designed Activity
ICD	Interface Control Document
ICWG	Interface Control Working Group
ILS	Integrated Logistics Support
ILSM	Integrated Logistics Support Manager
ILSMT	Integrated Logistics Support Management Team
ILSP	Integrated Logistics Support Plan
IM	Item Manager
IPR	In-Process Review

IRDS	Information Resources Dictionary Standard
IRN	Interface Revision Notice
ISP	Integrated Support Plan
ITO	Instructions to Offerors
LMS	Logistics Management Systems
LS	Logistics Support Deputy for Integrated Logistics
LSA	Logistics Support Analysis
LSAP	Logistics Support Analysis Plan
LSAR	Logistics Support Analysis Record
MA	Directorate of Maintenance
MA_	Product Division
MAB	Aircraft Division
MAC	Military Airlift Command
MAQ	Quality Assurance Division
MAW	Resources Management Division
MAJCOM	Major Command
MDC	Maintenance Data Collection
MDR	Maintenance Deficiency Report
MIO	Management Integration Office
MM	Directorate of Materiel Management
MMA	Acquisition Division
MME	Engineering Division
MMI	Item Management Division
MMM	Resource Management Division
MMS	System Program Management Division

MSD	Munitions Systems Division
NOR	Notice of Revision
OCP	Organic Change Proposal
OP	Deputy for Operations
OSD	Office of the Secretary of Defense
OT&E	Operational Test and Evaluation
PACAF	Pacific Air Forces
PCA	Physical Configuration Audit
PCO	Procurement Contracting Officer
PDD	Product Definition Data
PDES	Product Data Exchange Standard
PDR	Preliminary Design Review
PH&T	Package, Handling & Transportation
PIO	Provisioned Item Order
PM	Directorate of Contracting and Manufacturing
PMP	Program Management Plan
PMRT	Program Management Responsibility Transfer
PMS	Production Management Specialist
PPL	Provisioning Parts Lists
Q/A	Quality Assurance
Q/C	Quality Control
QDR	Quality Deficiency Report
RILSA	Resident Integrated Logistic Support Activity
RFP	Request For Proposal
R&M	Reliability and Maintainability

SAC	Strategic Air Command
SBSS	Standard Base Supply System
SC	Directorate of Communications-Computer Systems
SCN	Specification Change Notice
SDR	System Design Review
SSD	Space Systems Division
SERD	Support Equipment Recommendation Data
SGML	Standard Generalized Markup Language
SMR	Source, Maintainability and Recoverability
SON	Statement of Need
SORD	System Operational Requirements Document
SOW	Statement Of Work
SPACECOM	Space Command
SPM	System Program Manager
SPO	System Program Office
SRR	Systems Requirements Review
TAC	Tactical Air Command
TCTO	Time Compliance Technical Order
TD	Technical Data
TDR	Tear Down Deficiency Report
TEMP	Test and Evaluation Master Plan
TM	Technical Manual
TSC	Transportation system Center
TO	Technical Order
USAF	United States Air Force

USAFE	United States Air Forces in Europe
WRDC	Wright Research and Development Center
WS	Weapon System
YZ	Deputy Commander for Propulsion

Appendix B

CONTROL DOCUMENT LIST

Control Document List

Standards

DoD-D-100C	Engineering Drawing Practices
DoD-D-1000B	Drawings, Engineering and Associated Lists
DoD-D-5000.1	DoD Weapon System Acquisition Process
DoD-STD-483	Configuration Management Practices for Systems, Equipment and Computer Programs
MIL-HDBK-288	Review and Acceptance of Engineering Drawing Packages
MIL-STD-470	Maintainability Program Requirements
MIL-STD-480A	Configuration Control-Engineering Changes, Deviations and Waivers
MIL-STD-481A	Configuration Control - Engineering Changes, Deviations and Waivers
MIL-STD-482A	Configuration Status Accounting, Data Elements and Related Features
MIL-STD-483A	Configuration Management Practices for Systems, Equipment, Munitions, and Computer Programs
MIL-STD-490A	Specification Practices
MIL-STD-499A	Engineering Management
MIL-STD-785	Reliability Program for Systems and Equipment Development and Production
MIL-STD-965	Parts Control Program
MIL-STD-1367	Packaging, Handling, Storage, and Transportability Program Requirements (for Systems and Equipment)
MIL-STD-1388-1A	Logistics Support Analysis
MIL-STD-1388-2A	DoD Requirements for a Logistics Support Analysis Record
MIL-STD-1390	Level of Repair
MIL-STD-1521B	Technical Reviews and Audits for Systems, Equipments, and Computer Software
MIL-STD-1561	Provisioning Procedures, Uniform DoD
MIL-STD-1840A	Automated Interchange of Technical Information

Air Force Regulations

AFLCP/AFSCP 800-34	Acquisition Logistics Management
AFLCR 23-1	Air Force Acquisition Logistics Center

AFLCR 23-42	Directorate of Maintenance
AFLCR 23-42 (App 1-5)	Deviations in the Directorate of Maintenance
AFLCR 23-43	Directorate of Materiel Management
AFLCR 23-43 (App 1-5)	Deviations in the Directorate of Materiel Management
AFLCR 57-21	Operational Requirements
AFLCR 66-51	Use of Technical Data within Depot Maintenance
AFLCR 66-52	Depot Maintenance Materiel Support Systems
AFLCR 66-68	Functions and Responsibilities of the Equipment Specialist During Acquisition
AFLCR 400-1	Logistics Management Policy
AFLCR 523-1	Mission Assignment Policy
AFLCR/AFSCR 800-36	Logistics Support Analysis
AFP 23-21	USAF Command Organization Chart Book
AFR 23-2	Air Force Logistics Command
AFR 23-6	Air Training Command
AFR 23-8	Air Force Systems Command
AFR 23-10	Tactical Air Command
AFR 23-51	Space Command
AFR 57-1	Operational Needs, Requirements, and Concepts
AFR 57-4	Modification Approval and Management
AFR 65-3	Configuration Management
AFR 67-26	Engineering Data Acquisition and Logistics Management
AFR 67-28	Engineering Data Distribution and Control
AFR 81-10	Engineering Drawing System
AFR 81-11	Engineering Drawing Change System
AFR 800-2	Acquisition Program Management
AFR 800-3	Engineering for Defense Systems
AFR 800-4	Transfer of Program Management Responsibility Transfer
AFR 800-8	Integrated Logistics Support (ILS) Program
AFR 800-12	Acquisition of Support Equipment
AFR 800-14	Test and Evaluation
AFR 800-18	Air Force Reliability and Maintainability Program
AFR 800-34 S1	Engineering Data Acquisition
AFR 800-36	Provisioning of Spares & Repair Parts

AFSCP 800-7	Configuration Management
AFSCP 800-18	User's Guide for the Management of Technical Data and Computer Software
AFSCR 23-3	ASD Organization
AFSCR 23-10	ESD Organization

Related Documentation

"Air Force Almanac", Air Force Magazine, May 1989

"Lessons Learned Bulletin: Engineering Data", Air Force Acquisition Logistics Center, 1988

"Logistics and Engineering Functional Communications-Computer Systems Plan" USDOT/ Transportation Systems Center, July 1988

"Report of Audit: Management of Engineering Data", Air Force Audit Agency, 1983

"Systems Engineering Management Guide", Defense Systems Management College, 1986

"The Inspector General's (TIG) Inspection of the Effectiveness and Timeliness of Engineering Data", Air Force Inspection and Safety Center, 1986

Appendix C

CONTENT OF DATA FLOWS

Content of Data Flows

The introduction section of this document contains data flow diagrams. The data flows link the weapon system technical information processes of Create, Manage, and Use to each other, and to external entities which operate in the Air Force's business environment. Sections II and III (Product Definition and Logistics Support, respectively), contain matrices which identify specific items of technical information which the Air Force uses to plan, control and execute the processes which create, manage and use technical information. This appendix presents a cross-reference list between the data flows of the Level 0 Diagram and the data items of the two data matrices: Product Definition and Logistics Support. It is important to note that all of the data items from the matrices do not map to a specific data flow. This is true, and to be expected, because some data items are managed internally to a process only, and never flow between processes or between processes and external entities. Should the large scale processes of the Level 0 Diagram be further divided into more detailed processes in the future, it is likely that all data items from the matrices would become elements of the more detailed data flows that would result from this refinement.

Engineering Change Proposal

- Deviations/Waivers
- ECO
- ECP
- ECP/OCP Documents
- Interface Documentation

Government Furnished Technical Information

- Publications
- Regulations
- Standards

LSA Records & Reports

- LSA Plans
- LSAR B-J
- LSA Standard Reports
- ILS Plans
- ILSP
- SERDs

Mission Requirements

- Statement of Need
- Systems Operational Requirements Document

Non-LSA Logistics Support Data

- ILS Data
- Provisioning Plan
- Training Plan
- Supportability Plan
- System Support Requirements

Procurement Requests

Procurement Request

Procurement Technical Data Package

Bid Sets
ITOs
Specifications
Standards
Technical Data Package

Procurement Technical Requirements

"A" Record
CDRLs
Configuration Baseline
DIDs
ILSP
LSAP
Maintenance Concept
PMP
SOW
System Support Requirements

Specifications & Engineering Drawings

Analysis/Design Data
Analysis Models
Associated Lists
Engineering Data
Level 3 Engineering Data Packages
Specifications (Type A-E)

Standards & Specifications

Publications
Regulations
Requirements
Specifications
Standards

Technical Data Package

Bid Sets
Distribution List
Distribution List Update
Engineering Data Packages
Modifications Kits

Technical Data Request

Product Data Request
Spares Request

Technical Publications

- Technical Orders
- Time Compliance Technical Orders
- Training Documents

Technical Reports

- Deficiency Reports

Weapon System Life Cycle Technical Review Data

- Analysis Models
- Associated Lists
- Engineering Drawings
- ILS Plans
- ILSP
- Interface Control Documentation
- Level 2, 3 Engineering Drawings
- LSAP
- LSA Reports
- LSAR
- Revised Engineering Data
- Specifications
- Standards
- System Support Requirements
- Technical Reports

Weapon System Test Results

- Technical Reports
- Test Data/Results
- Test Plan