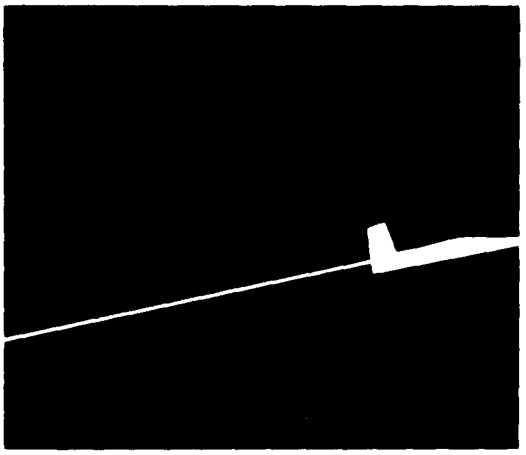
Contract: F33657-92-D-2055

CDRL C005
Data Item DI-S-30591



SIDAC

Supportability Investment Decision Analysis Center

Technical Assessment

AUTOMATED MASTER PLANNING TOOLS FOR INTEGRATED WEAPON SYSTEM MANAGEMENT (IWSM)

Submitted by

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to

US Air Force Materiel Command
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Dayton, Ohio 45433

July 1993

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	July 1993	Technical Assessment

4. TITLE AND SUBTITLE
Automated Master Planning Tools for Integrated Weapon System Management (IWSM)

5. FUNDING NUMBERS

6. AUTHOR(S)
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7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
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8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
US Air Force Materiel Command
Wright-Patterson Air Force Base
Dayton, OH 45433

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Distribution Unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

This technology assessment consolidates Phase I (Concept Definition) results of the Integrated Weapon System Master Plan (IWSMP) Program for review in executive level form. It addresses the overall issue of integrated master planning and its role in the present environment of change within the Department of Defense (DoD) and the new Air Force Materiel Command's (AFMC's) former, separately managed acquisition and sustainment communities. The specific purpose of the project was to validate the need for an automated tool/system to facilitate integrated master planning for Air Force weapon system and other "single manager" programs under the product-oriented Integrated Weapon System Management (IWSM) philosophy, implemented when the AFMC was formed in July 1992. The effort consisted of extensive research, including survey work, into the impacts of IWSM and the DoD business process overhaul upon the planning process in order to accurately document program manager and customer requirements for improved planning and execution.

14. SUBJECT TERMS	15. NUMBER OF PAGES
IWSMP, Planning, Weapon Systems, IWSM, Automated Planning, Management Systems	27
	16. PRICE CODE

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

SIDAC

Supportability Investment Decision Analysis Center

TECHNICAL ASSESSMENT

Automated Master Planning Tools for Integrated Weapon System Management (IWSM)

Contract No. F33657-92-D-2055

Prepared for:

United States Air Force
Air Force Materiel Command
Wright-Patterson Air Force Base, Ohio 45433

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July 1993

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Abstract

This technology assessment consolidates Phase I (Concept Definition) results of the Integrated Weapon System Master Plan (IWSMP) Program for review in executive level form. It addresses the overall issue of integrated master planning and its role in the present volatile environment of change within the Department of Defense (DoD) and the new Air Force Materiel Command's (AFMC's) former, separately managed acquisition and sustainment communities. The specific purpose of the project was to validate the need for an automated tool/system to facilitate integrated master planning for Air Force weapon system and other "single manager" programs under the product-oriented Integrated Weapon System Management (IWSM) philosophy, implemented when the AFMC was formed in July 1992.

The IWSMP Program effort was undertaken in October 1992 for the Headquarters AFMC Requirements Directorate as a special project with the Supportability Investment Decision Analysis Center (SIDAC). This effort consisted of extensive research, including survey work, into the impacts of IWSM and the DoD business process overhaul upon the planning process in order to accurately document program manager and customer requirements for improved planning and execution. IWSMP Program documentation to date includes a customer survey report, goals document and enterprise model update of the current business master planning process, and a IWSMP system functional description. Phase I was completed May 31, 1993. Follow-on (Phase II) actions are yet to be determined.

Summary

Automated Master Planning Tools for Integrated Weapon System Management (IWSM)

With the consolidation of the Air Force Systems (AFSC) and Logistics (AFLC) Commands in 1992, the need to accomplish integrated master planning to cover the complete "birth-to-death" life-cycle management of weapons systems and product/materiel groups became very apparent. Program master planning, though not a new concept, has become an imperative in today's environment in which managers must overcome new challenges to meet their customers' needs. These include broader product and life-cycle responsibilities, a smaller, more widely dispersed and multi-disciplined work force, and a much different customer focus. Changes brought about by the Integrated Weapon System Management (IWSM) philosophy and by Department of Defense/US Air Force (DoD/USAF) restructuring and business process orientation have turned traditional organizations on their side, challenging the effectiveness of established communications and functional processes. This fact, validated by consistently stated "single manager" (i.e., IWSM defined) needs, means simply that improved and updated management practices and automated capabilities are essential if organizations are to interact effectively with their internal as well as external business and mission area partners to ensure overall enterprise success.

Headquarters Air Force Materiel Command (HQ AFMC) initiated the Integrated Weapon System Master Planning (IWSMP) Program, with contractor support, in October 1992 to develop requirements for an automated integrated master planning capability. This project was to build upon the evolving IWSM implementation process and policy changes and include extensive customer survey/research work. The results of Phase I (Concept Definition), completed in May 1993, verify the need for continued development of an automated tool for integrated master planning and program execution for single manager organizations. [Note: This automated tool is referred to here as a MAster Planning System or MAPS rather than as an IWSMP tool/system to avoid confusion with similar IWSM acronyms for the planning process, strategic planning document, or the IWSMP Program itself.]

Alternatives developed for MAPS include first a "status quo" solution, which provides a baseline from which to measure the opportunity costs of two other broad-based alternatives. This option does not facilitate integrated planning, and it perpetuates an "everyone for themselves" tool development strategy that is largely incompatible with IWSM goals and DoD corporate management direction. It does, however, minimize up-front costs if no new investment is presumed, which is not necessarily a safe assumption. The

second MAPS alternative, i.e., to update present automated weapon system master planning capabilities, builds upon past corporate master planning initiatives for supportability programs and provides increased connectivity with acquisition program elements of newly formed AFMC single manager organizations. This option offers a cost-effective, automated planning solution to meet life-cycle needs for systems and product/materiel groups, with higher return on investment (ROI) and utility if recommended incremental steps are fully pursued. Elements of this alternative considered essential for effective integrated master planning are the development of planning process tools and the adaptation of system capabilities for a wider range of products and program activities, to include single manager programs on the AFMC Master Program List and activities at both ends of the product life-cycle. A third MAPS alternative defines an evolutionary development approach towards an ultimate "open systems" architecture solution. This option, not yet fully developed due to evolving integrated business processes and customer needs, would take longer to implement, but (by conservative estimate) would offer higher long-term investment savings and improved adaptability for efficient use in the joint service/defense industry environment of the future.

The IWSM implementation process, which continues today for aircraft and non-aircraft systems as well as product and materiel groups, provides a somewhat unique opportunity to address organizational, functional, geographical, customer, and cultural disconnects with the corporate planning process at the same time and as a top priority. The IWSMP Program analysis highlights the value of the automated master planning tool development effort in the role of continuous process improvement. The automated master planning approach focuses on summary planning/execution data and its source in core process technical and business data routines as a prerequisite step for effective program management. This focus is needed in order to prioritize data needs, to define and demonstrate the usefulness of an integrated data base, and to link the master technology process with other corporate processes in satisfying the customer as the ultimate objective.

Specific recommendations in the Phase I documentation boil down to a single imperative for action. Maintaining the status quo (i.e., Alternative 1) is not really a viable option because of changes to our business processes and the critical need for full visibility by the manager of the program(s) for which he/she is responsible. The early low risk payback period (i.e., one year) for Alternative 2 and its basic compatibility as a needed next step towards an "open system" (i.e., Alternative 3) indicate that the right time to act is now.

When harmonized with other initiatives, a fully developed MAPS Alternative 2, with an eye towards an eventual Alternative 3 solution, may offer perhaps the most realistic and cost-effective approach to ultimately meet a variety of AFMC and DoD/USAF improvement goals not only for program management, but for the technology master process and for other corporate processes that create, use, exchange, or maintain summary level planning/execution data. At a minimum, if integrated planning process tool development and connectivity increments of this alternative are pursued now, then an essential focus will be present for other DoD/USAF sponsored initiatives such as the development of an integrated weapon system data base (IWSDB).

Fostering a partnership role for MAPS funding and program tailoring is also important. The participation of HQ AFMC and at least one lead single manager organization (preferably both an aircraft system and product group) is necessary to promote development of integrated system capabilities that facilitate the effective communication of data with both internal and external customers, can be tailored to meet individual program requirements, and are exportable for adaptation by other programs. Conceivably, joint community participation will also be necessary, at least from a funding standpoint, if potential users are ready to sponsor a continued MAPS development now.

1.0 Introduction

1.1 Purpose and Scope of Technology Assessment

This technical report provides an executive level assessment of the need to improve integrated master planning and management capabilities for Air Force Materiel Command (AFMC) "single manager" organizations and their customers, specifically through a coordinated automation tool development effort. A key objective is to give the reader a clear view of the scope and the status of work accomplished to date in the area of master planning and management tools in order to facilitate timely and accurate investment decisions for the future. The assessment promotes an understanding of the methods, assumptions, and procedures used by AFMC to determine automated tool requirements. Likewise, it provides a top-level look at potential return-on-investment (ROI) opportunities for alternatives available to address stated user and customer needs. The review involved customer survey, research of business process development efforts and evolving policy issues, analysis of product management forums and mission element board results, and in-depth interviews with single managers and customers at several levels. It draws from extensive experience and participation in the Integrated Weapon System Management (IWSM) single manager implementation process by senior research personnel.

1.2 Relationship to Integrated Weapon System Master Planning (IWSMP) Program Documentation

This assessment weighs the overall role of master planning in the IWSM customer and product-oriented corporate management process, and addresses the importance of improved automated tools for use in that process. From a narrower perspective, it provides a synopsis of documentation developed as part of the IWSMP Program Phase I effort that verified customer requirements and defined alternative strategies for automated master planning tool development. In this sense, it largely parallels the IWSMP Program White Paper[1] provided to HQ AFMC/XRM as a supplement to other program documentation. The emphasis in this technical report is intended to provide the results of research that shows a recognized need for effective master planning, whatever its form, as a high priority cornerstone for process improvement in a volatile environment. In addition, it provides a needed focus toward potential solutions, as the White Paper does, to illustrate available options for good decision-making and to facilitate future direction for development of an automated tool for integrated master planning.

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[1]White Paper - "Integrated Weapon System Master Planning (IWSMP) Program", May 27, 1993

1.3 Terminology

An automated tool for integrated master planning and program execution for single manager organizations is referred to hereafter as a MAster Planning System or MAPS rather than as an IWSMP tool/system, although the later term is more widely used in IWSMP Program documentation. This is done for brevity and clarity to avoid confusion with similar/redundant IWSM acronyms for the planning process, strategic planning document, or the IWSMP Program itself.

1.4 Report Presentation

A brief history of previous command approaches to program master planning is included at the end of this introductory section of the report. Section 2.0 provides an essential overview of the integrated weapon system management or IWSM philosophy, adopted with the formation of AFMC in 1992, and a look at the impacts that this new approach has had upon the manager's ability to accomplish integrated master planning for assigned weapon systems and product/materiel groups. Section 3.0 briefly examines several associated DoD/US Air Force activities in a much changed business environment as they relate to the specific issue of automated integrated master planning tool development. It provides a perspective based upon a comprehensive review of past and present efforts to accomplish corporate planning tasks. Section 4.0, the bulk of the report, summarizes the HQ AFMC/XRM sponsored (and contractor supported) Integrated Weapon System Master Planning or IWSMP Program documentation that offers an up-to-date framework and focused application for future MAPS upgrade and/or development efforts. An overall assessment conclusion follows (Section 5.0), and the report ends with a series of recommendations (Section 6.0) stemming from the IWSMP Phase I effort on the future direction of the IWSMP Program itself and a potential MAPS solution.

1.5 Historical Approaches to Master Planning

Previous command approaches to program master planning varied significantly prior to 1992 and the formation of AFMC. The former AFLC had developed a weapon system supportability-oriented planning process for weapon system management called the Automated Weapon System Master Plan (AWSMP), a mainframe legacy system module (DO87M) of the Weapon System Management Information System (WSMIS), for long-term planning and system health reporting. WSMIS/AWSMP represented an evolutionary effort to automate planning and reporting capabilities developed in the mid-1980's. On the former AFSC side of the ledger, the acquisition management and planning processes tended to be program specific to meet program management direction and DoD 5000 series instruction criteria.

Automated planning and management capabilities, where they exist, were mainly developed through the initiatives of the individual system program offices (SPOs), often tied to, or embedded in, contractor devised and operated systems for program milestone cost, schedule, and performance tracking.

2.0 IWSM and Integrated Master Planning

2.1 Impacts of IWSM Philosophy and Implementation

The overall command consolidation concept was called Integrated Weapon System Management (IWSM). The intent of IWSM is not to just reorganize the two previous commands into a single entity, but rather to integrate the acquisition and sustainment communities and management structure into a "birth-to-death" program alignment with a "single manager" in charge throughout the total life cycle. Single manager organizations were to be formed for aircraft and non-aircraft systems as well as product and materiel groups. The challenge under IWSM then was to pull these processes together into a new management infrastructure, removing functional and organizational seams in favor of a product/customer orientation. This includes meeting the stated need for updated and improved tools to give single managers visibility and to insure both internal and external customer connectivity. Many on-going activities throughout the IWSM experiment with selected programs and several key forums since the mid-92 formation of AFMC all illustrate the need for improved single manager relationships and the further need to develop weapon system and product/materiel group master planning tools (AFMC Regulation 500-11). These activities, involving core functional process action teams (PATs), product/materiel (commodity) working groups (WGs), the ad hoc Integrated Product Life Cycle Planning (IPLCP) team, corporately worked process action paper (PAP) issues, and policy directives, each addressed important aspects of the business process. It was in line with these occurrences that AFMC/XR recognized the evolving IWSM planning process (IWSMPP) and directed the IWSMP Program effort to provide a basis for improvement and development of automated tools for integrated master planning.

2.2 Integrated Master Planning

The IWSMP Program Phase I effort, discussed in Section 4.0, validated and built upon the earlier IWSM process conclusions; however, two key precepts must be acknowledged in a broader context before significant future progress with integrated master planning tools (manual or automated) can be achieved:

- First, developing an integrated master planning capability, whether in the form of a planning document or with a day-to-day management routine/tool, is not as simple as "pasting" the process from the two old commands together. For example, an IWSMP document is not created by simply merging the Integrated Program Summary (IPS) and AWSMP. Conversely, the new integrated process must be known by the planner before any effective planning routine/tool can be developed.

- Secondly, the evolving IWSMPP has yet to be adequately defined, and, as a result, it represents an essential next step towards the development of a true integrated master planning and management capability. Several SPOs (e.g., prime example studied was the F-15), as well as HQ AFMC/XR system and product divisions have developed models or draft planning process guides. However, this work, as it would assist all managers in tailoring program requirements to their organization and infrastructure, is unfinished. The fully documented IWSMPP, specifically the way planning activities interact with each other at the summary (planning) data source, is crucial to the improvement of automated tools.

3.0 ASSOCIATED DOD/USAF ACTIVITY AND PERSPECTIVES

3.1 "Single Manager" Program Flexibility and Corporate Level Planning Needs

The initial AFMC/XR intent was to provide the single manager automated tools based on overall DoD, USAF, AFMC, and major command (MAJCOM) program goals and objectives. HQ AFMC/XR, with verification by the Product Management Mission Element Board (PMMEB), acknowledged that single manager programs, including aircraft and non-aircraft systems and product/materiel groups, are all different, and that they require flexibility in their management routines. On the other hand, from a practical viewpoint, tools developed either under the individual program's auspices or under the IWSMP Program should be exportable and adaptable to external customer needs. The whole tone of the integrated master planning direction was to recognize the need for compatibility and to provide for the harmonization of internal SPO program management capabilities with external AFMC mission areas, other single managers, MAJCOMs, and HQ's customers. In other words, product management tools need to interact effectively between program offices and business partners.

3.2 Corporate Information Management/Computer-Aided Acquisition and Logistics Support/Paperless Acquisition Initiative (CIM/CALS/PAI)

While initial master planning and IWSMP Program direction were being provided, several other initiatives were occurring which were on the same or closely related IWSM course, but not necessarily with the same focused application or approach. For example, under the DoD Corporate Information Management (CIM) auspices, The Office of the Secretary of Defense (OSD) initiated a contractor supported effort to explore multi-service acquisition opportunities and the implementation of an Acquisition Integration CIM. The Computer Aided Acquisition and Logistics Support (CALS) program supported a major initiative with the F-22 SPO and its contractor to provide for the development of a business concept for management of F-22 technical data. A product of this effort may well be to define the essential elements of an Integrated Weapon System Data Base (IWSDB) to support their objectives. More recently, in April 1993, an effort was initiated under the Paperless Acquisition Initiative (PAI) to define a set of data base elements (i.e., bins of data) to provide the source of information to build an IWSDB and to ultimately enhance present capabilities for weapon system level program management. At the same time, AFMC was continuing to upgrade the established WSMIS/AWSMP system as a continuation of the sustainment program tool mentioned earlier. It is readily apparent that these efforts require interfacing and integration in the near future to minimize the possibility of duplicative effort.

3.3 DoD/Air Force Models and Acquisition Policy Documents

The DoD Enterprise Model, the Air Force Acquisition Model (AFAM), DoD 5000.1/2/M series and other documents have outlined important work breakdown (activities) as a means to provide structure and a common frame of reference for organization, mission, product life cycle, reporting milestones/content, etc. These models and documents, along with previous IWSM PAT and IPLCP process work provide a basis for accomplishing the unfinished IWSMPP documentation effort. Further, an on-line IWSMPP, used in conjunction with the AFAM and other models would provide excellent interactive help in any future MAPS solution.

4.0 STATUS OF IWSMP PROGRAM

4.1 IWSMP Program Phase I

The IWSMP Program Phase I (Concept Definition) concluded May 31, 1993. The initial AFMC/XR directed effort was to conduct a customer survey to verify the continuing need for an automated master planning tool. The basic concluding consensus from the survey and extensive follow-on interviews was that an IWSMP tool, or MAPS as referred to here, was needed. The prime user would be the System Program Directors (SPDs) and Product/Materiel Group Managers (PGMs/MGMs). The specific concept and requirements beyond that point remained unclear. Most survey respondents agreed that a long-range plan was a priority. A variety of opinion existed as to what in the way of automation was required and achievable for day-to-day business routines, management visibility, worker efficiency, and planning data currency and usefulness. However, most respondents were of the single opinion that the system would have to be simple to use, responsive to the needs of all support managers involved in the program evolution, not manpower intensive, under the program manager's absolute control, and accurate. The survey displayed that there exist a number of customers (i.e., MAJCOM, SAF/HQ USAF, HQ AFMC, AFMC Mission Areas, DoD, Joint Services, and Industry) with a need for, and some with essential interface to, an automated IWSMP tool or MAPS.

4.2 IWSMP Goals/Objectives

The following set of seven goals emerged from the survey and follow-on interviews. These goals and thirty-nine specific objectives were mapped to Key (Enterprise) Areas and are visually reflected in an IWSM MAster Planning System (MAPS) "System View" in Figure 1 on the following page. They have been the most consistent yardstick for defining ultimate user requirements and have formed the basis for the Enterprise Modeling and the IWSMP System (MAPS) Functional Description documentation, including the System Development Plan. The goals are:

- Assist (including control) the long-range planning process.
- Facilitate consolidation of planning information from multiple sources.
- Provide consistent, integrated and non-redundant planning information within and across weapon systems.
- Improve development/update of acquisition and business planning products.
- Improve analysis of investment priorities and alternative plans of action.
- Improve access to planning information within and across weapon systems.
- Measure IWSMP progress.

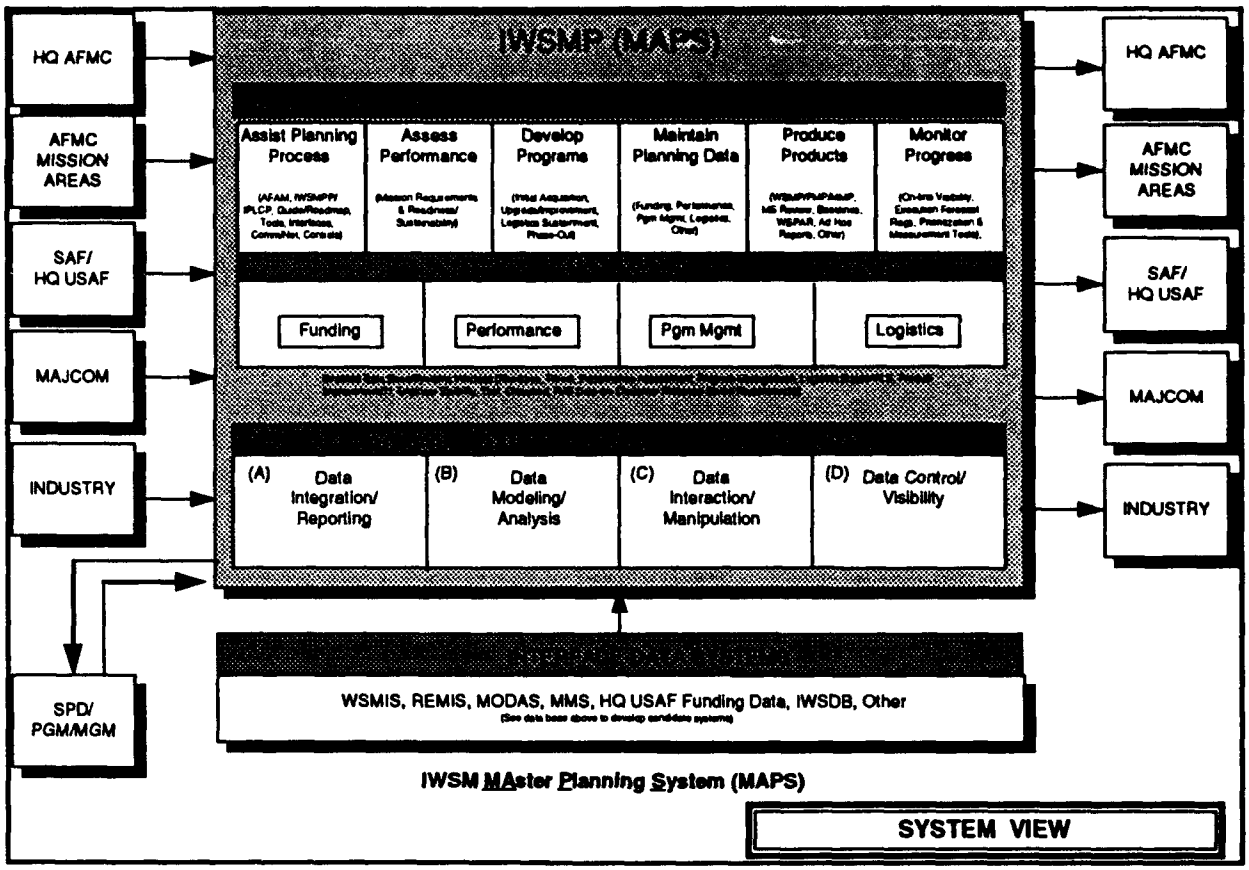

Figure 1. System View

4.3 User Requirements

In essence, it also became clear that a top-level, notional "User's View" of a potential MAPS features, in addition to the IWSM MAPS System View, would be helpful in illustrating customer needs. These features are visually depicted in Figure 2. These views, in conjunction with the IWSMP System (MAPS) Functional Description, specifically the System Development Plan (SDP)[2], provide an integrated master planning framework for evolving future MAPS development based on more refined customer needs/priorities.

[2]Integrated Weapon System Master Planning (IWSMP) System Functional Description, May 20,1993

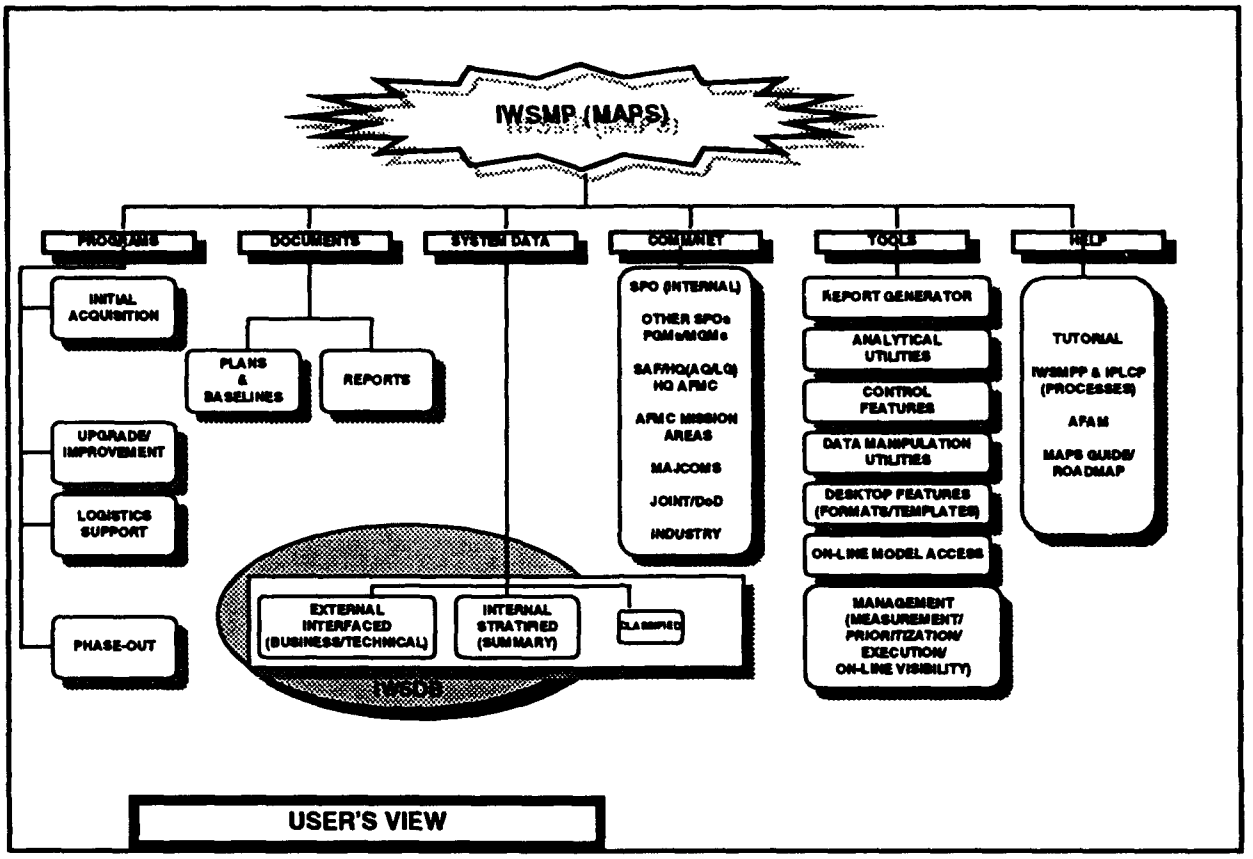

Figure 2. User's View

4.4 Alternative Strategies

Throughout the survey and follow-on analysis, it became apparent that there were choices between broad alternative approaches that could be adopted in developing the IWSMP and a MAPS solution. Three primary strategies were developed based on the need for an evolutionary program development concept and an ultimate goal for progression towards an "Open System" architecture solution from a baseline option to preserve the existing "Status Quo" planning system. These strategies were modified to analyze and accommodate a potential incremental development and implementation of the favored second (or interim) alternative solution (i.e., "Updated WSMIS/AWSMP to Meet IWSMP Requirements"). This was based on the premise that follow-on activity should build from present capabilities and concentrate on connectivity as a first priority. The alternative strategies were established/defined as follows:

- **Alternative 1: Status Quo**

This alternative utilizes the baseline situation in which master planning is accomplished today using existing tools and processes. WSMIS/AWSMP software is available for sustainment programs (i.e., twenty-eight aircraft systems, five non-aircraft systems, and one materiel group). Program specific, primarily manual or contractor-embedded, automation is the norm for acquisition programs, although only manual capabilities have been quantified for cost analysis to date. Additional measurement of automated capabilities is necessary to validate the extent. A common thread in acquisition planning is DoD/SAF milestone reporting requirements for cost, schedule, performance, and the flexibility to tailor contractor activity support to meet peculiar program-specific needs.

The advantage of Alternative 1 is that up-front costs are low to retain existing (measured) capabilities, and the flexibility to use program resources is high. Alternative 1 disadvantages are that integrated master planning and program management capabilities are not improved, and the potential for proliferation of redundant, non-exportable data and non-standard system/tool development at a large overall cost to the command is high.

- **Alternative 2: Updated WSMIS/AWSMP to Meet IWSMP Requirements**

This alternative expands or modifies existing WSMIS/AWSMP architecture to accommodate new IWSMP (MAPS) functional requirements. A sub-option, Alternative 2a, separately analyzed for ROI would concentrate on improved connectivity (versus software development) as a priority and possible incremental implementation, beginning with lead demonstration program(s) to enhance existing master planning/management capabilities. Secondly, this sub-option would also include availability of latest AWSMP software with template generator capability for other single manager program adaptation. The sub-option, Alternative 2b would add the on-line "help" tools (i.e., the IWSMPP and guide/road map) and a basic development package for integrated planning to the 2a connectivity features for a full Alternative 2 strategy. The tools would make life easier in using the existing system environment. The development package would include software to automate the production and update of acquisition program "baselines" (similar to those used by the F-15 community), and extension of those to modification management and other sustainment activities

The advantages of Alternative 2 are that the capability for integrated IWSM planning/ management will be improved by better connectivity for internal (geographically separated) SPO activities as well as for primary external customer interfaces (e.g., primary test, lab, PGM, etc.).
A second advantage is that the availability/adaptation of AWSMP software for other programs may facilitate earlier (in life cycle) sustainment planning and provide sustainment activity "lessons" back to the acquisition end of the process. Full implementation of this alternative (i.e., with 2b features) is where most significant gains in truly integrated planning capability and efficiency would be achieved. Alternative 2 disadvantages (i.e., with only 2a increment) are that connectivity initiatives alone, without the effort and time invested early to provide added "help" features such as the IWSMPP and a basic development package, threaten a timely and coordinated evolution toward fully integrated planning and program management capabilities. It may also deter or delay the willingness for sponsoring partnerships with potential demonstration organizations unless more IWSMP functionality is included. These features (i.e., included in 2b), when prioritized and provided, will aid the understanding of the life-cycle process and will show where data and SPO activity interfaces occur as a prerequisite to future process improvement and their automation when and if appropriate.

- **Alternative 3: Open System**

This alternative provides for full-up, open system architecture. This alternative would be an evolutionary step and explores two sub-options, both oriented away from mainframe and platform dependencies. Additional automated functionality for master planning/execution will be developed to take advantage of open system potential. These include integrated program routines for key life-cycle processes (e.g., post-production support, test, budget), IWSDB access/use, on-line access to models and other tools, as well as the improved connectivity and functionality of Alternative 2 "help" features. Sub-option, Alternative 3a would involve fielding CIM/CALS compliant hardware and software, moving from mainframe (i.e., AMDAHL) dependency except for data retrieval from legacy systems that have not been converted to open system formats. Sub-option, Alternative 3b would employ distributed data placement and allow the capability to bypass the mainframe altogether.

Advantages of Alternative 3 are that the open system architecture would facilitate a more responsive and complete interchange of data between involved users and with integrated systems for maximum planning and management capability. Given that parallel process improvements are pursued, managers could reap the time-saving and accuracy benefits of an IWSDB. Alternative 3 disadvantages are that this fully fielded alternative will take time, and up-front costs will be high. Sub-option, Alternative 3b

(Distributed Data Placement) presents higher complexity and costs in data control as a tradeoff to the lessened impact of a central site failure.

4.5 Results of Cost Benefit Analysis

The cost benefit analysis performed was a quantitative assessment of the most likely options, given the evolutionary development scenario envisioned. The model used calculates and summarizes costs in variety of ways (summary totals, non-recurring versus recurring, work breakdown summary category, and base year versus "then year") The F-15 program was the principle source of input. A detailed examination of ROI opportunities was limited for costed Alternatives 1, 2a, and 2b. This summary reflects the overall results of the study effort. The reader is encouraged to review Sections 7.0 and 8.0 of the IWSMP System Functional Description for details.[3]

Summary **($M of Then Year $)**	* Alternative 1 "Status Quo" (Baseline)	** Alternative 2a Updated AWSMP "Connectivity +"	** Alternative 2b Updated IWSMP "Integrated Planning"	† Alternative 3 "Open System" Architecture
Investment Costs	$0	$3.1m	$5.8m	
Total O&M Costs	$732.3m	$683.4m	$600.2m	
Total Alternative Cost	$732.3m	$686.5m	$606.0m	
Total Benefits		$48.9m	$132.1m	
Net Present Value of Benefits		$32.5m	$87.9m	
Benefit/Investment Cost Ratio (Discounted 7%)		11.4	16.4	
Investment Payback Period		1 Year	1 Year	

Table 1. Summary - Alternatives Cost Overview

Notes:

* Alternative 1 (i.e., "Status Quo") cost measurement for acquisition activities was limited to manual planning capabilities. Only operating and maintenance (O&M) costs are estimated. Although individual program specific initiatives requiring acquisition/investment costs continue to be

[3]Integrated Weapon System Master Planning (IWSMP) System Functional Description, May 20, 1993

performed, these costs could not be accurately identified and reflected in the Alternative 1 cost analysis. However, these costs are believed to be substantial, and as a result, the estimated expenses identified in this section are lower than the actual costs.

** Unquantified benefits for Alternative 2a or 2b (i.e., "Upgrade AWSMP to Meet IWSMP Requirements") make this analysis conservative: For example, the scope of an Alternative 2 implementation was limited to aircraft systems, as sufficient quantifying data was not available to include the non-aircraft systems and product/materiel groups in this financial analysis. The initial ROI efforts show, as assumed, that USAF aircraft system program needs alone would justify IWSMP (MAPS) development. It was concluded that benefits would extend to the other USAF single manager programs and that joint service application was also promising.

† Alternative 3 was not costed, but the potential for investment savings from an "Open System" MAPS solution, with projected process improvement and joint service/industry benefits, is high.

4.6 Development Approach

The evolutionary system development approach uses the best of existing capabilities, allowing the scaled engineering development of improved solutions to demonstrate potential benefits while customer needs evolve and become more transparent. The next phase should include an engineering development initiative involving an aircraft SPO, at both product and logistics center locations, and if possible, paired/linked with an interrelated product/materiel group, primary lab, and test organization to demonstrate more fully coordinated planning. Discussions with some program managers confirmed that there existed some programs at the peak of their maturity with a vision and possible willingness to co-sponsor such a scaled engineering development demonstration proposal. Work should continue with the refinement of the IWSMP (MAPS) Functional Description, including the System Development Plan and the Cost Benefit Analysis, and with a Program Management Directive. A flexible, cost-effective solution choice to satisfy the individual manager's specific requirements should ultimately be offered for implementation, yet it should be linked for any major investment consistent with overall CIM, CALS, and PAI goals. The cost/benefit of perpetuating individual program capabilities and new potential development initiatives, as well as the legacy system capabilities, for master planning would need to be more closely examined and measured for a true comparison of the "As Is" with proposed automated improvements. The development of the Alternative 2b on-line integrated master planning process and guide/road map should be pursued as a next step, in parallel with 2a connectivity improvements, to assist the user in getting the most from available automated planning and communications capabilities. The approach would be to document essential program management activities and work breakdown, using AFAM and other IWSM references

as a basis. The completed IWSMPP would identify relationships and interfaces between activities and data systems, and likewise, between summary data and its source in technical or business data routines where information is developed, used, exchanged, and maintained.

The "Development View" in Figure 3 may help understand the approach and the relationship of this aspect of IWSMP (MAPS) with related initiatives. Essentially, the IWSMPP will define the "As Is" and facilitate proceeding to the "To Be" in automated process improvement. This work would be coordinated with other initiatives (i.e., PAI) to insure top level program management planning needs are accurately defined for the IWSDB development effort.

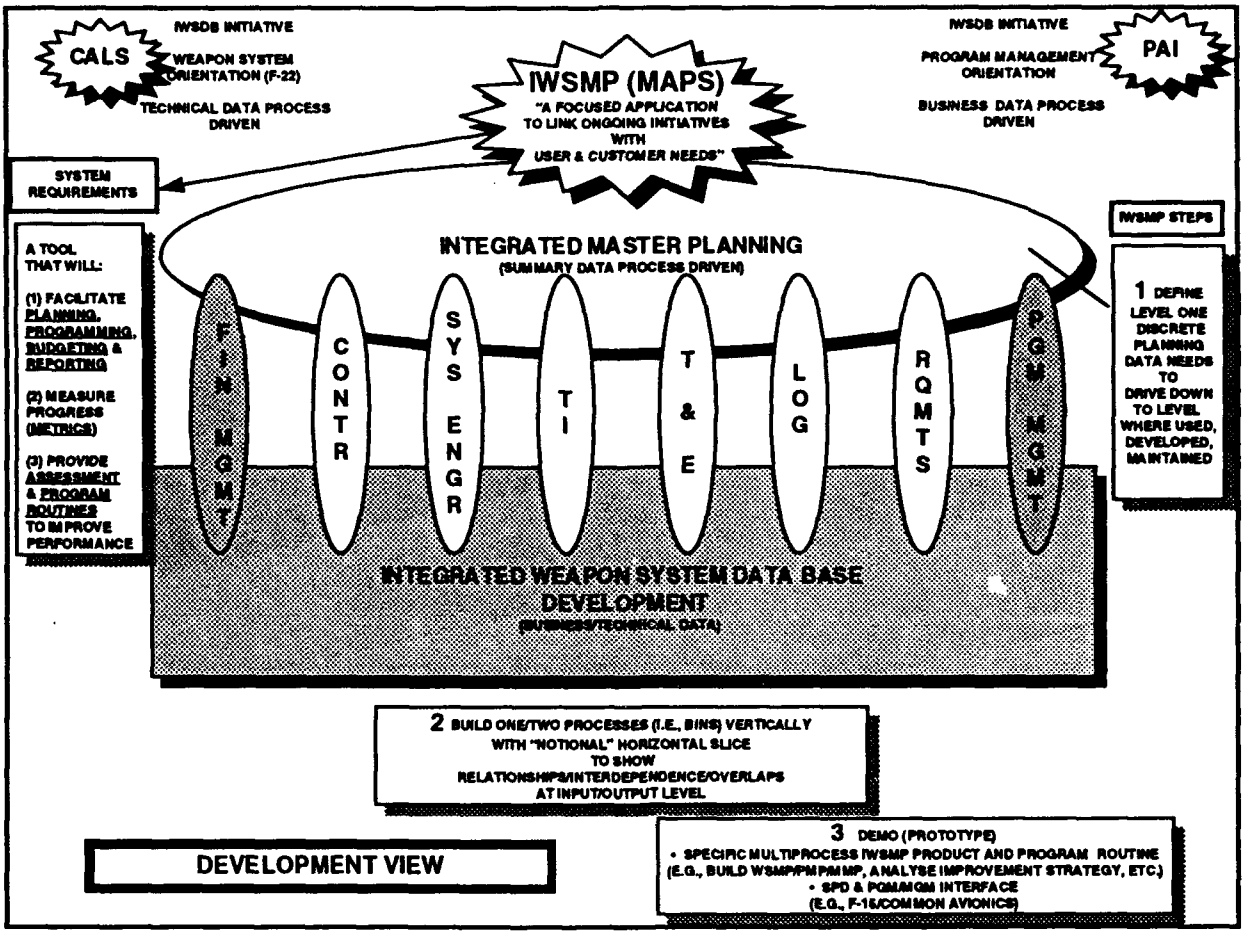

Figure 3. Development View

5.0 CONCLUSION

It has been adequately demonstrated that an automated IWSMP system (MAPS) is required and should be pursued to pull together acquisition and weapon supportability (sustainment) planning and execution. The existing AWSMP should be used to form the foundation for further design and development of a MAPS solution in the near term, while providing for progression towards an open-systems concept to reap the benefits of an IWSDB and other harmonization improvements in the future.

6.0 RECOMMENDATIONS

A. *Proceed with IWSMP Program system (MAPS) engineering development (Phase II),* adopting the development approach from the joint USAF/contractor Phase I effort. Alternative 2b (Update WSMIS/AWSMP to Meet IWSMP Requirements) is the recommended strategy. This choice will provide cost-effective additional communications capabilities and standardized software to assist in the day-to-day and long-term planning needs. Additional Integrated Definition (IDEF) modeling will be needed to flesh out system requirements.

B. *If the full IWSMP Functional Capability (Alternative 2b) sub-option cannot be pursued immediately, then recommend the following concurrent actions* as a minimum first step:

1. Sub-option, Alternative 2a (AWSMP LAN Connectivity) - in total.

2. Sub-option, Alternative 2b (IWSMP Functional Capability) - portion to include the development of "Help" tools (a) IWSMPP and (b) Guide/Road map.

C. *Select lead program(s) for Phase II.* The IWSMP Program team's recommendation was that the F-15 SPO be pursued as the prime aircraft system program. [Note: Several factors were developed as criteria for this choice, including the life-cycle status of the program, with both development/production and sustainment activity; the development of a master planning model; the formation and use of integrated product and corporate process teams; the present efforts to improve internal processes with automation initiatives; the potential local or relatively close geographical proximity with other potential demonstration partners, (i.e., PGM, test, lab, product center, other SPDs, etc.)]

D. *Work with chosen aircraft SPO to select other IWSMP Program Phase II participants.* Organizations should be chosen so that only one product center and logistics center are involved.

E. *Specific IWSMP (MAPS) development capabilities should be explored and demonstrated* in concert with other IWSM initiatives to fully meet system functionality and program management needs (e.g., MAPS is the perfect application to focus and demonstrate the value of an IWSDB).

F. *IWSMP Program should be adopted as the controlling process* to pull together the various on-going activities to achieve a viable weapon system and product/materiel group planning system.

G. *Continue to develop ROI profiles and costing to support and advocate IWSMP (MAPS) development* based on USAF needs and potential joint service applicability. Initial efforts to seek joint service support for IWSMP (MAPS) have been successful with the U.S. Army Tank and Automotive Command (TACOM) and Aviation Transport Command (ATCOM). Continued work with lead Service management systems centers (i.e., MICOM for Army) is essential in making a case for joint-service IWSMP (MAPS) development with the Joint Logistics Systems Center (JLSC).

H. *Develop a partnership role with single managers and other field activities* to sponsor follow-on IWSMP activities to satisfy specific program requirements, while providing a tool that harmonizes internal as well as external customer needs at the best cost.

I. *Continue the process development work begun by the IWSM PATs,* picked up by the ad hoc IPLCP Team, but never completed. This is an essential and prerequisite bridge between activities and the interfaces/relationships with the data that supports them. Recommend this be pursued, with program office participation, as part of Alternative 2b IWSMPP development (B.2, above).

J. *Strongly consider an active, informed staff role in HQ AFMC/XR for Acquisition CIM activities.* CIM goals and objectives cannot be met without the same corporate focus on acquisition data systems as on logistics and other CIMs. While individual program initiatives may be viewed as an essential business practice, they must be balanced against CIM/CALS standards for data and against the need to eliminate proliferation of data systems and connectivity challenges.

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List of Abbreviations and Acronyms

AFAM	Air Force Acquisition Model
AFLC	Air Force Logistics Command
AFMC	Air Force Materiel Command
AFMCR	Air Force Materiel Command Regulation
AFPEO	Air Force Program Executive Office
AFR	Air Force Regulation
AFSC	Air Force Systems Command
ALC	Air Logistics Center
APB	Acquisition Program Baseline
AWSMP	Automated Weapon System Master Plan
CALS	Computer Aided Acquisition and Logistics Support
CIM	Corporate Information Management
DAC	Designated Acquisition Commander
DAE	Defense Acquisition Executive
DoD	Department of Defense
EM	Enterprise Model
FD	Functional Description
FY	Fiscal Year
HQ	Headquarters
HQ AFMC	Headquarters Air Force Materiel Command
HQ USAF	Headquarters United States Air Force
IAW	In Accordance With
IE	Information Engineering
IPLCP	Integrated Product Life Cycle Planning
IPS	Integrated Program Summary
IWSDB	Integrated Weapon System Data Base
IWSM	Integrated Weapon System Management
IWSMP	Integrated Weapon System Master Planning
IWSMPP	Integrated Weapon System Management Planning Process
JLSC	Joint Logistics Systems Center
LAN	Local Area Network
MAJCOM	Major Command
MAPS	MAster Planning System
MGM	Materiel Group Manager
MMP	Materiel Master Plan
MS	Milestone

NPV	Net Present Value
O&M	Operations and Maintenance
OPR	Office of Primary Responsibility
PAI	Paperless Acquisition Initiative
PAP	Process Action Paper
PAT	Process Action Team
PEO	Program Executive Officer
PGM	Product Group Manager
PMD	Program Management Directive
PMMEB	Product Management Mission Element Board
PMP	Product Master Plan
POC	Point of Contact
R&D	Research and Development
R&M	Reliability and Maintainability
ROI	Return on Investment
SAF	Secretary of the Air Force
SIDAC	Supportability Investment Decision Analysis Center
S/I	Saving to Investment Ratio
SPD	System Program Director
SPO	System Program Office
T&E	Test and Evaluation
TBD	To Be Determined
USAF	United States Air Force
WPAFB	Wright-Patterson Air Force Base
WSMP	Weapon System Master Plan
WSMIS	Weapon System Management Information System
WSPAR	Weapon System Program Assessment Review