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THE PROGRAM MANAGER'S SUPPORT SYSTEM (PMSS)

AN EXECUTIVE OVERVIEW

AND

DESCRIPTIONS OF FUNCTIONAL MODULES

by

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PREFACE

The Program Manager's Support System (PMSS) is an application of decision support systems technology to the defense acquisition program management environment.

The purpose of the PMSS is to provide a management tool for managers in a program management office (PMO), to assist them in their decision-making process, and to help them execute their project more effectively and efficiently.

The PMSS is intended to support the defense Program Manager and his/her first echelon staff; for example, the Chief Engineer, the Plans and Programs Officer, the Configuration Manager, the Integrated Logistics Support (ILS) Manager, etc. The PMSS also can be utilized by other managers in the acquisition community, for example, by headquarters level executives, program management officers in major projects, and field activity managers.

This Executive Overview is designed to acquaint you with the background, philosophy, and description of the PMSS, and provide you with descriptions of related functional modules. The Executive Overview is affectionately known as the "Purple Book" to signify the multi-service nature of the program.

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EXECUTIVE OVERVIEW
OF THE
PROGRAM MANAGER'S SUPPORT SYSTEM (PMSS)

The College

The Defense Systems Management College (DSMC) is a Department of Defense (DOD) institution dedicated to providing education to the defense acquisition community and, in particular, program management office (PMO) personnel. Education is provided in the program management policies, philosophies, skills, and techniques necessary for the effective and efficient execution of defense weapon systems acquisition projects.

In addition to its educational mission, DSMC has a research mission. Research in applied management science is conducted to support the above educational mission and to support the DOD acquisition community.

The third DSMC mission is dissemination of information, including software programs, to the DOD acquisition community.

DSMC also has a fourth mission, to provide oversight for education and training in the DOD acquisition community.

A Need for Decisions

The defense systems acquisition process is a complex process comprising six decision-making disciplines, many functional areas of responsibility, and five acquisition phases. The defense program manager (PM), in executing an assigned program within this environment, is faced with many non-routine and unstructured decisions. Although management information systems (MISs) can provide the program manager with some of the information needed in the decision-making process, such systems predominately supply only historical data and current project status, usually with an

abundance -- and many times an overabundance -- of unprocessed information. A need exists, therefore, to enhance the program manager's decision-making process by examining future courses of action, assisting in answering the "What if....?" and "Should I....?" questions, and distilling the available data into meaningful alternatives.

One Solution

A DSMC research project was established to address this need. This project applies decision support system (DSS) technology to the defense systems acquisition program management environment. This research project is called the Program Manager's Support System, or simply, the PMSS.

PROGRAM MANAGER'S SUPPORT SYSTEM

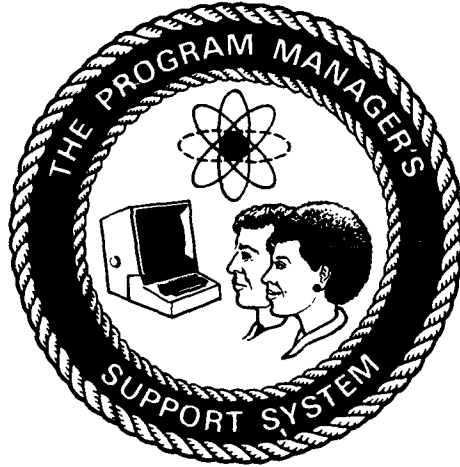


Figure 1

What is the PMSS?

A comprehensive depiction of the PMSS is contained in the PMSS logo shown in Figure 1.

The PMSS will:

- Be an integrated software system operable on various hardware systems. The target hardware is low-cost microcomputers; e.g., the DOD standard microcomputer, the Zenith Z-248. (The system also is being designed to run on minicomputers.)

- Provide a capability to 1) integrate program management functional areas of responsibility, 2) generate program alternatives and impacts caused by various management actions and technical activities, 3) assess these impacts on the program's functional areas, and 4) utilize other decision-making support methodologies.

- Provide educational tools to facilitate the teaching of program management functions at educational institutions involved with defense systems acquisition program management.

The PMSS consists of two major parts, the integrated PMSS and functional modules.

-- The integrated PMSS is a manager's tool to assist the program manager in his/her decision-making process. It is NOT a management information system nor is it the decision-maker. The PMSS will permit the integration of the user's experience, judgment and intuition to allow the user to evaluate available alternatives and, ultimately, aid the user to make better, more timely decisions. A description of the integrated PMSS starts on page 24.

-- Functional modules are software programs that can be used as stand-alone programs to assist in program management areas of responsibility such as planning, acquisition strategy development, program management plan generation, cost estimating, scheduling, Program Objectives Memorandum (POM) development, budget generation, budget execution monitoring, financial management, systems engineering, production planning, integrated logistics support planning, test issues identification, Test and Evaluation Master Plan (TEMP) generation, TEMP evaluation and monitoring, configuration management, document generation, document evaluation and monitoring, program office staffing and organization, etc. These modules support specific functions of program management operations. More detailed information about the functional modules begins on page 45.

PMSS CHARTER

- **Support the School of Systems Acquisition Education in the development of curricula that implement the Program Manager's Support System (PMSS).**
- **Improve the decision-making process of defense program managers.**
- **Identify and understand the factors that affect and influence the decision-making process.**
- **Orient personnel in the defense program management environment in ways to improve the decision-making process.**
- **Provide information to the defense program management community to facilitate the decision-making environment.**
- **Encourage research in the decision science disciplines.**
- **Share accumulated knowledge with the decision sciences community.**

Figure 2

The PMSS Charter

The PMSS project was conceived in-house in the DSMC Department of Research and Information (DRI) in early FY 1982. In August 1983, a PMSS Directorate was created within DRI to manage this project. The charter for the PMSS Directorate is shown in Figure 2.

The PMSS Directorate has now been renamed the Decision Support Systems (DSS) Directorate to reflect added responsibilities the directorate has assumed. The charter remains the same.

DSS AND DSAM INFORMATION DIRECTORATE

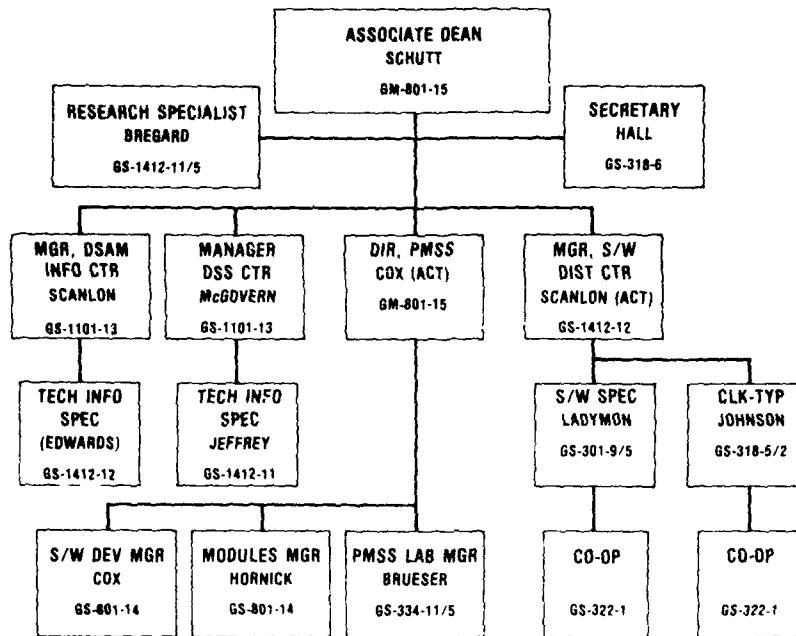


Figure 3

Decision Support Systems Directorate

The current organization of the DSS Directorate is shown in Figure 3.

The Manager, Defense Systems Acquisition Management (DSAM) Information Center is responsible for identifying, collecting, cataloging, distributing, and resource sharing of acquisition management information and materials. The DSAM Information Center functions as a hub of information for the defense acquisition community.

The Manager, Decision Support System (DSS) Center is responsible for identifying, collecting, cataloging, distributing, and resource sharing of information about decision support systems research projects and documents of interest to the defense acquisition community. The Manager, DSS Center also manages the Decision Support Systems Research Institute (DSS RI) which provides the network for resource sharing of DSS information.

The above two organizational elements of the DSS Directorate will not be addressed further in this overview. For additional information about them, contact the Director, DSS Directorate.

Having uncovered DSS items that can be used by the defense acquisition community, these are implemented in the PMSS software, managed by the Director of the PMSS group.

The Software Development Manager is responsible for the overall architecture -- the top-down approach -- which involves the development of the PMSS integrating software and related decision science research projects.

The Modules Manager is responsible for development of functional modules supporting the PMSS. Functional modules form a part of the integrated PMSS and also can be used individually. This represents the bottom-up approach in the PMSS development.

The PMSS Laboratory Manager is responsible for operations of the PMSS Laboratory (described later) and provides on-site software evaluation and support.

With software programs and documentation produced and ready for distribution, they are turned over to the Manager, DSMC Software Distribution Center. The purpose of the Software Distribution Center is to collect, catalog and distribute all software modules developed by the DSS Directorate and other organizational elements of DSMC.

The Research Specialist provides supporting research in the discipline areas affecting the PMSS project.

Hence, the DSS Directorate is developing the PMSS which includes the integrated system and the separate functional modules. As the system and modules are developed, the Directorate provides support in the use, refinement and operation of PMSS.

DECISION-MAKING INTERACTIONS

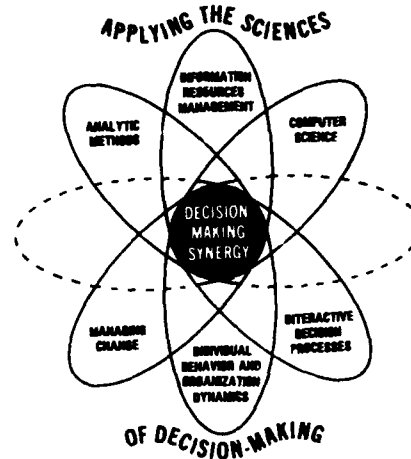


Figure 4

Decision-Making Interactions

The overall PMSS concept is delineated in Figures 4 and 5. The first element of the PMSS, is shown in Figure 4.

Everyone makes decisions. Executing the results of that activity is sometimes an easy task, particularly if the decision only affects the decision-maker. At other times, it is a complex task involving the difficulties of getting other people to act in certain ways.

The primary disciplines that affect the decision-making environment in the modern, technologically oriented world are shown in Figure 4. These disciplines involve some "hard technologies" -- analytical methods and computer science; "soft technologies" -- interactive decision processes and individual behavior and organization dynamics, which bring the people into the process; and the "umbrella philosophies" -- information resources management and managing change.

Of more importance than any of these individual disciplines is the impact of their interaction as they function together, and the synergy generated by those interactions. Hence, for a successful implementation of the PMSS, all of the above disciplines, and the interaction of these disciplines, must be appropriately integrated into the PMSS concept.

PMSS CONCEPT

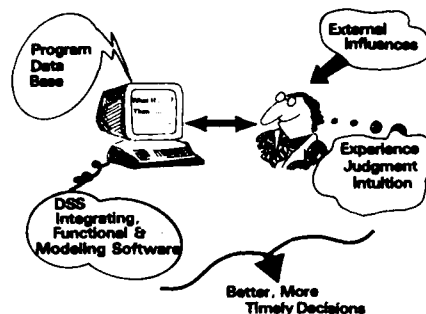


Figure 5

PMSS Concept

As depicted in Figure 5, the PMSS envisions the interactive use of a small, inexpensive computer system by a manager. The manager, in the context of the PMSS, may be the program manager, or functional area specialist or manager in the program management office. This would include, for example, the Chief Engineer, the Plans and Programs Officer, the Configuration Manager, the Integrated Logistics Support (ILS) Manager, etc. -- in other words, the first echelon staff of the PMO.

The PMSS will operate on a data base of program information which may be derived from extractions from the program management office's or supporting activities' MISs, or from direct inputs to the PMSS data base.

Various elements (decision support systems integrating software, functional modules, analytical models of several kinds) provided as part of the PMSS will operate on this data to permit the manager to ask "What if....?" and "Should I....?" questions and to generate alternative courses of action for his/her consideration. By integrating the results with the external influences imposed upon the program and by applying his/her experience, judgment and intuition, the program manager will be able to evaluate the available alternatives and, ultimately, make better and more timely decisions.

PMSS PROGRAM OBJECTIVES

- Modules/System for Classroom Use
- Modules/System for Operational Use
- PMSS Support
 - Software Packages
 - User/Programmer Manuals
 - Installation Assistance
 - Consulting
- PMSS Software Distribution
 - Maintain CM for Software

Figure 6

PMSS Program Objectives

The four basic objectives of the PMSS program are shown in Figure 6.

The first objective is to develop modules and the PMSS system for classroom use in the DSMC Program Management Course (PMC) and other DSMC courses, on campus and at DSMC regional sites.

The second objective is to develop modules and the PMSS system for use in program management offices and other activities of the defense acquisition community. As a part of the PMSS development process, program management office test sites have been selected to evaluate the modules before they are designated as operational modules.

The third objective is to develop materials necessary for a program management office to implement the PMSS as it is developed in the future. These include:

-- The software packages themselves, developed to operate on the current standard hardware configurations in the military services. These include the Zenith Z-248 and also the IBM PC/XT/AT and compatible microcomputers. For other special configurations, users should contact the DSS Directorate.

-- Complete user and programmer documentation. User manuals are provided with every software package. Programmer manuals are distributed only to those activities working on the applications. If a user is interested in working on a module for another application, contact the DSS Directorate.

-- Installation assistance is available if required. The DSS Directorate attempts to develop the user manuals so this is usually not necessary; however, sometimes assistance is required. In this regard, users finding problems with the documentation are asked to contact the DSS Directorate.

-- Finally, consulting on the PMSS and the capabilities it provides.

The fourth objective of the PMSS program is to establish the necessary capabilities for DSMC to perform configuration management functions for the PMSS in order to maintain control of the software and to ensure that all users can obtain maximum utility of the PMSS software. Recommendations for changes and improvements to the PMSS from all sources are welcomed and solicited. The DSMC has established the Software Distribution Center to maintain configuration control of the system to ensure maximum usefulness for all who need the system. Recommendations for additions and/or changes to DSMC software and documentation should be forwarded to the Manager, DSMC Software Distribution Center.

DEFENSE PROGRAM MANAGER'S RESPONSIBILITIES

- | | |
|---|--------------------------|
| • Functional Areas | • Capabilities |
| • Administrative Management | • Risk Management |
| • Program Overview/Status Management | • Cost Estimating |
| • Project Planning | • Scheduling |
| • POM Development and Budgeting | • Monitoring |
| • Financial Management | |
| • Contracting | |
| • Government Activity Tasking | |
| • Technical Management | |
| • Configuration Management | |
| • Integrated Logistics Support | |
| • Deployment and Operational Status | |

Figure 7

Defense Program Manager's Responsibilities

One of the initial activities of the PMSS project was to conduct a survey of DOD program managers to examine their information requirements and existing information systems. This resulted in the definition of the 11 program management functional areas of responsibility and the need for the four capabilities shown in Figure 7.

This breakout, including all subfunctions falling within each area, represents overall responsibilities of the defense program manager and was used to formulate the base line for the initial PMSS design.

DEFENSE PMs DECISION-MAKING METHODOLOGY

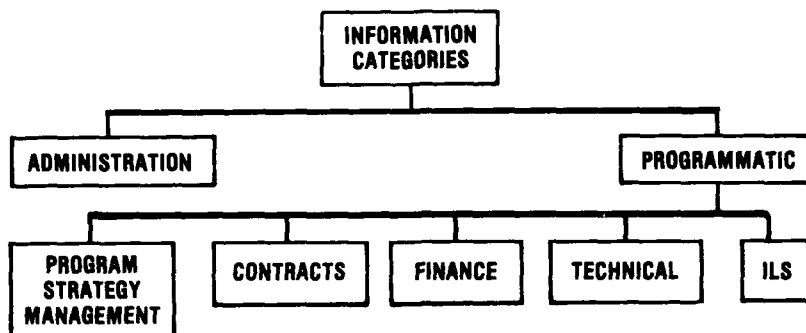


Figure 8

Defense Program Manager's Decision-Making Methodology

As part of the analysis of the program manager's modus operandi, a Program Manager's Action Model was developed to delineate the manner in which a program manager functions. From this analysis evolved the information categories used when solving problems. These categories include administrative information and programmatic information. Administrative information is related to the functioning of the program management office such as personnel, organization and security. Programmatic information is specifically associated with the program and can be further categorized into the areas of program strategy management, contracts, finance, technical, and ILS as shown in Figure 8.

In the analysis of the program manager's functions, it evolved that he/she frequently superimposes a "management perspective template" over the programmatic information when a program decision is required. That program management template (or filter) looks at the information with a view toward how the "current situation" affects the cost, schedule, performance and supportability of the program. These four areas -- cost, schedule, performance and supportability -- establish the uppermost level of requirements for the program manager's decision-making methodology.

A comprehensive analysis of 1) the program manager's responsibilities, 2) needed capabilities, 3) information categories, and 4) management areas affecting the decision-making methodology, provided the base line for the design of the integrated PMSS.

The integrated PMSS will provide a management tool for the program manager and key staff members to use in the decision-making process. The PMSS tool will, when completed, support the program management process in all stages of program management; that is, birth of the program through concept exploration/definition, concept demonstration and validation, full scale development, full rate production/initial deployment, operations support and, finally, retirement of the system. The PMSS will support this acquisition process by providing an automated tool to support decision-making activities during the acquisition process.

PMSS OVERALL APPROACH

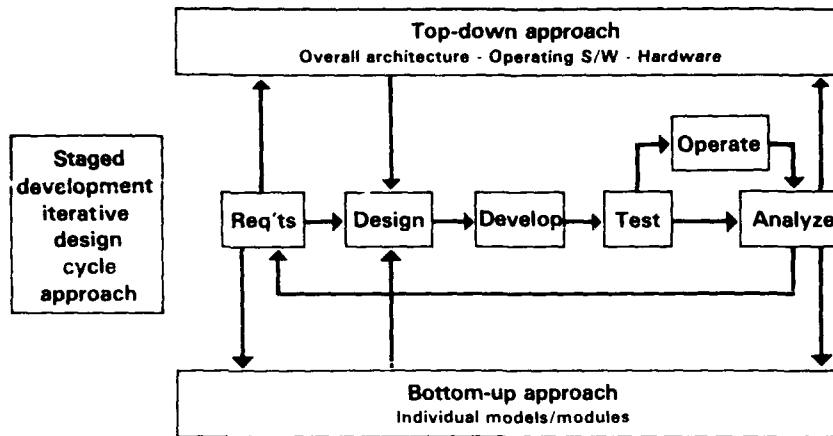


Figure 9

PMSS Overall Approach

Two simultaneous approaches are being employed to develop the PMSS. A top-down approach is providing the overall architecture design -- the boundaries of the system, what can be accomplished and, equally important, what cannot be accomplished. This includes the development of integrating software for the integrated PMSS. A bottom-up approach also is being executed. This concerns development of functional modules which, when integrated together, provide the main PMSS functionality. Figure 9 depicts these two approaches which will be integrated as the PMSS evolves from stage to stage.

In addition, Figure 9 outlines a third key approach being used in the PMSS development process. That is the use of the staged development iterative design cycle approach or, for short, the iterative design cycle.

The iterative design cycle approach is to build a "small" system addressing a portion of the problem, use and test it, reevaluate the requirements, redesign the system, rebuild it, and repeat this process until the system is as required. The designer/builder and the user work side-by-side to develop the system.

There are many approaches to the development of decision support systems. Some are successful; some are not. In general, however, those that followed the iterative design cycle approach have been successful. Therefore, based on that track record, and the unstructured/semistructured and changing characteristics of the program manager's decision-making processes, this approach is being employed in the development of the PMSS.

The following sections address the design and development of the integrated PMSS and the functional modules. The integrated PMSS will include capabilities, in addition to the integration of the functional areas of program management, to provide convenient support to the user of the PMSS.

**PMSS SOFTWARE DEVELOPMENT CONTRACT
EVOLUTIONARY PHASES**

- Operational PMSS Definitization
- PMSS Software Development
 - 3 Tasks
- Functional Module Development
 - 2 Tasks
- Program Impact/Functional Module Integration
 - 3 Tasks
- Final Test and Demonstration

Figure 10

PMSS Software Development Contract Evolutionary Phases

In FY 1983, three parallel, competitively awarded contracts were executed to develop the PMSS architecture. The results were consolidated by DSMC into the requirements for the PMSS software development contract.

A competitively awarded contract for the PMSS software development was executed in 1984. It contained a number of tasks to be performed over several years, representing various evolutionary phases as shown in Figure 10.

An initial task addressed the definitization of the operational PMSS. Several additional tasks concentrated on the PMSS software including the basic architecture, user interface, resource manager, and decision support kernel. These tasks addressed separately a prototype linked software system to be used to test and refine concepts, and an integrated software system that incorporated the results from the prototype.

Other tasks concentrated on the development of specific functional modules and the program impact advisor. A final task addressed test and evaluation.

In late 1988, an Alpha Test version of the PMSS was delivered. The Alpha Test version does not include all of the functionality, fully integrated, that will be in the operational PMSS. This test version is undergoing evaluation, both at DSMC and at selected PMOs, with the goal of identifying any problems or enhancements that must be incorporated prior to formal distribution. Subsequent versions of the PMSS will incorporate more functions that are fully integrated.

PMSS SOFTWARE ARCHITECTURE

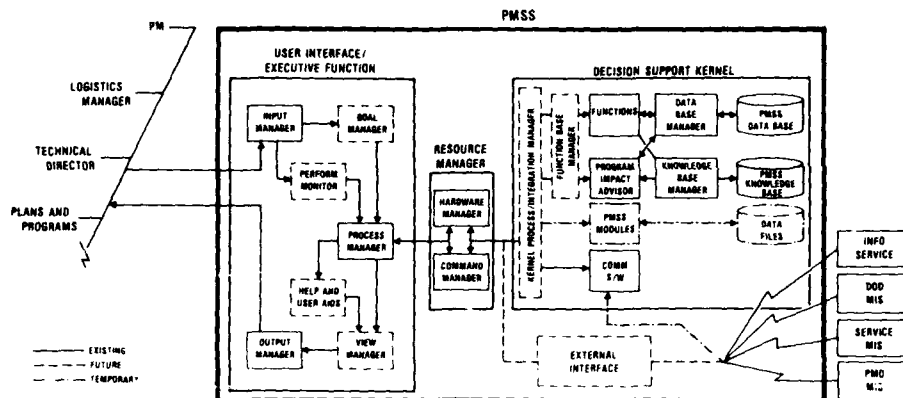


Figure 11

PMSS Software Architecture

The PMSS is designed along the lines of a decision support system (DSS) with three major elements: a user interface, a model (or function) base, and a data base. The software architecture, shown in Figure 11, consists of a User Interface/Executive, a Resource Manager, an External Interface, and a Decision Support Kernel.

The PMSS user will interface with the PMSS through the user interface/executive which will include seven submodules: input manager, goal manager, performance monitor, process manager, view manager, output manager, and help and user aids. The resource manager, acting as an interface between the decision support kernel, external interface, and user interface, coordinates commands and allocates hardware resources.

The decision support kernel is the heart of the PMSS. It will contain a kernel process/integration manager, function (model) base manager, and knowledge base manager in addition to the data base, data base manager, knowledge base, functions, program impact advisor, and other software. Applications of artificial intelligence have been applied to the program impact advisor.

The external interface will provide the program manager the capability to query other automated systems ranging from the program management office's own management information system to external information services such as the Defense Technical Information Center (DTIC), CompuServe, etc. The external interface may also be used to update the PMSS data base from other DOD and Service management information systems.

PMSS UNIQUE CHARACTERISTIC

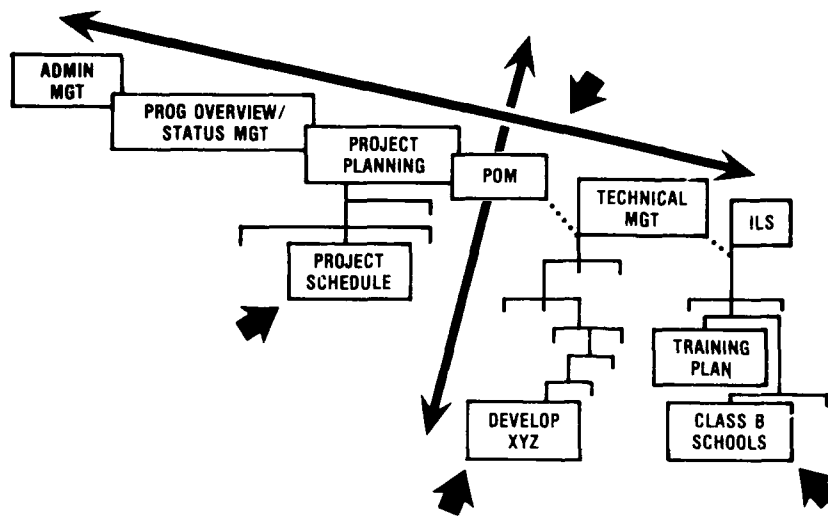


Figure 12

PMSS Unique Characteristic

Many management information systems have been developed to support specific functional areas of responsibility; e.g., budgeting, configuration management, ILS, etc. These MISs support key people in the program management office and assist them to perform their duties.

An integrated decision support system has not yet been developed that extracts and integrates data from all these functional areas in support of the program manager/program management office decision-making process. Yet, the program manager is concerned with all elements of his/her program and needs to see the "big picture" and know the impact of one area on another.

This is the unique characteristic that is a key part of the PMSS concept. As depicted in Figure 12, it is the capability to assess rapidly the impact of program perturbations both across and within all functional areas of program management responsibility as related to the program manager's decision-making areas of interest.

This program impact advisor function -- the integration across and within all areas of concern to the program management office -- is the unique and most important function of PMSS.

On the next few pages, the integrated PMSS, or as it is simply called, the PMSS, will be described.

PRIMARY FUNCTIONS OF THE INTEGRATED PROGRAM MANAGER'S SUPPORT SYSTEM

- **Program Overview/Status**
- **Program Impact Advisor**
- **Functional Analysis/Support**
- **Information Category Data**
- **Independent Modules**
- **Executive Support**
- **Utilities**

Figure 13

PMSS Functions

In order to support the decision-making efforts of the program manager and his/her staff, the PMSS provides the seven basic functions listed in Figure 13.

The Program Overview/Status function provides the capability to easily assess the program status, based on the six information categories described previously, as compared to cost, schedule and performance, and to quickly find the data that are driving the status.

Program Impact Advisor, perhaps the most important PMSS function, provides the capability to rapidly assess the impact of program perturbations both across and within the areas of interest to the program manager/program management office.

The Functional Analysis/Support function is a set of functional capabilities that allows the program manager and staff to enter and manipulate program data in each functional area. Such functions as Work Breakdown Structure, PERT Networking, Critical Path Analysis, Gantt Milestone Scheduling, Budget Planning, Budget Preparation, Budget Tracking, and Budget Execution Monitoring are included.

The Information Category Data function provides quick access to the program data via the six information categories. The data are presented in standard reporting format wherever possible.

Independent Modules is a capability for the user to directly access software that does not use the PMSS data base. Two categories of software are supported: PMSS Functional Modules that have not yet been integrated into the PMSS architecture, and commercial software packages that the user can install via a PMSS utility function.

The Executive Support function provides assistance with routine tasks each program manager performs. These functions include capabilities such as a calendar, telephone/address list with automatic dialer, and action item and travel status.

The PMSS Utility function provides both Program Management related and PMSS System Administration related utilities. Included in the Program Management utilities are the Brief, an audit trail of all changes made to the PMSS data base, the capability to change the Project being worked on, and access to the Escalation Indices.

System Administration functions include the capability to archive the Brief data, Backup/Unload and Restore/Load the PMSS data base, select screen colors, define the hardware configuration, and a Supervisor function where users, projects, and read/write access are controlled.

In most cases, standard DOD/Service or other sample data is provided by the PMSS as a base line from which the manager can tailor his/her own program.

PROGRAM OVERVIEW/STATUS

- **Red, Yellow and Green Arrow Indicators**
- **Information Category/
Cost-Schedule-Performance-Matrix**
- **Text Explanations**
- **Related Data Screens List with Status**
- **Direct Access to Problem Data**
- **Data Color Coded**

Figure 14

Program Overview/Status

The Program Overview/Status function provides the capability to easily assess the program status based on the six information categories described previously as compared to cost, schedule and performance, and to quickly find the data that is driving the status. This is outlined in Figure 14.

Red, yellow and green arrow indicators are given for each of the categories in terms of cost, schedule, and performance. These indicators are based on criteria that is adjustable by the program manager. After selecting a category of interest, the user can select either an explanation of the status, presented in text, or one of the related data screens. The explanation will incorporate the actual project data in the text.

A listing of data screens that affects the category of interest is presented, each with its own status indicator. The user can select a data screen of interest, such screens generally being formatted after standard reporting formats. The data itself in each data screen is color coded red, yellow and green to show status. The user can enter weights for each data item to control how much each data item affects the status indicators.

Control over the overall status indicators is maintained through color coded "thermometers". The user can adjust the thresholds on these thermometers where the status indicators change colors. The value of the data related to each category is shown to facilitate adjustment of the thresholds.

PROGRAM IMPACT ADVISOR

- **Expert System Application**
- **Assists with "What if . . . ?" and "Should I . . . ?" Questions**
- **Analyzes Real or Potential Program Perturbations**
- **Looks at Entire Life Cycle**
- **Results Presented in Text**
- **Proposes Solutions in Terms of Specific Cost and Schedule Changes**
- **Highlights High Risk Areas**

Figure 15

Program Impact Advisor

Program Impact Advisor, perhaps the most important PMSS function, provides the capability to rapidly assess the impact of program perturbations both across and within the areas of interest to the program manager/program management office.

This function, as shown in Figure 15, consists of an expert system that assists the program manager in responding to unplanned changes. It can also be used for program planning by testing possible program conditions and analyzing the potential resultant impacts. Putting it another way, the Program Impact Advisor function assists with the "What if ...?" and "Should I ... ?" questions.

Program schedule changes are entered as changes to task durations or task precedences. Task precedences are changed graphically on the screen by the user adding, deleting, or moving tasks in the PERT network. Cost changes are entered at the task level and rolled up by the system, and funding changes are entered at the Appropriations level.

A set of five scheduling priorities can be rank ordered to tell the system how to evaluate your program. The Evaluation is then invoked, and can address either constant dollars or inflated dollars. The results are presented in a report that explains in text problem areas and potential solutions. Specific schedule and cost data are presented. High risk areas are also addressed.

A number of different sets of data can be saved as "Scenarios" and called back later. Any scenario can also be designated as the new base line when proposed changes are approved.

FUNCTIONAL ANALYSIS/SUPPORT

- **Work Breakdown Structure**
- **PERT Network**
- **Critical Path Analysis**
- **Gantt Milestones**
- **Budget Planning**
- **Budget Preparation**
- **Budget Tracking**
- **Budget Execution Monitoring**

Figure 16

Functional Analysis/Support

The Functional Analysis/Support function is a set of functional capabilities that allows the program manager and staff to enter and manipulate program data in each functional area. Such functions as Work Breakdown Structure, PERT Networking, Critical Path Analysis, Gantt Milestone Scheduling, Budget Planning, Budget Preparation, Budget Tracking, and Budget Execution Monitoring are included as shown in Figure 16.

The Work Breakdown Structure function provides the capability to create and modify a work breakdown structure for your program. MILSTD-881-A WBSSs are included in the PMSS, and can be called in and modified as required.

PERT Networking allows the creation of a PERT network for your program. A DOD generic life cycle PERT network is included in the PMSS and can be called in and modified, or a PERT network can be created from a blank screen. The user adds, modifies, and deletes Tasks and precedence lines graphically on the screen. The system will tell

the user if improper relationships have been created. Program start and end dates, and Task durations are entered, and the system calculates the critical path and planned Task start and end dates. The critical path is shown in red. The PERT network can be plotted out to a plotter in color.

The Gantt milestone chart shows all tasks on a time scale. Each task is color coded to represent status the same as the Program Overview/Status function. The time scale can be quickly changed to years, quarters, months, or weeks. The tasks can be sorted by name, number, start date, or end date. The Gantt milestone chart can be plotted out to a plotter in color.

The Budget Planning function allows the selection of Appropriations (all DOD appropriations are included in the PMSS), assigning Program Elements or Line Item numbers, designating Performing Activities, and tying any or all of these attributes and the WBS to the Tasks created with the PERT function. In addition, individual Task costs and risk can be entered.

The Budget Preparation function provides roll ups of all costs by Appropriation, Program Element or Line Item, Performing Activity, Work Breakdown Structure, and Task. These roll ups represent the budget requirements of the program.

Budget Tracking allows the user to track the budget process and serves as an audit trail of funding changes throughout the budget cycle. Budget Execution Monitoring allows the tracking of commitments, obligations, and expenditures, and can be accessed by Appropriation, Program Element/Line Item, Performing Activity, Work Breakdown Structure, or Task.

OTHER RELATED PMSS FUNCTIONS

- Information Category Data
- Independent Modules
- Executive Support
- Utilities

Figure 17

Other Related PMSS Functions

The PMSS contains additional capabilities to help the user with various tasks associated with program management. The Information Category Data function allows quick access to all of the program data through a hierarchical menu structure that represents the hierarchical PMSS data structure. The data is contained on Data Screens which are generally formatted in accordance with standard reporting requirements.

Independent Modules provides the capability to access software that is not integrated into the PMSS data base. PMSS Functional Modules that have not yet been integrated are included. The user can also install, through a PMSS utility, most commercial packages such as word processors, spreadsheets, and presentation graphics. This capability allows the program manager to use related management aids, modules, spreadsheets, word processors, etc. without leaving the PMSS environment.

Executive Support provides several administrative type functions that are normally performed on a day to day basis. These include a calendar function with a three month display, daily schedule, and note pad. A name and address function is available with automatic dialing capability. Travel status information can be maintained, and a tickler system is included to help keep track of action items.

The PMSS Utilities include both Program Management functions and System Administration functions. Here is where the user can change the project that is loaded into PMSS, update Escalation Indices, and view the Brief which is an audit trail of all changes made to the PMSS data base. System Administration functions include the capability to archive the Brief data, Unload/Backup and Load/Restore the PMSS data base, change the colors of the screen display, and perform System Supervisor functions such as setting read/write access to the data base.

PMSS IMPLEMENTATION AT DSMC

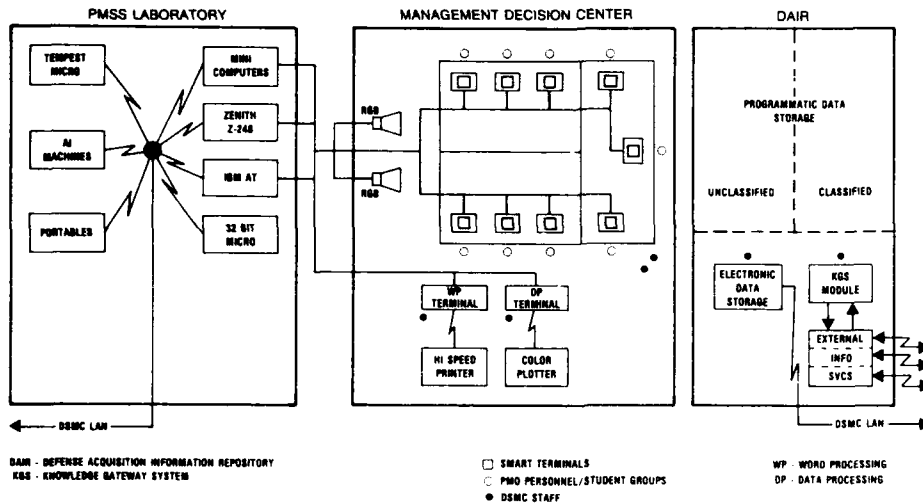


Figure 18

PMSS Implementation at DSMC

The development and implementation of PMSS will primarily concern two facilities as shown in Figure 18.

A major research objective of the PMSS program is to remain aware of, and up-to-date on, software that has been developed by other activities and which may be of use in the PMSS program or to the DOD acquisition community. Another objective is to test out PMSS software as it is developed. These requirements lead to the development of the PMSS Laboratory. The purpose of the laboratory is threefold: first, to test the PMSS concept; second, to have a facility to design, build, debug, test, and operate modules of the PMSS; third, to test the microcomputer capabilities and capacities in the PMSS environment. Standard, off-the-shelf software packages will be tested in the laboratory for potential application in the PMSS environment, and for use in the DOD acquisition community.

A second facility that relates to the PMSS program is the DSMC Management Decision Center (MDC). The MDC will be used by student groups to solve classroom exercises, by program managers and their staffs to solve program problems and/or by other management executives to do policy formulation and/or types of management decision exercises. In any of the cases, users bring the technical content of their problems and exercise them by using the decision supporting tools that are available in the MDC. One of these tools will be the PMSS. Users are supported by facilitators assisting in the process portion of problem-solving.

A third element that will be necessary to support the use of PMSS at DSMC will be the Defense Acquisition Information Repository (DAIR). The DAIR will consist of the collection of programmatic data on selected defense system programs that provide the necessary data base for operation of the modules and PMSS.

PMC



At DSMC, the Program Management Course (PMC) is the primary educational vehicle. Students acquire knowledge and learn skills about program management from three departments in the college: Policy and Organization Management, Business Management, and Technical Management. Students integrate and apply these knowledges and skills in the PMC Simulation Department. In their educational environment, students run the full spectrum from attending lectures to conducting exercises.

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as an action officer in a program management office or other activity of the acquisition community.

The PMC course has been revised to teach program management material in two segments. The first segment is a 6-week program concerning fundamental knowledge and skills of program management. The second segment, lasting 14 weeks, places the student in a simulated program management office environment and teaches how to do program management by having him/her progress through the life cycle of a simulated project.

The PMSS is being designed to provide the software management tool to support the simulated program management project. The PMSS can be used in the other DSMC courses in the same manner as shown in Figure 19.

PMSS TESTING SCHEDULE

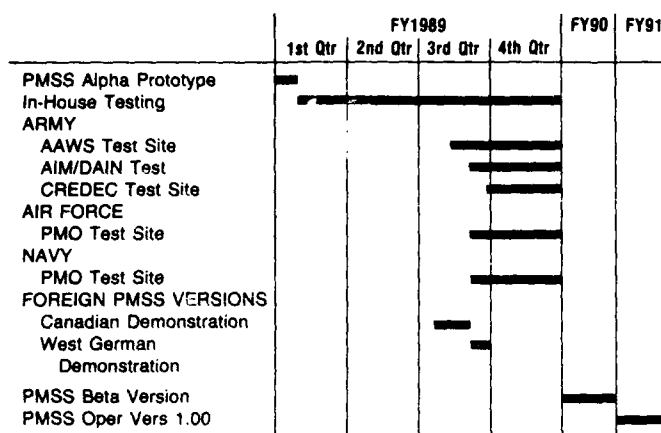


Figure 20

PMSS Testing Schedule

The PMSS testing schedule is shown in Figure 20. Modules are being developed and initial products from these developments are being delivered. Program management offices are invited to submit requirements for new, needed software support; to send requests for development of the planned modules; or to send requests for refinements of prototype or operational modules.

At the present time several modules are in distribution, several are in in-house testing and will be released for distribution shortly and others are still in development. Descriptions of these modules are included in the next portion of this overview.

The first alpha prototype of the integrated PMSS has been delivered and is undergoing in-house testing. This prototype will be used at selected program management offices in the Army, Navy and Air Force to commence field testing of the system. Refinements to the alpha version will be made during the rest of FY 89. In early FY 90, a beta-test version will be available for distribution to additional program management offices.

PMSS MODULES DESIGN

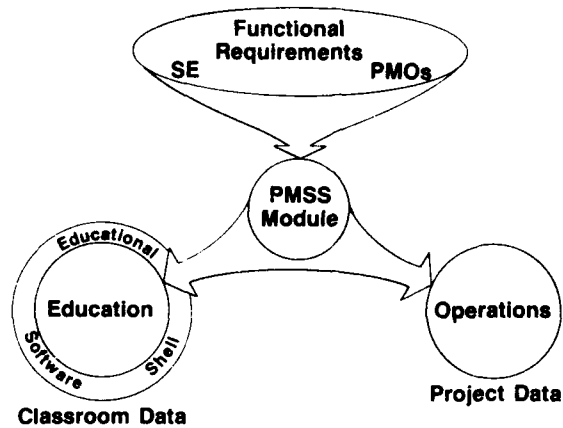


Figure 21

PMSS Modules Design

The PMSS modules, supporting various functions of the program management office, are being designed for dual usage, as shown in Figure 21. Modules will be used in educational environments at DSMC and other DOD educational institutions. Modules used for this purpose may require minor modification for teaching applications. Data appropriate to the local education environment will have to be input for use of the modules in the classroom. The other purpose for the modules is, of course, for operational use in program management offices. Here a particular program's actual data will provide the data source for operation of the PMSS.

To the maximum extent possible, the desire is that modules designed for these two purposes be alike so that as students move from the classroom to their operational assignments they will see and use the same process in a particular application. Therefore, for the design portion of PMSS module developments, requirements are gathered from the DSMC School of Systems Acquisition Education (SE) and from program management offices. Modules at this stage are called "planned."

PMSS MODULES IMPLEMENTATION

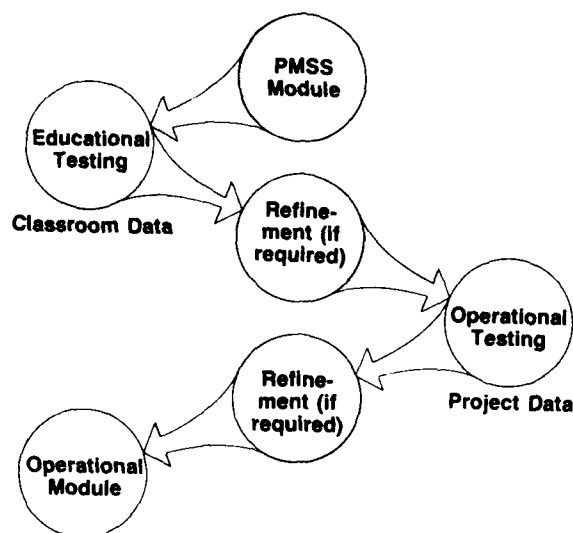


Figure 22

PMSS Modules Implementation

After development, PMSS modules undergo a substantial amount of testing before they are declared "operational." Several program management offices have volunteered to be PMSS test sites. During the development process, the contractor's progress is reviewed through progress reviews and demonstrations which are given to DSMC faculty and representatives from the program management office test sites. Comments and recommendations are fed back into the development process as shown in Figure 22.

When the module is "completed" to the prototype stage, as an initial alpha-test version, it is tested at DSMC and refinements are made, if required. Then, the module is subjected to beta-test field testing and, again, refinements are made if required.

When the module is considered operational, it is given to the Manager, DSMC Software Distribution Center, for distribution.

Further refinements/modifications still can be made, as necessary, to meet users' needs. Changes at this stage normally are funded by the requesting user.

Hence, modules are designated as in testing and distribution, in development, or planned. A summary table of the PMSS modules is contained in Table 1. More detailed descriptions of these functional modules follow Table 1.

TABLE 1

NAME OF MODULE	SHORT NAME	BRIEF PURPOSE	STAGE	EQUIPMENT	PAGE
MODULES IN TESTING AND DISTRIBUTION					
Contract Appraisal System	CAPPS	Monitor contract cost performance	Operational	IBM-PC; Z-248 Z-120	45
Cost Analysis Strategy Assessment	CASA	Conduct LCC analysis	Operational	IBM-PC; Z-248 Z-120	45
Competition Evaluation Model	CEM	Conduct production competition analysis	Operational	IBM-PC; Z-248 Z-120	46
Software Cost Estimating	SWCE	Develop cost estimate for software developments	Prototype	Z-248 ¹	47
Government Activity Tasking	GAT	Generate and monitor tasking to government activities	Prototype	IBM-PC; Z-248	48
Procurement Strategy Module	PSM	Select a procurement strategy	Prototype	IBM-PC; Z-248	48
Schedule Risk Assessment Management	SCRAM	Network development Milestone management Schedule risk assessment	Prototype	IBM-PC; Z-248	49
Executive Support System	ESS	Day-to-day administrative functions	Prototype	IBM-PC; Z-248	49
Quick Cost	QUICKCOST	Conduct quantity/cost trade-off analysis	Prototype	IBM-PC; Z-248	50
Program Office Organization and Staffing	PROS	Develop PMO organization charts, on board counts	Prototype	IBM-PC; Z-248	50
Expert System for Acquisition Strategy	ESAS	Assist in writing acquisition strategy	Prototype	Z-248	51
Procurement Document Generator	PDG	Development and maintenance of procurement documentation	Prototype	Z-248	51
Parametric Cost Estimating	PACE	Conduct parametric cost estimates	Prototype	IBM-PC; Z-248 Z-120	52
Schedule and Resource Allocation	SARA	Develop Gantt chart schedule; do resource allocation	Prototype	Z-248; Z-120	53
Automated Program Planning and Documentation Module	APPDM	Generation and monitoring of PMP; PS/P; TEMP; SEMP; ILSP; RAMP	Prototype	IBM-PC; Z-248	54

TABLE 1 (CONTINUED)

NAME OF MODULE	SHORT NAME	BRIEF PURPOSE	STAGE	EQUIPMENT	PAGE
Budget Preparation and Execution	BP&E	Develop budgets Monitor progress	Prototype	IBM-PC; Z-248	54
Venture Evaluation Review	VERT	Simulates decision environments under risk	Prototype	IBM-PC; Z-248	55
MODELS IN DEVELOPMENT					
Parametric Cost Estimating Relationships	PACER	Collection of cost estimates relating to cost factors	Prototype	IBM-PC; Z-248	55
Document Keyword Search	DOKS	First phase of document configuration control	Prototype	IBM-PC; Z-248	56
Test Issues Management Evaluation	TIME	Conduct pre-TEMP planning	Prototype	IBM-PC; Z-248	56
OTHER MODULES					
Decision Styles/Information Usage Research	DSI	Determine users' decision styles	Development	IBM-PC; Z-248	56
Project Control System	PCS	Financial control system	Prototype	IBM-PC; Z-248 ²	57
Small (or Service) Contract Cost Performance System	SCCPS	Monitor contract performance	Development	IBM-PC; Z-248	58
MODULES PLANNED					
Production Planning					
Contract Management					
SAR Generator					
Initial Spares/Replenishment Spares Planning					
Travel Management					
Administrative Management					
Checklists					
P3I Planning					

¹ Needs Symphony Version 1.1 to run; not provided with module

² Needs Lotus 1-2-3 Version 2.0 to run; not provided with module. Requires customization per site.

*IBM-PC means IBM-PC, IBM-XT, Z-150, or compatibles

*Z-248 means Z-248, IBM-AT, or compatibles

*Z-120 means Z-120 (Z-100) only

Specific availabilities will be published in DSMC Software Distribution Center Quarterly Update

DSMC Software Distribution Center

The purpose of the DSMC Software Distribution Center is to collect, catalog and distribute all software modules developed by the DSS Directorate and other organizational elements of DSMC.

The Software Distribution Center provides software modules to be used in the classrooms at DSMC and to program management offices (PMOs). The software is intended to aid in the planning, programming, execution, and monitoring of defense weapons systems programs. The PMOs, for whom the software is developed, are those in the DOD acquisition community. However, any government agency which can demonstrate a valid need for this software can receive copies. Requests should be sent to:

Defense Systems Management College
ATTN: DRI-S (Software Distribution Center)
Fort Belvoir, VA 22060-5426
(703) 780-1850 or Autovon 354-5783

The DSMC Software Distribution Center puts out an update report to keep users and potential users informed about new software modules, new versions of existing modules and any changes or announcements of interest. If you are interested in receiving these updates, please contact the address listed above.

DESCRIPTIONS OF FUNCTIONAL MODULES

Contract Appraisal System (CAPPS) Module

The basic purpose of the CAPPS module is to facilitate the use of Contractor Performance Measurement (CPM) data for management decision-making. The CAPPS is a software program, with accompanying user documentation, designed to help managers keep abreast of, and quantify, project contract status information.

The CAPPS provides an analysis of Cost Performance Report (CPR) or Cost/Schedule Status Report (CSSR) data provided by contractors, readily accommodating any work breakdown structure or functional organization associated with a particular project. The module provides performance "exception" indicators, interpretations of the data presented, and automated trend analysis. The CAPPS makes maximum use of color and graphical presentations and has such features as zoom (to show more clearly the last 6 months of data) and full explanation screens. The CAPPS includes mathematical checks on new data, key elements based on lowest work breakdown structure element, and incorporation of actual data in the explain screens. In addition, monochrome and tabular data versions are included.

The CAPPS program is operational and available in two versions, one for the IBM-PC/XT/AT, Zenith Z-248 and compatibles (Version 2.10), and one for Zenith Z-120 (Version 2.00). The IBM version will run on several compatibles but requires color graphics.

Cost Analysis Strategy Assessment Module

The Cost Analysis Strategy Assessment (CASA) module is a life cycle costing model that operates

on microcomputers. The CASA was derived from Honeywell's Total Resource and Cost Evaluation (TRACE) family of Logistics and Life-Cycle Cost (LCC) Models. The TRACE models are used only on a mainframe computer.

The CASA module can be used for a number of tasks. They include LCC estimates, trade-off analyses, repair-level analyses, production rate and quantity analyses, warranty analyses, spares provisioning, resource projections (e.g., manpower, support equipment), risk and uncertainty analyses, cost driver sensitivity analyses, reliability growth analyses, operational availability analyses, and spares optimization. With these capabilities, the CASA module can also be used in Design to Life Cycle Cost (DTLCC) studies.

The Air Force and Marine Corps have recently sponsored major enhancements to the CASA program including conversion from FORTRAN to C and a new user interface. The new CASA Version 2.00 will operate on IBM-PC/XT/AT, Zenith Z-248 and compatible microcomputers.

Competition Evaluation Model

The computerized Competition Evaluation Model (CEM) is an analytical tool to help decision-makers determine the economics of using production competition. It compares the benefits with the costs of using a competitive production strategy. The model is a mechanism for keeping track of a large number of variables and assumptions, and for performing breakeven and sensitivity analysis on those variables.

This particular model uses standard progress curve theory as a starting point for analysis. The methodology on which the model is based assumes two changes occur to an initial producer's progress curve when competition is introduced. It assumes the first change to be a downward shift in the curve due to the initial producer's price reduction when competition is introduced. It assumes the second change to be a continuing steepening

downward, or rotation, of the curve as the initial producer continues to reduce prices more than if competition had not been introduced. The model balances these positive assumptions against the expected cost of establishing production competition--the progress curve and rate penalties caused by splitting production between two or more sources.

The model is not a "crystal ball" for projecting any positive or negative aspects of production competition other than those that can be quantified. It is not a sophisticated tool for making precise statistical projections, because the existing data base on production competition is small and of uncertain validity. The model, however, provides a means to work around the data base problem by facilitating extensive sensitivity analysis. The model performs calculations based on numbers entered by the user. The model is operational and will run on the IBM PC/XT/AT, Zenith Z-248 and Zenith Z-120 series microcomputers.

Software Cost Estimating (SWCE) Module

This module is based on a model originally developed for a Navy program management office. The original module, developed as a template on LOTUS 1-2-3, is an application of the Constructive Cost Model (COCOMO) developed by B. Boehm. The DSMC SWCE module, a modification of the Navy module, was developed as a template on Symphony to improve its user friendliness. The user can enter or modify several categories of lines of code and any of 14 cost drivers with results shown in terms of estimated effort in thousands of man-hours and estimated development time in months. Two versions are available, one without graphics, and one that graphs sensitivity curves of the cost drivers and comparisons of several user developed "what if" data bases.

The SWCE module is in the prototype stage and is available. It requires Symphony Version 1.10 and should run on any system compatible with

Symphony. The graphics version requires an Enhanced Graphics Adapter.

Government Activity Tasking (GAT) Module

The GAT module can assist with the planning, budgeting and tracking of tasks assigned to government activities (as opposed to contracting) such as another service, laboratory, field activity, or another agency. Funding of such tasks is usually accomplished via a Military Interdepartmental Procurement Request (MIPR), Project Order (PO), or Work Request (WR). This module will allow correlation of tasks by funding citation, project, activity, or task.

The GAT is available, as a prototype module, and will run on an IBM-PC/XT/AT or Zenith Z-248.

Procurement Strategy Module

The Procurement Strategy Module (PSM) is designed to assist acquisition management personnel in selecting a procurement strategy that can be pursued during each phase of a specific defense system's life cycle. For example, the module provides the user with an indication of the time and cost implications of pursuing a strategy of prototyping a complete system in the concept demonstration and validation phase as opposed to just building subsystems. Likewise, the time and cost implications of using multiple sources, versus a single source in the development phase, are addressed.

The user enters specific program parameters and the module compares these with a historical data base of real program data to identify the most attractive strategies for the weapons system under development.

At the present time, the data base consists of only two categories of defense systems -- tactical missiles and electronic subsystems. The opportunity exists to expand the data base for

other types of systems. Military services and the acquisition community interested in expanding the data base into other categories (e.g., aircraft, tracked vehicles, ship systems, etc.) should contact the Director, DSS Directorate at DSMC.

The PSM operates on an IBM PC/XT/AT or Zenith Z-248 and should run on most MS-DOS based microcomputers. The program is written in FORTRAN 77 and does not require color or graphics. The module is a prototype module.

Schedule Risk Assessment Management (SCRAM) Module

This PMSS module will provide defense program management personnel with the capabilities of: 1) developing network schedules of their program activities, 2) performing schedule management functions (such as determining program status, identifying critical activities, developing work-arounds, etc.) and 3) conducting top-level schedule risk assessments. As a risk management tool, the module will provide estimates of the likelihood of achieving specified program milestones and will assist the manager in developing alternative plans that do meet program objectives. The module is intended for use directly by the manager within the program management office and will provide reports that directly support his/her decision-making.

Beta-Test Version 3.00, a prototype module, is available and will run on an IBM-PC/XT/AT or Zenith Z-248. Color graphics is required. The DSMC is not planning further development efforts on the SCRAM module as a stand-alone module. Most of the functions of SCRAM have been incorporated into the integrated PMSS. If anyone is interested in sponsoring further development/refinement of the stand-alone module, contact the Director, DSS Directorate.

Executive Support System (ESS) Module

The Executive Support System module is designed to assist managers with the day-to-day administrative type of functions such as keeping track of appointments and actions due. It contains

a calendar function, action item status, telephone and address lists with automatic dialing, and travel status. It is designed specifically for government users.

The ESS is available as a prototype and will run on an IBM-PC/XT/AT or Zenith Z-248.

QuikCost Module

The QuikCost Module is designed to respond quickly to the budget question: "What is the impact if we cut your production rate from 500/year to 300/year?" The module shows quantity/rate relationships and the impacts of stretch-outs and inflation changes. It should be used as strategies are considered for splitting buys or changing influences that will impact first unit cost and/or learning curves. It operates on the IBM-PC/XT/AT, Zenith Z-248 and compatible microcomputers, and is a prototype module. It requires a color graphics card.

Program Office Organization and Staffing (PROS) Module

The Program Office Organization and Staffing (PROS) module is being developed to assist with organization and staffing functions which always seem to be time consuming. It is designed to allow easy development of the program management office's organization chart, to enter various attributes relative to the positions within the organization, and to keep track of on-board counts. Analyses of attributes, such as turnover rates or travel trends, and results presented either through highlighted organization charts or standard graphic charts are potential future enhancements.

This prototype module will run on an IBM-PC/XT/AT or Zenith Z-248. It requires a color graphics card.

Expert Systems for Acquisition Strategies and Procurement Document Generator Modules

The ESAS and its companion module the PDG, were funded by, and developed for, an Army activity that was concerned with non-developmental items (NDI) and non-major development support equipment. The ESAS module was tailored for that application and cannot be used by program management offices in other weapons systems areas. However, it can be provided for demonstration purposes. If a reviewing office is interested in having this module generalized for other applications, contact the Director, DSS Directorate.

The ESAS is a software tool designed to assist project engineers or project managers in writing acquisition strategies. ESAS allows for the rapid development of a clear, concise, and consistent acquisition strategy. The generated acquisition strategy will assist in preparing for review committees and in executing a successful procurement.

ESAS engages the project engineer/manager in a dialogue, posing questions that must be addressed by an acquisition strategy. In all, more than 40 different topics are addressed. The questions were derived from applicable regulations, the Project Engineer's Guide, and knowledge gained through interviews with experts in the procurement process. Once the dialogue has been completed, the expert system can use the information provided by the engineer to produce a consistent acquisition strategy which can be viewed and edited on the computer's screen.

The system encourages an inexperienced project engineer to think about important issues that are often overlooked. The engineer can focus attention primarily on program issues, spending less time on the composition of a document. This allows time for extra attention to the program goals.

As an additional aid, ESAS provides expert recommendations about how to handle certain issues during the course of the dialogue.

The ESAS runs on an IBM XT/AT, Zenith Z-248, or compatibles.

The PDG is a computerized system designed to assist managers in the development and maintenance of procurement documentation. The PDG may be executed in stand-alone mode or used in conjunction with the ESAS module. The PDG environment consists of a word processor for preparing and modifying documents; a context-sensitive help module, which is on-line at all times; plus databases containing overview, help, explain, and sample text. An optional expert system interface is also included which is currently configured to support only the Expert System for Acquisition Strategies module. The PDG makes extensive use of windows, pull-down menus, and submenus to provide a clear and easy-to-use environment.

The PDG has the primary task of helping the user to write, update and otherwise maintain various procurement documents for program management personnel. PDG is used to facilitate this process as much as possible. To this end, the PDG provides the tools needed to create and maintain the following plans:

- a. Acquisition Strategy (AS)
- b. Commerce Business Daily (CBD) notices
- c. Specification/Product Description (SPEC)
- d. Statement of Work (SOW)
- e. Contract Data Requirements List (CDRL)
- f. Source Selection Plan (SSP)

The PDG is designed for use on the IBM-XT/AT or Zenith Z-248 microcomputers or compatibles.

Parametric Cost Estimating (PACE) Module

The objective of this module is to assist managers in a program management office to develop cost estimates for elements of a weapon system and the conduct of cost trade-off analyses. The user will be able to select a data base from a preloaded set for several categories of weapons systems or any other data base devised. Data base management functions such as input and change or delete will

be available, and the user can manipulate the data for analysis, forecasting and graphics. After a cost estimate has been prepared, it can be passed to the Budget Preparation and Execution module through a compatible data file.

This module is designed to run on an IBM-PC/XT/AT, Zenith Z-248 and compatibles, and the Zenith Z-120.

Schedule and Resource Allocation (SARA) Module

The Army Institute for Research in Management Information and Communications/Computer Sciences (AIRMICS) developed an Automated Program Management System (APMS) for software development managers. The initial system operated on a minicomputer with a high-resolution color microcomputer as a front end. In conjunction with DSMC, the APMS project has been expanded to provide a resource allocation and program scheduling capability and has been programmed to operate on an IBM XT with a high-resolution color monitor and special color graphics board. This program has been renamed the SARA module which is a planning tool to assist managers in the initial development of, and subsequently making changes to, a program schedule and the allocation of resources. A schedule is entered, resource categories are designated (up to 13 can be color coded), resource limitations are entered, and the program schedule is constructed in a Gantt Chart format. Resource totals are compared with limitations, category by category, and the schedule is revised, manually or by the computer as the user desires, until an optimum schedule is developed.

The SARA program for use on an IBM-XT has been prototyped, but is hardware limited due to the special color graphics board that is required to provide the resolution necessary for maximum system usefulness. The AIRMICS, in conjunction with DSMC, is currently converting SARA from FORTRAN to the C language, and optimizing it for operation on the Zenith Z-248 microcomputer.

A version of SARA, with reduced capabilities, is being developed to work on a Zenith Z-120 system.

Automated Program Planning and Documentation Module (APPDM):

The objective of this module is to develop a generic software program to assist managers in a program management office with planning activities in all appropriate elements of a defense weapon system acquisition program, and then help create the requisite documentation associated with that element's planning activity. Documentation that can be created with this program include: a Program Management Plan (PMP), Production Strategy/Plan (PS/P), Test and Evaluation Master Plan (TEMP), Systems Engineering Management Plan (SEMP), Integrated Logistics Support Plan (ILSP), and Risk Analysis and Management Plan (RAMP). The software program will aid in developing the above documents in the following ways: 1) identify, describe, schedule and provide a means to track the progress of the activities that lead to the creation of these documents and 2) provide sample documents that combine with the user's program summary data to create draft documents. These draft documents can then be easily tailored to fit a particular program's needs.

This module will run on an IBM-PC/XT/AT or Zenith Z-248.

Budget Preparation and Execution (BP&E) Module

This module provides a simulation and tracking tool to assist managers in a program management office with program budget formulation, monitoring, and decision-making. It has the capability to plan and prepare budgets, and to track the budget process and budget execution. It allows generation of a work breakdown structure and individual tasks, selection of appropriations and assignment of program element/line item numbers, assignment of performing activities, and the tying of these attributes together with cost estimates. The module contains the DOD appropriations, MILSTD-881A WBSs, a production cost function, escalation indices, and guidance and suggestions to assist with managing the budget process.

The BP&E provides the capability to view a program both from the WBS point of view and the budgetary/appropriation point of views. It also allows "What if?" exercises to assist with alternative planning and generation, and can compare obligation plans versus actuals. Various standard format reports are available.

The module is being developed to run on an IBM-PC/XT/AT, Zenith Z-248, and compatibles.

Venture Evaluation Review Techniques (VERT) Module

The VERT module is a computerized, stochastic network module designed to simulate decision environments under risk. The VERT provides the program manager with accurate risk information in all three risk parameters (time, cost, and performance) simultaneously. In addition, the network methodology of VERT provides a systematic way to analyze the various tasks required to accomplish a project or mission. An automated menu-driven editor is being developed to make inputs easy. The VERT has been down-sized to run on an IBM XT/AT or compatibles with 640K memory. An 8087 math coprocessor is recommended.

The U.S. Army Logistics Management College (ALMC), at Fort Lee, Virginia provides training on VERT in two courses. These are the Decision Risk Analysis Course (DRAC) and the Decision Risk Analysis for Logisticians (DRALOG) course. Further information can be obtained by calling ALMC commercial (804) 734-2027 or autovon 687-2027.

Parametric Cost Estimating Relationships (PACER) Module:

This module provides for collecting and documenting of Cost Estimating Relationships (CERs) and Cost Factors (CFs) to assist in the defense materiel systems life cycle cost estimating process. It is intended that this module shall be used as an element of the Parametric Cost Estimating (PACE) Module. In the future, this module and the PACE module will be integrated into one module.

This module runs on an IBM-PC/XT or a true compatible, or a Zenith Z-120.

Document Keyword Search (DOKS) Module

The Document Keyword Search module represents the first phase of the Document Configuration and Control (DOCC) module development. The DOKS provides the capability to index text files and search multiple files based on user selectable key words.

Future development will expand DOKS into a capability that will, in conjunction with the APPDM module, assist with maintaining consistency and configuration control of a program's documentation requirements. Initially the module will address the basic program planning documents that are developed in APPDM. The module will also provide a capability to assess the extent and cost of updating these documents based on changes made, or proposed, to an acquisition program.

The basic DOKS module is under development and will operate on an IBM-PC/XT/AT, Zenith Z-248, and compatibles.

Test Issues Management Evaluation (TIME) Module:

The U.S. Army is funding a software development program to develop a Test Issues Management Evaluation (TIME) module. This module will assist the manager in the identification and development of the test issues and criteria for a weapons systems program.

A prototype has been developed and is in testing at eight Army activities. The prototype module development is scheduled for completion in FY 89.

Decision Styles/Information Usage Research

The Decision Styles/Information Usage research is related to the development of the PMSS user interface. The goal is to develop more efficient and effective man-machine interfaces by determining

correlations among different types of people, tasks, and information format preferences. These correlations can then be used as a base to develop adjustable input/output features so that information is presented in an optimum format for the particular user and task.

As part of this research, a Decision Style Inventory instrument, which identifies a person's decision style, has been validated. Two additional prototype instruments, a Values Inventory and an Organization Culture, have been tested. These instruments help determine the basis for a person's decision style and the organizational factors that affect it. The Decision Style Inventory instrument is being modified to represent the DOD program management environment.

A software program is being developed for the Decision Style Inventory which allows the instrument to be taken on-screen, demographics collected, data stored, and results printed out. These instruments can be used for organizational effectiveness studies and assigning tasks. The program is designed to operate on an IBM-PC/XT/AT and Zenith Z-248.

Further research, currently unfunded, is required to complete the correlations needed. This research includes conducting controlled tests with a large number of subjects and analyzing the results.

Project Control System (PCS) Module

The Project Control System is a spreadsheet-based system designed to assist with manipulating, tracking, and presenting financial data for a program office. It contains capabilities for cost estimates and budget plans at the totals level; also, it is broken down to program management office division, appropriation, program element, and line item levels. Cost estimates are calculated in "base year" (or current year) dollars, and "then year" dollars are derived using

the inflation index. A financial plan can be produced using an appropriate weighted index resulting in 1977 "base year" dollar figures. Eleven different reports, including a financial plan, POM feeder, and several cost estimates, can be produced. The system can be used for "What if?" exercises.

The Project Control System was developed for a specific Air Force program office but could be modified for use by others. Program management offices that would be interested in "tailoring" this module for use in their offices should contact the DSS Directorate at DSMC.

Small Contract Cost Performance System (SCCPS) Module

The SCCPS module, originally sponsored by the White Sands Missile Range, is an adaptation of the Contract Appraisal System (CAPPS) module. Its adaptation was designed to provide analysis capability for service contracts, but is equally applicable for any less than major contract. The module will accept data from several elements such as overall contract, fee, material, labor, ODC's, etc. Text and graphic analysis are provided, including actual vs. planned, cumulative performance, cumulative variance trends, indices, and estimates at completion.

SCCPS is currently being tested, and requires some minor modification prior to distribution. It is designed to operate on an IBM-PC/XT/AT or Zenith Z-248 and requires a color graphics card.

IDENTIFIED FUTURE MODULES

- Production Planning
- Contract Management
- SAR Generator
- Initial Spares/Replenishment Spares Planning
- Travel Management
- Administrative Management
- Checklists
- P3I Planning

Figure 23

Identified Future Modules

As part of the PMSS development effort, an extensive analysis was conducted of the functions performed in a program management office. These functions were then reviewed, combined, sorted, and categorized to determine functions that should be included in the PMSS, and which modules would be most appropriate to perform the functions. Approximately 100 functions, such as budget preparation and cost/schedule analysis, resulted.

Although the analysis of functions is a continuous process, the modules listed in Figure 19 have been identified thus far as additional modules to be developed in the future when funding is available. Additional functions that should be included in existing modules, or in modules already under development, have been identified. In some cases, such as the SAR Generator, software developed elsewhere exists and could be integrated into PMSS with little additional effort. For the remaining functions, new module development, or modifications to other modules, will be required. If your office has an interest in these modules/functions, contact the DSS Directorate at DSMC.

In Summary

This document, with an Executive Overview and Descriptions of Functional Modules, was developed to tell you about the PMSS and give you a report on its status and future plans. Your comments and requirements are solicited.

If you have any comments, requirements or questions, please contact:

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