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FINAL SUMMARY REPORT

PROGRAM ANALYSES  
FOR THE  
S-3 WEAPON SYSTEM IMPROVEMENT PROGRAM

15 June 1978

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Prepared for  
NAVAL AIR SYSTEMS COMMAND  
DEPARTMENT OF THE NAVY  
WASHINGTON, D.C.  
under Contract N00019-77-C-0495

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by  
W. Amos

12 29p.

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ABSTRACT

ARINC Research Corporation analyzed the requirements and constraints associated with the S-3 Weapon System Improvement Program for the Naval Air Systems Command between 15 September 1977 and 15 June 1978. This report summarizes the results of the analyses.

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## CHAPTER ONE

### INTRODUCTION

#### 1.1 SCOPE

Under Contract N00019-77-C-0495 with the Naval Air Systems Command (NAVAIRSYSCOM), Washington, D.C., ARINC Research Corporation analyzed program planning requirements and development alternatives in support of the S-3 Weapon System Improvement Program (WSIP). The period of performance on this contract was 15 September 1977 through 15 June 1978.

#### 1.2 BACKGROUND

##### 1.2.1 S-3 WSIP

The S-3 WSIP is a Category I Major Defense System Acquisition Program created in response to Operational Requirement (OR) OR-0927-AS, which formally established the operational need for an S-3A Weapon System Improvement, S-3( ). The overall objective of the program is to update major avionic and weapon subsystems of the S-3A to provide improvements and additional capabilities required to perform certain sea control mission elements during the late 1980s through the 1990s.

##### 1.2.2 Contract Management

The contractual tasks were performed under the direction of the S-3 Project Manager (PMA-244). The S-3 Avionic Systems Project Officer (AIR-533DV) was designated as the Contracting Officer's Technical Representative for these tasks.

##### 1.2.3 Contract Requirements

The contract statement of work outlined the following four task assignments:

- Task 1 - Analyze Program Planning Requirements

"This task will include review and analysis of the primary requirements and constraints on the S-3 Weapon System Improvement Program. The objective is to insure that all program requirements and constraints are compatible, and identify areas where further program definition is required."



- Task 2 - Analyze Program Development Alternatives

"This task will include analysis of the individual program elements (i.e., hardware, software, aircraft installation, test and evaluation, and support) relative to the requirements and constraints documented in Task 1. Through interface with Navy and vendor activities, each program element will be evaluated to identify actual or potential problems. As required, selected problems will be analyzed to identify program alternatives and impact, in terms of cost, schedule, and technical risk."

- Task 3 - Prepare Program Status Summary

"The overall program schedule and preliminary Program Plan from Task 2 will be utilized to prepare detailed program schedules which document all significant actions which must occur, who is responsible for the actions, and budgetary implications. These schedules will be maintained for use as a management guide. As the program progresses, the Program Status Summary will document achievement (or non-achievement) of program milestones, actual and potential problem areas, and changes in the program."

- Task 4 - Provide Bi-Weekly Briefings

"Provide Bi-Weekly Briefings for PMA-244 and AIR-533DV on the S-3 Weapon System Improvement Program Status."

Specific documentation (including conclusions and recommendations) resulting from the accomplishment of the assigned tasks was provided in separate reports during the contract period. Major efforts are summarized in this report, and a complete list of data submissions is provided in Appendix A.

## CHAPTER TWO

### WORK ACCOMPLISHED

The identification, collection, and review of DoD and Navy directives and instructions pertaining to system acquisition provided the framework for performing this analysis. These documents, combined with existing S-3 program documentation (e.g., Operational Requirement, Development Proposal), were used to identify the initial program requirements and constraints. The following paragraphs discuss the activities associated with the accomplishment of each task.

#### 2.1 ANALYZE PROGRAM PLANNING REQUIREMENTS

During initial discussions with AIR-533DV, it was decided that efforts on this task should focus on identifying specific program planning requirements within the Major Defense Systems Acquisition Process that are applicable to the S-3 WSIP. Working toward that objective, we identified, collected, and reviewed pertinent DoD, SECNAV, OPNAV, NAVMAT and NAVAIR directives and instructions to determine the actions, coordination, and documentation requirements relevant to a Category I major acquisition program. The most applicable of the documents reviewed are listed in Appendix B.

The background investigation revealed general requirements for typical Category I programs, and these were tailored as specific requirements for the S-3 WSIP. The requirements center on preparation of primary documents that define the program and are subject to review and approval, at specified decision points, by various organizations within the Navy and DoD. Examples of the documents involved are: Development Proposal, Mission Element Need Statement (MENS), Navy Decision Coordinating Paper (NDCP), Decision Coordinating Paper (DCP), Test and Evaluation Master Plan (TEMP), and Integrated Logistics Support Plan (ILSP). The objective was to identify content requirements; responsibilities for preparation; coordination, review and approval requirements; and processing time required for each activity.

Principle Government entities involved in the acquisition process include: Project Manager, OPNAV Sponsors, CNO Executive Board (CEB), Department of the Navy Systems Acquisition Review Council (DNSARC), Defense Systems Acquisition Review Council (DSARC), Defense Acquisition Executive, OSD Cost Analysis Improvement Group (CAIG), and the Navy laboratories that provide support.

Additional research was performed to identify requirements in program planning and budgeting relative to the Navy Planning, Programming and Budgeting System (PPBS). Where possible, S-3 WSIP planning was adjusted to conform with the programming and budgeting cycles of the PPBS. (See Appendix A, Item 9.)

These investigations and analyses provided much of the data used in preparing the S-3 WSIP Management Plan discussed in Paragraph 2.3.

At the request of AIR-533DV, this task was expanded to include preparation of a Mission Element Need Statement for the S-3 WSIP. Research efforts were initiated, and through coordination with the OPNAV Sponsor (OP-506D), the S-3 Update Program Office at the Naval Air Development Center (NADC 1S21), and the Naval Intelligence Support Center (NISC-OOW), information required to prepare the MENS is currently being developed.

## 2.2 ANALYZE PROGRAM DEVELOPMENT ALTERNATIVES

This task was a logical extension of the previous task: the implementation of individual program elements was evaluated in relation to the requirements and constraints identified in Task 1. We participated in the review process for the S-3 WSIP Development Proposal and in the preparation of program overview and development schedules.

Our review of the DP was focused on the appendixes for Reliability, Maintainability, T&E, and ILS. In addition, NAVAIRSYSCOM comments were cross-referenced to the DP for amplification of detail, correlated by topic, and summarized for use by PMA-244, AIR-533DV, and NADC in revising the document. (See Appendix A, Items 7, 16, and 27.)

On the basis of the results of Task 1, information available in OR-0927-AS, and the description of equipment alternatives contained in the DP, program overview and development schedules (see Appendix A, Items 3 and 4) were prepared for the improvement program. The overview schedule (Figure 2-1) identifies the major events in the program from inception through the initial outfitting date. The development schedule (Figure 2-2) depicts in more detail the near-term actions required and identifies the funding required to accomplish them.

These schedules were included in the S-3 WSIP Management Plan to provide a time reference for the activities described and were also provided to NADC for use in the DP. Program activities were monitored, and periodic updates of the schedules to reflect program progress were submitted. (See Appendix A, Items 15, 18, 21, and 23.)

At the request of PMA-244, and in coordination with NADC, an alternate overview schedule (Figure 2-3) was developed to consider the effects of completing the S-3 WSIP in two phases. The phased modification schedule was then compared to the baseline schedule (see Figure 2-1) in order to evaluate the effect on aircraft downtime and the planned program in general. (See Appendix A, Item 28.)



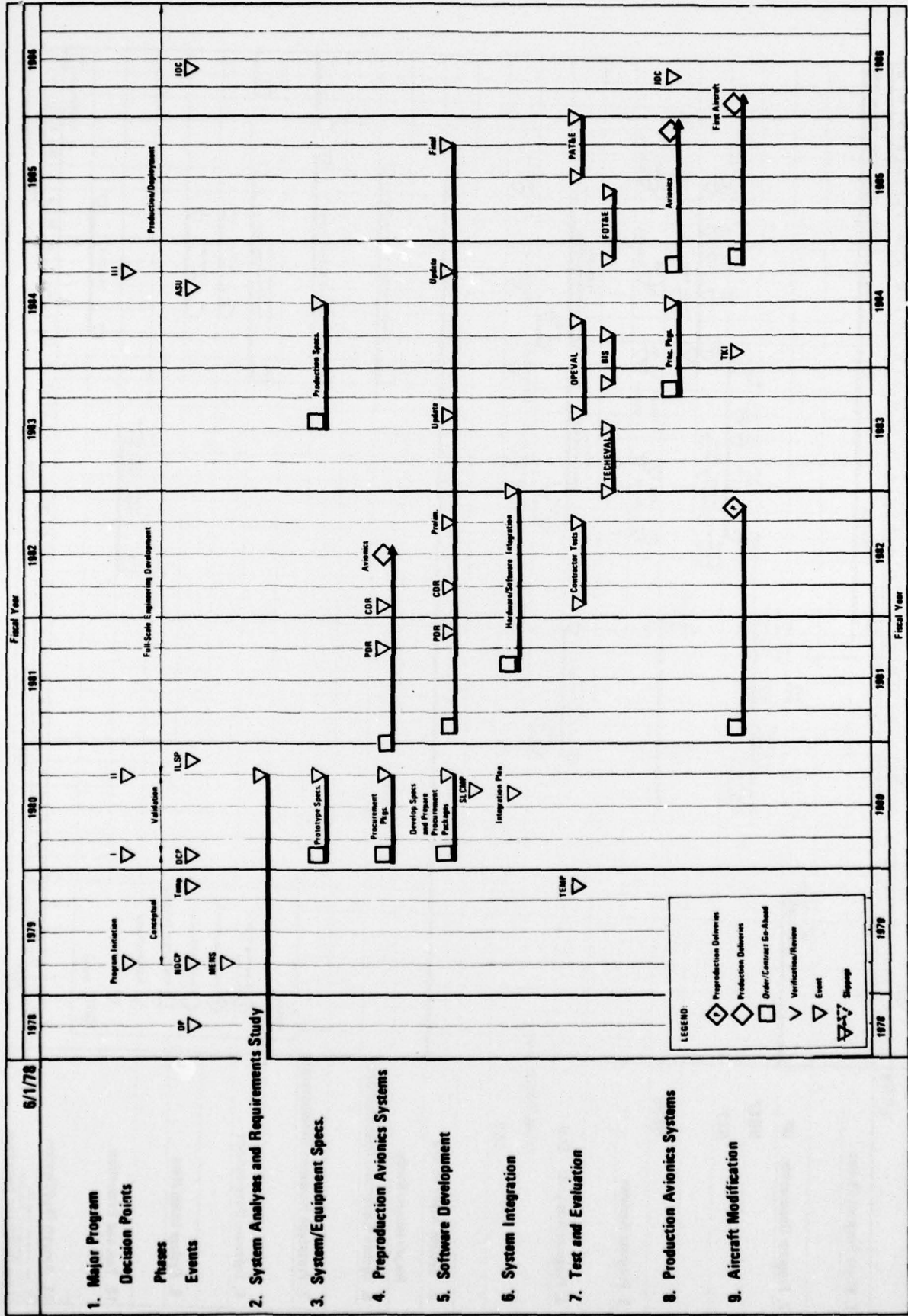


Figure 2-1. S-3 WSIP - PROGRAM OVERVIEW



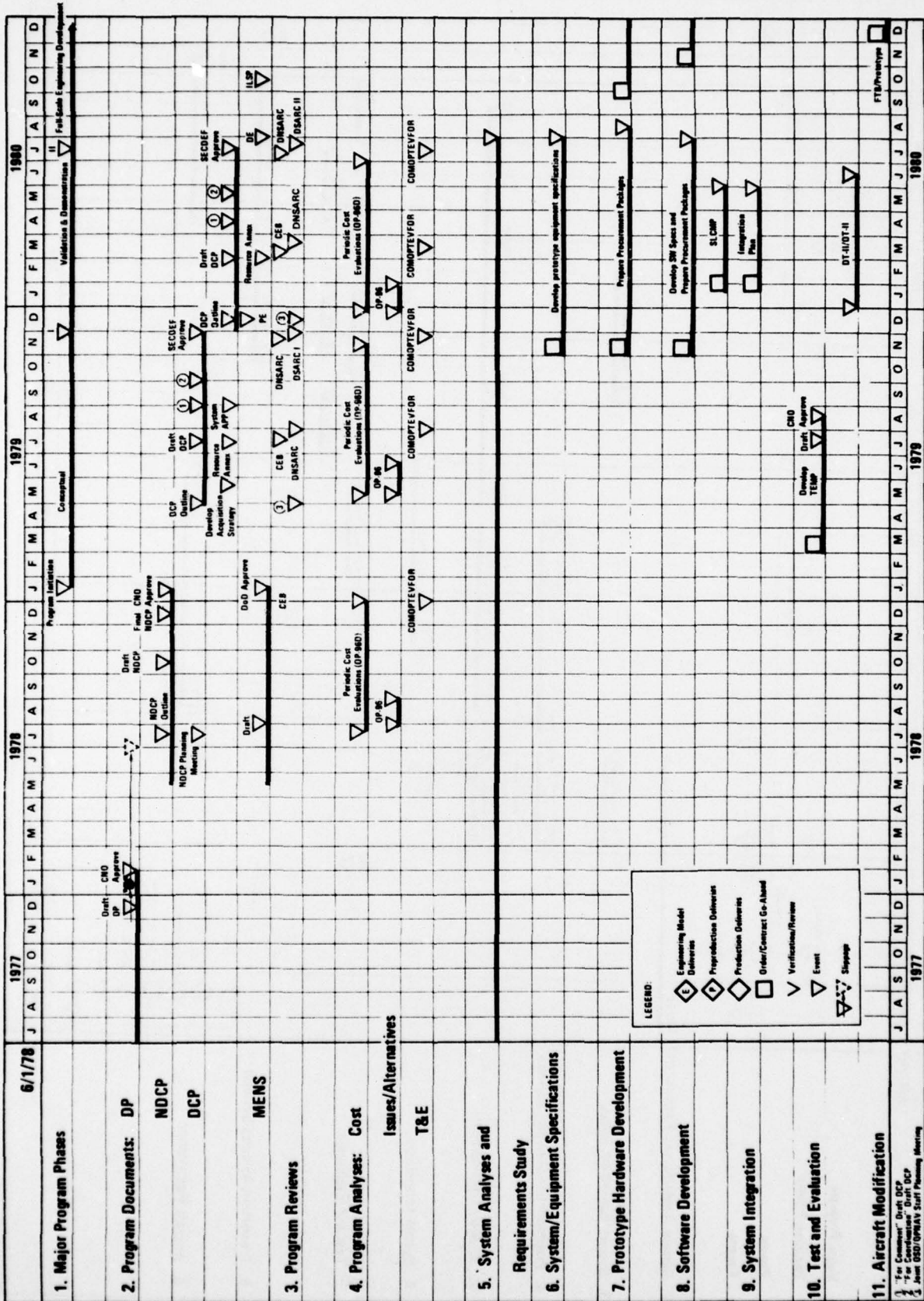


Figure 2-2. S-3( ) DEVELOPMENT SCHEDULE

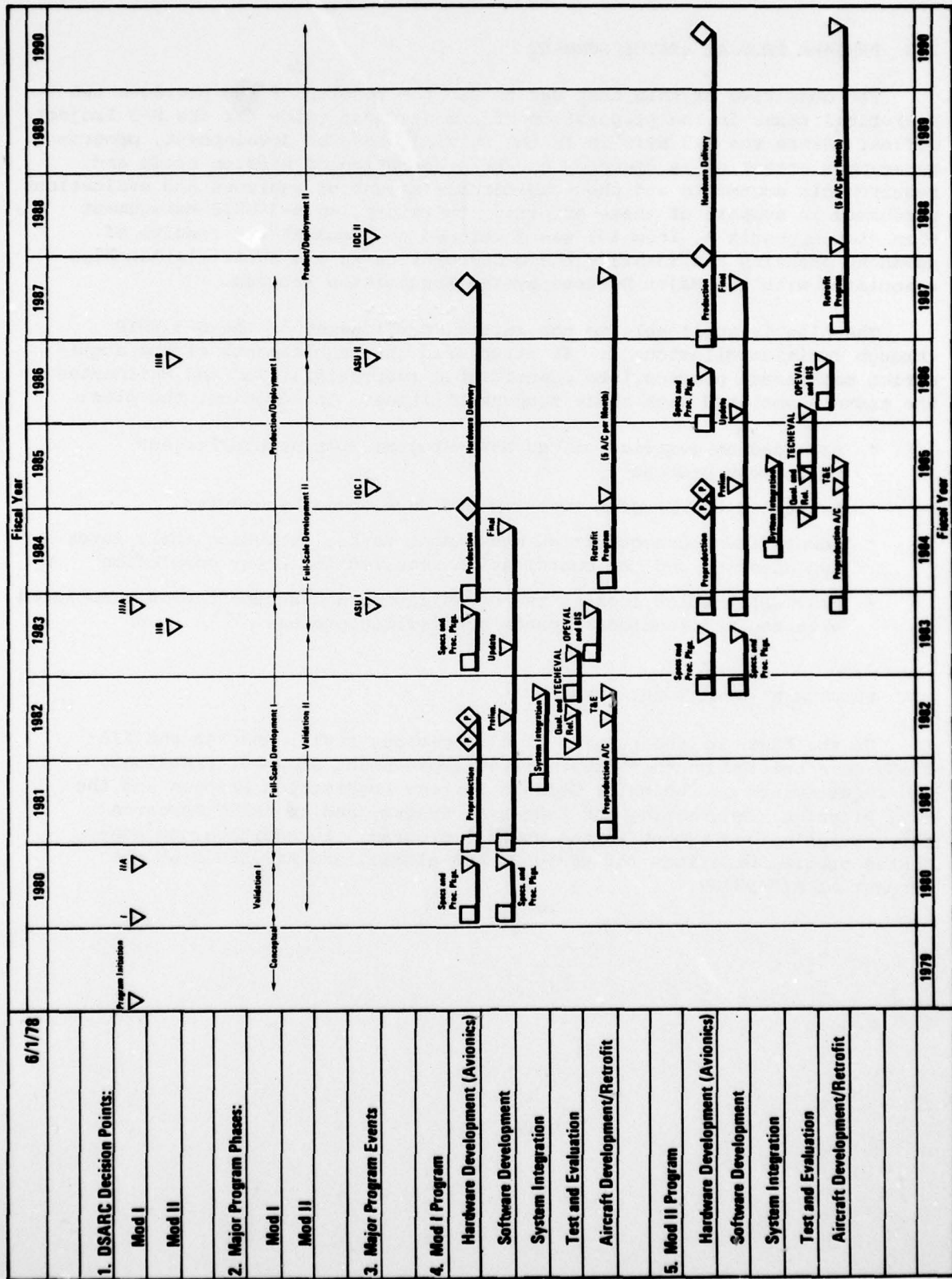


Figure 2-3. WSIP-PHASED MOD PROGRAM OVERVIEW

### 2.3 PREPARE PROGRAM STATUS SUMMARY

The objective of this task was to use the results of the previous two analytical tasks in the preparation of a management guide for the S-3 Project Office. Since the S-3 WSIP is in the initial phase of development, program management attention is centered on the preparation of mission needs and requirements documents and the considerable amount of analyses and evaluations performed in support of these efforts. Therefore, an S-3 WSIP Management Plan (see Appendix A, Item 10) was developed to document the results of advanced planning and identify the management tasks and interrelationships associated with the Major Defense System Acquisition Process.

The plan is applicable to the initial development of the S-3 WSIP through decision Milestone I. It structured the requirements of the acquisition management process into identifiable responsibilities and delineated the tasks associated with these responsibilities. In addition, the plan:

- Provided an overview of the Navy Program Sponsorship/Project Management process
- Presented the program overview and development schedules
- Identified the acquisition management tasks, including their interdependencies and the coordination required for their completion
- Provided a quick look at the organization and documentation associated with the major defense system acquisition process

### 2.4 PROVIDE BI-WEEKLY BRIEFINGS

On the basis of the results of all previous tasks, PMA-244 and AIR-533DV were briefed on the status of the improvement program, functions, and requirements of the Major Defense Systems Acquisition Process and the Navy Planning, Programming and Budgeting System, and on ARINC Research Corporation's involvement in the overall program. In addition, we conducted program briefings for OP-506D, AIR-4101B1, and AIR-5102K at the request of AIR-533DV.



APPENDIX A

DATA SUBMISSIONS

Table A-1 lists all data submissions made during this contract period.



Table A-1. DATA SUBMISSIONS

Title	Submitted To	How Submitted	Date
1. S-3( ) Weapon System Improvement Program Brief (C)	AIR-533D4V	Briefing	10/11/77
2. S-3( ) Electronic Warfare Systems Brief (C)	AIR-533D4V	Briefing	11/1/77
3. S-3( ) Weapon System Improvement Program Overview Schedule	AIR-533D4V NADC (J. McFadden)	Handcarried Telephone	11/1/77
4. Baseline S-3( ) Weapon System Improvement Program Schedule	AIR-533D4V NADC (J. McFadden)	Handcarried Handcarried	11/8/77 11/8/77
5. Draft DNSARC/DSARC Task Flow Diagram	AIR-533D4V NADC (J. McFadden)	Handcarried Handcarried	11/8/77 11/8/77
6. Bi-Monthly Progress Report	PMA-244/AIR-533D4V	Letter ASG/OSP/A&V-77-123	11/11/77
7. Review of S-3( ) Development Proposal, Appendix H, Reliability and Maintainability	AIR-533D4V	Letter ASG/OSP/A&V-77-124	11/17/77
8. A Review of the Major Systems Acquisition Process	PMA-244/OP-506D/ AIR-533D4V	Briefing	11/18/77
9. Development Plans for the S-3( ) Weapon System Improvement Program (WSIP)	PMA-244/OP-506D/ AIR-533D4V	Letter ASG/OSP/A&V-77-132	12/9/77
10. Transmittal of Program Status Report (CDRL Item A001)	PMA-244/AIR-533D4V	Letter ASG/OSP/A&V-77-133	12/15/77
11. Preliminary S-3( ) Weapon System Improvement Program Management Plan	NADC (J. McFadden)	Letter ASG/OSP/A&V-78-300	1/5/78
12. Preliminary S-3( ) Weapon System Improvement Program Management Plan	OP-506D	Handcarried	1/9/78

(continued)

Table A-1. (continued)

Title	Submitted To	How Submitted	Date
13. Bi-Monthly Progress Report	PMA-244/AIR-533DV	Letter ASG/OSP/A&V-78-301	1/13/78
14. S-3 WSIP Planning Activities	AIR-533DV	Briefing	2/10/78
15. S-3 Weapon System Improvement Program Plan (Update)	PMA-244/OP-506D/ AIR-533DV/NADC (J. McFadden)	Letter ASG/OSP/A&V-78-307	2/22/78
16. S-3 WSIP Development Proposal Comments Summary	AIR-533DV	Handcarried	2/10/78
17. S-3 WSIP Phased Mod Downtime Impact	PMA-244/AIR-533DV	Briefing	3/10/78
18. S-3 Weapon System Improvement Program Plan (Update)	PMA-244/AIR-533DV	Letter ASG/OSP/A&V-78-310	3/10/78
19. Network Logic Flow Applications	AIR-533DV	Briefing	3/10/78
20. Bi-Monthly Progress Report	PMA-244/AIR-533DV	Letter ASG/OSP/A&V-78-311	3/14/78
21. S-3 Weapon System Improvement Program Plan (Update)	PMA-244/OP-506D/ AIR-533DV/NADC (J. McFadden)	Letter ASWG/OSP/ A&V-78-319	4/13/78
22. RDT&E Threat Support Request (draft)	OP-506D	Handcarried	4/14/78
23. S-3 ( ) Development Proposal Review Comments by AIR-4101B1	PMA-244/AIR-533DV/ AIR-4101B1	Letter ASWG/OSP/ AIR-4101B1	4/26/78
24. S-3 WSIP Phased Mod Development Plan (draft)	PMA-244/AIR-533DV/ NADC (J. McFadden)	Handcarried Telefax	4/28/78 4/28/78
25. S-3 Weapon System Improvement Program Plan	PMA-244/OP-506D/ AIR-533DV/AIR-4101B1/AIR-5102K	Letter ASWG/OSP/A&V-78-325	5/3/78

(continued)

Table A-1. (continued)

Title	Submitted To	How Submitted	Date
26. Bi-Monthly Progress Report	PMA-244/AIR-533DV	Letter ASWG/OSP/A&V-78-326	5/5/78
27. S-3( ) Development Proposal Review Comments by AIR-4101B1	PMA-244/AIR-533DV/ AIR-4101B1	Letter ASWG/OSP/A&V-78-334	6/1/78
28. S-3 WSIP - Phased Mod Program Overview	PMA-244/OP-506D/ AIR-533DV/NADC Code 1S21	Letter ASWG/OSP/A&V-78-336	6/1/78
29. Special Site Requirements (NADC)	PMA-244/AIR-533DV/ AIR-4101B1	Handcarried	6/2/78



APPENDIX B

REFERENCE DOCUMENTS

Table B-1 provides a summary of the DoD and Navy policy and guidance documents most applicable to this initial phase of the S-3 WSIP.

Table B-1. REFERENCE DOCUMENTS			
Reference Number	Date	Subject	
DoDD 5000.1	1/18/77	Major System Acquisitions	
DoDD 5000.2	1/18/77	Major System Acquisitions Process	
DoDD 5000.3	1/19/73	Test and Evaluation	
DoDD 5000.4	6/13/73	OSD Cost Analysis Improvement Group	
DoDD 5000.26	1/21/75	Defense System Acquisition Review Council (DSARC)	
DoDD 5000.28	5/23/75	Design to Cost	
DoDD 5000.30	8/20/76	Defense Acquisition Executive	
DoDD 7000.3	9/23/75	Selected Acquisition Reports	
SECNAVINST 5000.1	3/13/72	System Acquisition in the Department of the Navy	
SECNAVINST 5200.30	8/27/75	Management of DCPs and PMs within the Department of the Navy	
SECNAVINST 5420.172B	5/18/76	Establishment of the Department of the Navy Systems Acquisition Review Council (DNSARC)	
OPNAV 90P-1D	3/29/77	Department of the Navy Programming Manual, Change 23	
OPNAVINST 3960.10	10/22/75	Test and Evaluation	
OPNAVINST 5000.41B	3/30/74	Pre-Defense Systems Acquisition Review Council (DSARC) Procedures	
OPNAVINST 5000.42A	3/3/76	Weapon System Selection and Planning	

(continued)



Table B-1. (continued)

Reference Number	Date	Subject
OPNAVINST 5000.46	3/10/76	Preparation and Processing of DCPs, PMS, and NDCPs
OPNAVINST 5420.70	4/2/71	Mission, Organization and Functions of the Board of Inspection and Survey
NAVMATINST 3960.6A	5/3/75	Test and Evaluation
NAVMATINST 5000.18A	3/12/74	Headquarters NMC Participation Relative to DSARC
NAVMATINST 5000.22A	7/14/77	Weapon System Selection and Planning
NAVMATINST 5000.23	3/20/75	Defense System Acquisition Review Council (DSARC)
NAVAIRINST 3910.11	8/15/75	Procedures for Submission of Development Proposals and DD Form 1634, Research and Development Planning Summary
NAVAIRINST 4355.12	6/22/72	Board of Inspection and Survey Service Acceptance Trials and Inspections of Aircraft
NAVAIRINST 5000.8	12/2/71	Project Management/Coordination in the Naval Air Systems Command Headquarters
NAVAIRINST 7044.1	12/17/68	Scope of Research, Development, Test and Evaluation, Navy (RDT&EN) Appropriation