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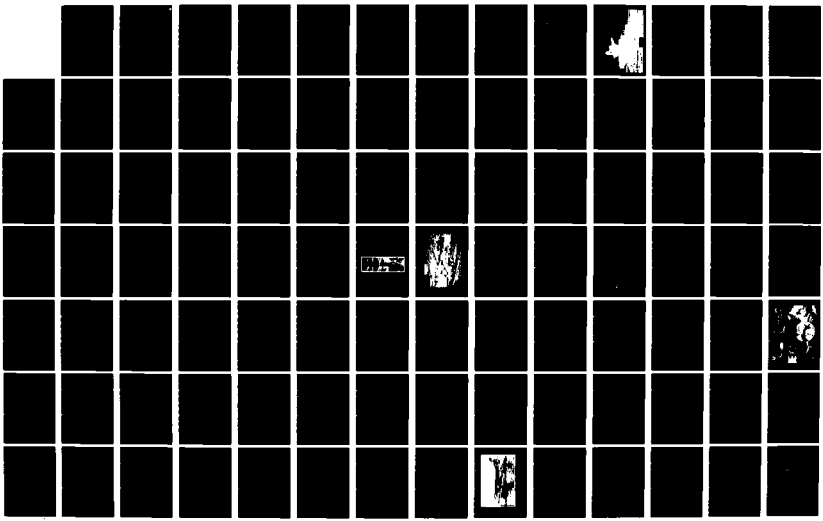

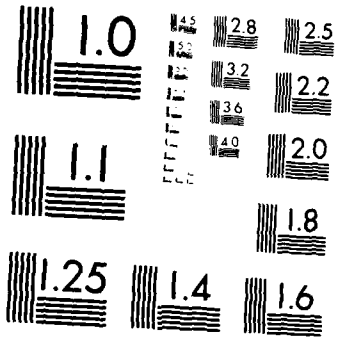

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Defense Systems Management College
Fort Belvoir, Virginia

Evaluation of the Effectiveness of the Defense Systems Acquisition Review Council (DSARC)

Volume II, Part 2: Appendices J through R

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April 1983

Prepared for the
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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER

2. GOVT ACCESSION NO. AD A127 297

3. RECIPIENT'S CATALOG NUMBER

4. TITLE (and Subtitle)
EVALUATION OF THE EFFECTIVENESS OF THE DEFENSE SYSTEM ACQUISITION REVIEW COUNCIL (DSARC)
~~Volume~~ I: ~~Technical Report~~
Volume II: Appendices, Part 2

5. TYPE OF REPORT & PERIOD COVERED
Final Report 1969-1982

6. PERFORMING ORG. REPORT NUMBER
ISI Report No. V-3824-03

7. AUTHOR(s)
DSMC Project Officer: David D. Acker

8. CONTRACT OR GRANT NUMBER(s)
MDA 903-82-G-0053
D.O. 0001

9. PERFORMING ORGANIZATION NAME AND ADDRESS
Information Spectrum, Inc.
1745 S. Jefferson Davis Highway
Arlington, VA 22202

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS

11. CONTROLLING OFFICE NAME AND ADDRESS
Department of Research and Information
Defense Systems Management College (DSMC)
Fort Belvoir, Virginia 22060

12. REPORT DATE
April 4, 1983

13. NUMBER OF PAGES
649

14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)

15. SECURITY CLASS. (of this report)

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for Public Release; Distribution Unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DSARC: DRB: DAE, Defense System Acquisition Review Council; Defense Resources Board; Defense Acquisition Executive; DODD 5000.1; DODI 5000.2; DODD 5000.26; DODD 5000.30; A-10; F-16; ALCM, GLCM, NAVSTAR (GPS); UH-60; FVS: Roland; Copperhead; SOTAS: AV-8B; LAMPS MK III; Trident; FFG; Harpoon TACTAS

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The objective of this study was to evaluate the Defense System Acquisition Review Council (DSARC) process since its inception and to assess, in a qualitative sense, the degree to which the process has proved to be effective and efficient. The study focused on both the process and the supporting procedures from the standpoint of specific programs.

Although the basic process has remained relatively constant during the 14 years since it was conceived, the procedures have undergone a continual maturation,

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Changes in the political leadership, various study activities, and the emergence of additional functional management techniques have all contributed to the evolving nature of the DOD Directives and Instructions on Systems Acquisition Management, the DSARC, and the DCP. Within this changing environment, approximately 160 defense acquisition programs were subjected to varying levels of DSARC involvement.

The fundamental question answered in this report was whether experience has shown that DSARC reviews are still the most effective way to manage the transition of a defense system program from one program phase to the next. The experience data base for this study was a fact-finding investigation of 16 programs and interviews with individuals with current and prior defense acquisition management experience.

Based on the observations from the programs studied and information gained in the literature survey, it was concluded that:

- The DSARC process is effective
- The DSARC process/procedures are not efficient
- The DSARC and DRB functional responsibilities should remain organizationally separated.

The sutdy results show that the basic control mechanism envisioned when the DSARC was established are still operative, but the process has been hampered in its performance.

The recommendations made as a result of this study are based on the precept that the DSARC review preparation time can be reduced and less burden placed on the program manager if there is senior management commitment to the process, planning is focused, and all parties have retained a moderate degree of currency on the designated DSARC programs.

Defense Systems Management College
Fort Belvoir, Virginia

Evaluation of the Effectiveness of the Defense Systems Acquisition Review Council (DSARC)

Volume II, Part 2: Appendices J through R

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April 1983

Prepared for the
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VOLUME II, Part 2: Evaluation of the Effectiveness of the Defense System Acquisition Review Council (DSARC) - Appendices

J - ROLAND Program Study Report

K - Copperhead Program Study Report

L - SOTAS Program Study Report

M - AV-8B Program Study Report

N - LAMPS Program Study Report

O - TRIDENT Program Study Report

P - FFG Program Study Report

Q - HARPOON Program Study Report

R - TACTAS Program Study Report

APPENDIX J

ROLAND
PROGRAM STUDY REPORT

I. SYSTEM DESCRIPTION

ROLAND is an European-designed All Weather Short Range Air Defense System (AW-SHORADS) that is now in production in the United States, France, and Germany. The ROLAND fire unit is a self-contained module consisting of a surveillance radar, a track radar, an Identification Friend or Foe (IFF) unit, a computer, an optical sight, two automatic reload launchers, and two storage magazines (see Figure J1). Ten missiles are carried on the fire unit: two on launchers ready for firing, and eight in the magazines for automatic reloading. Originally scheduled to be mounted on the X975 tracked vehicle (derivative of the M109 155mm Howitzer carriage), ROLAND fire units are now planned for mounting on a 5-ton truck as shown in Figure J2. The fire unit module can be operated from the carrier vehicle or be dismounted and provide an air defense capability independent of the carrier vehicle. The fire unit modules (palletized) can be airlifted by CH-47D and CH-53E helicopters and are air transportable by C-130 (intra-theater) an C-141 (inter-theater).

The US ROLAND missile is command-to-line-of-sight guided. It employs boost-sustain operations, both contact and proximity fuzing, and a 13.2lb. multiple line focused fragment warhead. The missile is packaged as a round of ammunition and is fired from its launch tube (wooden round concept).

US ROLAND can provide low altitude air defense in the Army Corps or Division areas. It is capable of either mobile operation with search on-the-move capability or stationary defense of fixed assets. Original plans for production of 194 fire units for four corps ROLAND battalions have been systematically reduced so that current procurement calls for one battalion of 27 fire units to be used in support of the Rapid Deployment Force.

The maintenance concept consists of three levels of field maintenance equipment: Built-in-Test Equipment (BITE) used to perform operator maintenance; Organizational Maintenance Test Set (OMTS) used to perform organizational maintenance and to provide contact team maintenance support, and; Field Maintenance Test Set (FMTS) for direct support maintenance. System items not repairable at one of these levels will be evacuated to depot for repair.

Because ROLAND was a foreign developed system (France and Germany), schedule and technical risks associated with the clear weather version were considered to be moderate -- the problems would be solved before the U.S. was ready to produce the system. However, development of the track radar for the all-weather version ROLAND II (US ROLAND) had a higher technical risk.

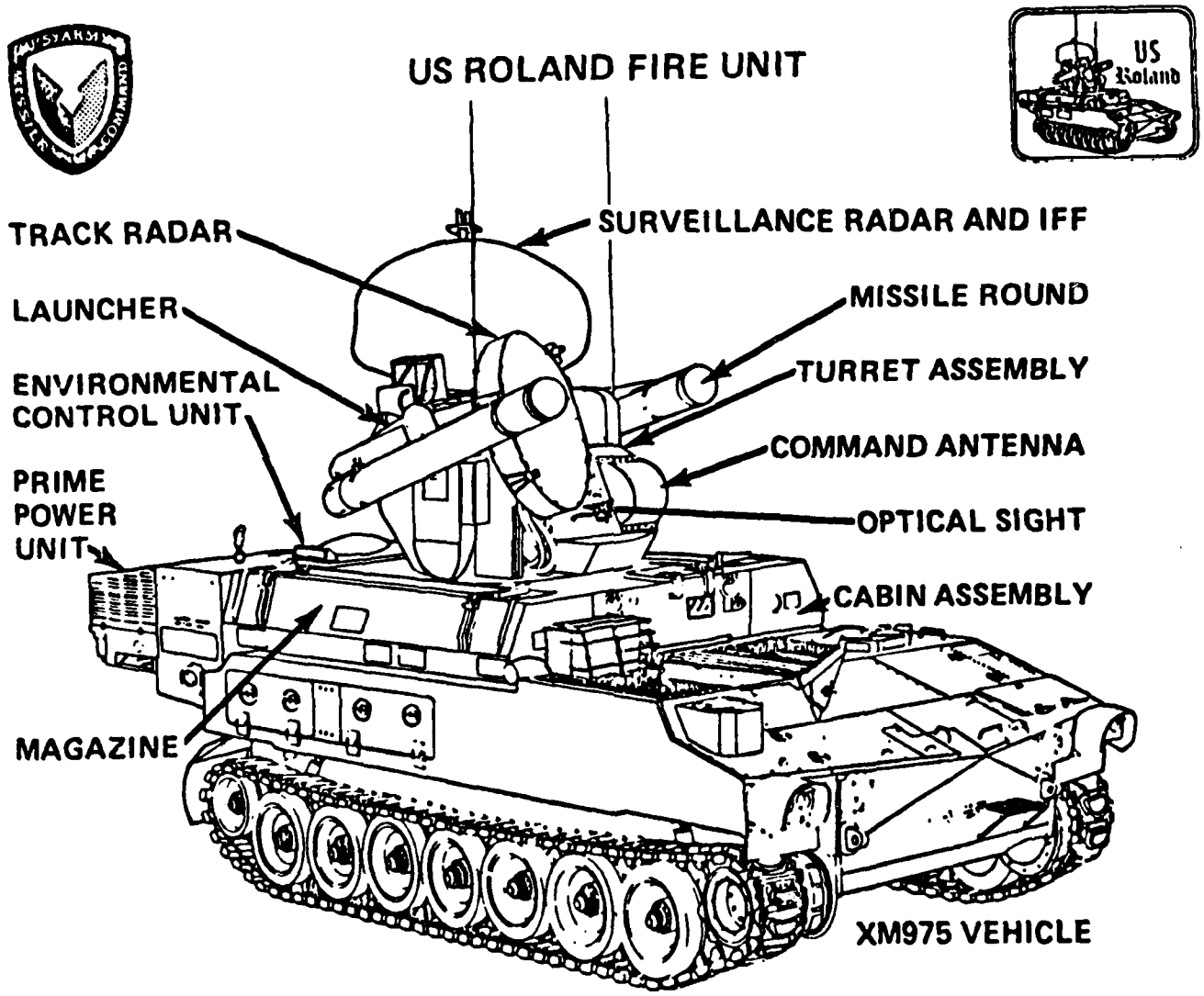
US ROLAND FIRE UNIT
US Roland
TRACK RADAR
SURVEILLANCE RADAR AND IFF
LAUNCHER
MISSILE ROUND
ENVIRONMENTAL CONTROL UNIT
TURRET ASSEMBLY
COMMAND ANTENNA
PRIME POWER UNIT
OPTICAL SIGHT
CABIN ASSEMBLY
MAGAZINE
XM975 VEHICLE

FIGURE J-1

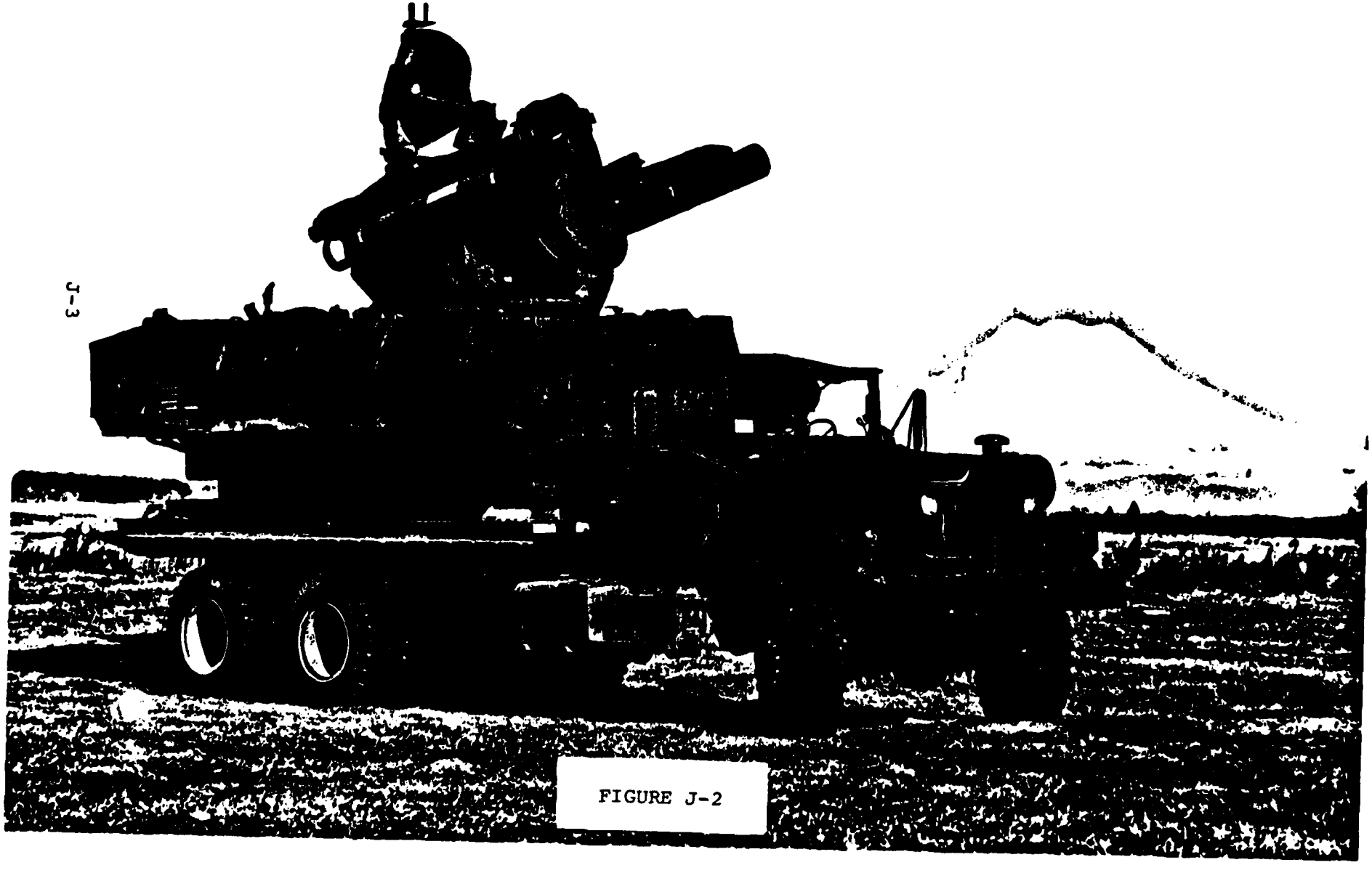

FIGURE J-2

II. PROGRAM SUMMARY

A. Background

The US ROLAND program evolved from earlier attempts to develop an All-Weather, Short Range Air Defense capability (AW-SHORAD).[1] Upon termination of the MAULER program, the European nations, still convinced that a valid requirement existed, began development of their own capability. The British RAPIER program was accelerated, the Union of South Africa began development of the CROTALE system, and the French and German governments agreed to jointly develop ROLAND.

In the U.S., upon the termination of MAULER, the CHAPARRAL, a clear-day-only system, became the Army's crew served, low-altitude air defense missile system. The first unit was activated in May 1969. Meanwhile, effort on the AW-SHORAD technology virtually ceased. A 1969 Request for Proposal for a new SHORADS concept resulted in no new technology predictions from U.S. industry.

During the period from June 1971 through April 1973, the U.S. Army evaluated RAPIER and ROLAND and found that each system generally satisfied the Army's AW-SHORAD requirements.

In March 1973, a special study group was formed by the Army to resolve difficulties with an earlier study and verify or refute the need for an AW-SHORAD system. The study, completed in August 1973 and subsequently approved by DA, found that an AW requirement existed in the Army Corps area (the division role was later added following a 1975 air defense study).

Anticipating the possible need for the U.S. procurement of a foreign air defense system, the Commanding General (CG) of the U.S. Army Missile Command (MICOM) directed the formulation of a MICOM AW-SHORAD System Procurement Task Force in August 1973.[2] In September, DA directed the formation of a DA AW-SHORAD System Task Force to prepare a Required Operational Capability (ROC) and a Development Concept Paper (DCP). The ROC was approved by DA on November 13, 1973. The SHORADS Management Office (Provisional) was established at MICOM on December 7, 1973. On February 5, 1974, the office was redesignated as the Office of the Project Manager, SHORADS. On the same day, the DCP was presented to the

---

[1] The MAULER Program was terminated on July 19, 1965, by the Secretary of Defense after 8 years of effort due to "requirements growth".

[2] It was becoming apparent that pressure was building for a foreign system procurement.

DSARC I/II. The DCP was approved on April 23, 1974.[3]

The RFP was released on July 26, 1974, to 21 sources. Proposals were received from four contractors on September 12, 1974, each proposing a different system:

- o Hughes Aircraft Company (ROLAND II)
- o Philco-Ford (AW-CHAPARRAL)
- o Rockwell International (CROTALE)
- o United Aircraft (RAPIER)

Source selection activities continued through December 1974, followed by an OSD review and Secretary of Defense approval on January 8, 1975, of the ROLAND II system selection. The contract was awarded on January 9, 1975.

On July 7, 1975, the SHORADS name was officially changed to U.S. ROLAND by the U.S. ROLAND Project Office Charter.

B. US ROLAND Program

Acquisition strategy for U.S. ROLAND is shown in Figure J3. The U.S. ROLAND Project contracted in January 1975 for a 64 month $226M Technology Transfer, Fabrication, and Test (TTF&T) Phase which would lead to an ASARC/DSARC III production decision. The strategy was influenced by the high level of interest and visibility of the program. It presented the Army's first attempt (and only the second attempt in DoD -- the U.S. Navy had an unsuccessful experience with a Swiss radar) to transfer the technology of a major sophisticated weapon system from Europe to the U.S..

Identified program costs consisted of the TTF&T Phase (R&D) costs and Produce-to-Unit-Production-Costs (PTUPC). The TTF&T cost was negotiated at $226M, a figure that was not accepted by Congress or OSD and ultimately underwent many changes, resulting in a May 1975 contract modification for a 54 month/$177M TTF&T Phase. The PTUPC was not directed by the ASARC/DSARC process but the project office predicted a cost of $6.084M per fire unit in FY75$.

Figure J4 presents a chronology of the events leading to the initiation of the US ROLAND TTF&T Phase.

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[3]The delay between the February 5 DSARC I/II and the April 23 DCP approval is explained later.

[4]Source: U.S. ROLAND Project Office Historical Report, Vol. II, December 1, 1976.

US ROLAND
ACQUISITION SCHEDULE - 1975

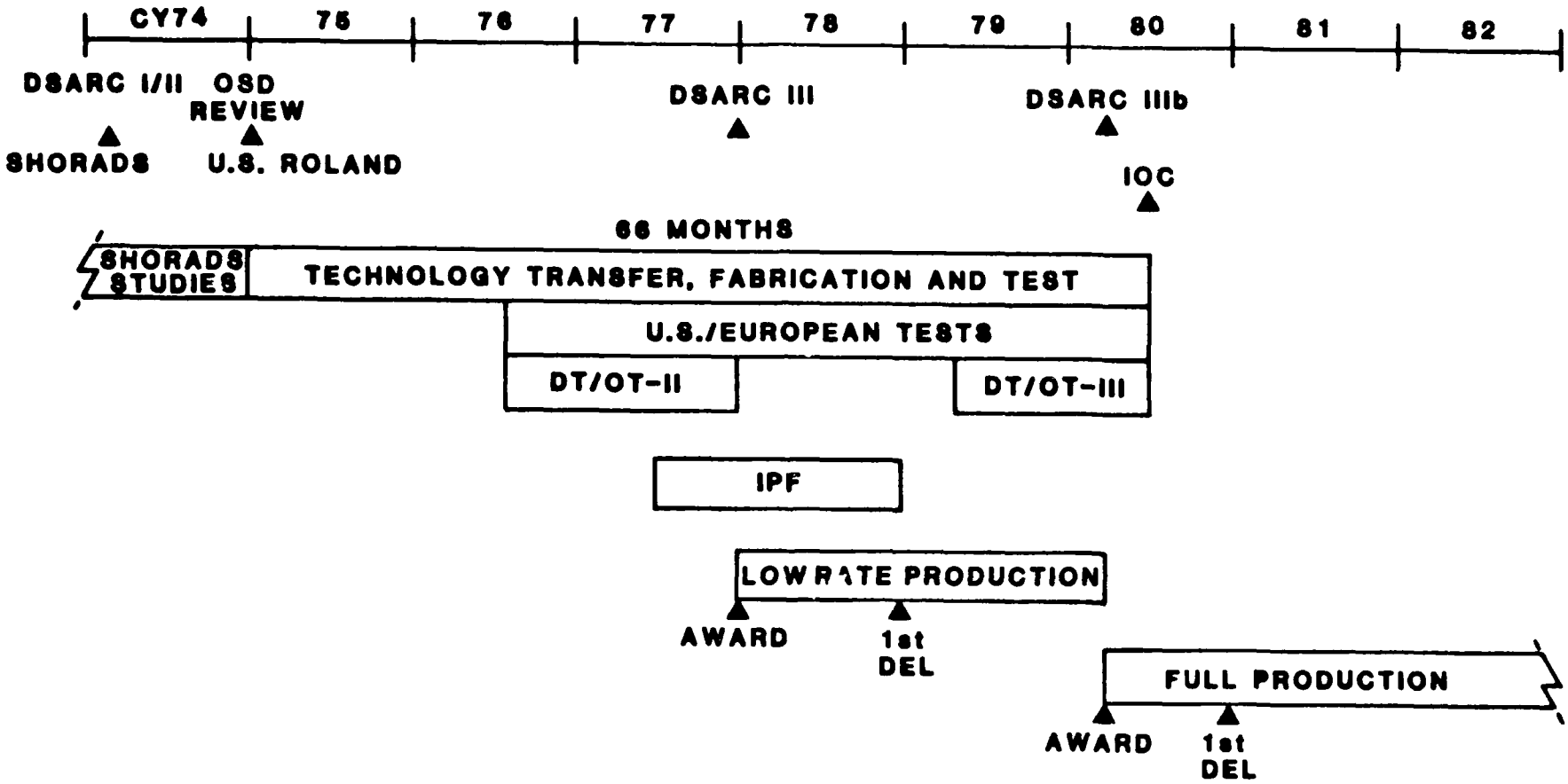

FIGURE J-3

YEAR	MONTH	EVENTS
1973	MARCH	SHORADS Study Group Formed
	AUGUST	MICOM AW-SHORADS System Procurement Task Force Established
		SHORADS Study Group identified the requirement for an AW capability at corps.
	SEPTEMBER	DA AW-SHORAD System Task Force formed
	NOVEMBER	ROC approved by DA DCP presented to ASARC I/II
	DECEMBER	SHORADS Management Office (Provisional) formed at MICOM
1974	FEBRUARY	DCP presented to DSARC I/II Office of Project Manager SHORADS formed
	APRIL	SecDef approved DCP and release of RFP
	JULY	RFP released
	SEP-DEC	Proposals evaluated
1975	JANUARY	US ROLAND selected SecDef approved selection Contract award to Hughes, 64 months, $226M

FIGURE J4
Pre-U.S. ROLAND Events

III. PROGRAM EVOLUTION

A. ASARC/DSARC I/II - Program Initiation

The ASARC I/II was held on November 16, 1973, to decide if the Army should recommend to the DSARC that, for the defense of the Corps area, an all-weather SHORADS system be introduced into development. Discussion included variations in the degree of maturity of the foreign candidate systems; the duration of LRIP based on the time required to include all the engineering fixes in the production package; the utility of DT/OT II in view of the fact that the foreign produced hardware had already undergone extensive engineering tests overseas and, in addition, had also been tested in the US; recognition of the pressures for presenting a shorter program; and finally, affordability. At the completion of the discussion, the Chairman and the Under Secretary of the Army concluded that, for the Corps area air defense, the Army would investigate the acquisition of an all-weather SHORAD missile system through formal solicitation of U.S. licensees for three foreign systems, without preclusion of U.S. industry bidding, utilizing an "on shore" development and production program in which DT/OT II is accomplished on U.S. produced hardware. Also, changes to the foreign produced system would be limited to those absolutely necessary in order to meet user imposed requirements, and the test program would be structured to permit concurrent and joint testing. The ASARC I/II attendance list is shown in Figure J5. A later, reduced membership meeting was held to consider PM proposed schedule options as requested by the ASARC Chairman.

The DSARC I/II was held on February 5, 1974, to review the SHORAD DCP #95. The DSARC attendees are listed in Figure J6.

On April 23, 1974, the DepSecDef advised the Secretary of the Army of his approval of Alternative III in the SHORAD DCP No. 95, Revision A, and release of the RFP. His guidance to the Army included requirements that costs (both TTF&T and production) should be a major criterion in source selection and that a plan for participation in a cooperative test effort should be presented at the next OSD review.

Following release of the SHORADS RFP and the source selection process, the Army's selection of the U.S. ROLAND system was reviewed and approved by OSD on January 8, 1975. The TTF&T contract was let on January 9, 1975.

Shortly after this date, the Chairman of the House Subcommittee on R&D wrote to the SecDef expressing Congressional concern with the length of the TTF&T Phase and their perceived threat of Americanization of the ROLAND system.

As a result, a special ROLAND Program review by the DDR&E was held on April 15, 1975. At this review a TTF&T Phase schedule

Chairman:
GEN Fred C. Weyand, VCSA

Attendees:
GEN Henry Miley, CDR USAMC
Honorable Hadlai A. Hull, ASA(FM)
Honorable Norman R. Augustine, ASA(R&D)
Mr. Eugene E. Berg, ASA(I&L) Designee
LTG John R. Deane, Jr., CRD
LTG E.H. Almquist, Jr., ACSFOR
LTG Donald H. Cowles, DCSOPS
LTG Edward M. Flanagan, Jr., COA
LTG James G. Kalergis, AVCSA
Dr. Wilbur B. Payne, DUSA(OR)
Mr. Robert W. Berry, GC
MG G.J. LeVan, TRADOC
MG Peter G. Olenchuk, ODCSLOG

Observers:
Honorable Herman R. Staudt, USofA
Mr. Richard J. Trainor, OAVCSA
BG William J. Kennedy, OACSC-E

Presenters:

SHORAD Task Force Director:	COL Shaw
SHORAD PM Designee:	COL MaGill
SAM-D Program Status & Alternatives:	BG Means
SAM-D Review and Analysis:	Mr. Augustine

Executive Secretary:
LTC John L. Ballantyne, III, OAVCSA

FIGURE J5
Attendance List
SHORAD ASARC I/II Meeting
November 16, 1973

ATSD

H Gaffney

O(ASD(C))

D. Brazier
J. Dietz
R. Jackson

DPA&E

L. Sullivan
A. Cutchis
L/Col. F. Fitts
E. Pyatt

CAIG

M. Margolis
R. Starsman

ARMY

H. Staudt U/Sec Army
Gen. F. Weyand VC/S
N. Augustine ASA(R&D)
Gen. H. Miley AMC
B/Gen. F. Clarke TRADOC
L/Gen. J. Deane CRD
L/Gen. E. Almquist ACSFOR
M/Gen. H. Cooksey DCRD
B/Gen. E. Hirsch Dir, AD(OACSFOR)
Dr. W. Payne D/USEC
R. Trainor OCS
A. Colub (SCIENT Advisor)

EXECUTIVE SECRETARY

E. J. Nucci

ODDR&E

Dr. M. Currie
(Chairman)
D. Heebner
L/Gen. R. Coffin
D. Fredericksen
T. Kotonias
G. Sutherland
R. Basil
B/Gen. C. Spence
Dr. C. Cook

JCS-(J-5)

Capt. F. Watson
Col. J. McGurk

O(ASD(I&L))

H. Witt
J. Malloy
B/Gen. F. Trogdon
M. Eyler

ODDR&E(T&E)

L/Gen. A. Starbird
Col. J. Barron

BRIEFERS

Col. D. Shaw (T.F. Dir)
Col. H. MaGill P/M
Designee
Maj. R. Bohls
L/Col. R. Mathis

FIGURE J6

Attendance
SHORAD - DSARC Review
February 5, 1974

reduction was forced on the Army and the DCP was revised accordingly. The SecDef had already replied on March 6, 1975, to the Congressional inquiry stating that a U.S./European ROLAND Coordinating Organization and a Joint ROLAND Control Committee would be established, the TTF&T Phase would be reduced to 57 months with further reduction possible, and there would be a standard missile for the U.S. and European ROLAND systems.

On May 7, 1975, the DDR&E, in a memorandum referencing the April 15 review, stated that the differences between the European and U.S. ROLAND II equipment must be kept to a minimum and interchangeability be maximized; tests should be planned with U.S. and European produced hardware to demonstrate interchangeability; and a matrix should be established including all U.S. and European flight tests planned to provide data supporting the U.S. production decision. He also concurred with the Army's recommendation, for planning purposes, that it should proceed with a 54 month program structured so that the 54 months could be reduced, contingent on the success of the flight test program.

B. Special ASARC - October-December 1975 - Cost and Schedule Problems

In May 1975, only three months into the TTF&T Phase, Hughes announced that they anticipated a $40M contract cost growth and a seven month slip in schedule. Hughes was given six weeks to "get their act together", but no progress was made. In August, DA was informed of the anticipated cost and schedule overruns. These were particularly serious at this time because OSD had only recently talked the Army into a $177M TTF&T Phase and a 54 month schedule.

The Hughes problems developed from both the contractor and the U.S. Government making several invalid assumptions:

- The European drawing indenture system was equivalent to the U.S. system;
- European manufacturing processes could be easily replicated by U.S. industry;
- Drawing translations would be easier;
- The European design was more mature than it actually was -- particularly the track radar necessary for the all-weather capability;
- Test equipment was available.

In short, the contractor and the U.S. Government significantly underestimated the complexity of the transfer effort.

The projected cost and schedule growth triggered a series of special Army reviews and meetings to determine a program struc-

ture for system development. A Special ASARC was held on October 17, 1975, to consider schedule alternatives. One of its actions was to reduce the level of effort to $2.5M/month, to be provided on a month-to-month basis, until the issues were resolved and the European base-design had stabilized. Estimated TTF&T phase costs had increased to $249.5M and the time to IOC increased to 74 months, figures which OSD was reluctant to accept.

A DDR&E memorandum to the ASA(R&D) on November 21, 1975, indicated that OSD had reviewed the ROLAND program following the Army's Special ASARC in October. In addition to objecting to the Army's procurement decision because it was contrary to the April 1975 DSARC decision, the DDR&E instructed the Army to examine ways to increase the program funding for the following four months -- to $3.5 - 5M per month for more efficient accomplishment of the tasks required. During the four-month effort, the Army and the contractor were to carry out a program review to identify ways to reduce both cost and time for completion of the program as close to the original funding and schedule as possible, and at the conclusion of the review the Army was to make recommendations on modifications of the program. The DDR&E also specified that the missile will be required to have international interchangeability (I2). Additional elements of the system would be made interchangeable where it was economically and operationally sensible. (This guidance upset the French and Germans who expected more I2 than just the missile.) Finally, the DDR&E stated that the Army's intent to use the GOER vehicle as the ROLAND transporter would be subject to further discussion and review between the Army and OSD.

During the period between December 1975 and September 1976, the Army held several reviews and there were a series of meetings of Army and OSD principals regarding ways to restructure the ROLAND Program. Options considered included the following:

- Continue on present program - all U.S. for TTF&T and production;
- Buy selected subassemblies in Europe for TTF&T, establish U.S. source for production;
- Buy all systems, except GFE, in Europe for TTF&T and production;
- Buy whole system in Europe.

NOTE: It was the position of the DDR&E that termination of the ROLAND contract was <u>not</u> a viable option.

Based on its own reviews and the OSD guidance, the Army structured a program that it hoped would meet the various Congressional and OSD requirements.

C. Special ASARC/DSARC September 1976 Approval of Program Restructuring

In July 1976, a DA SHORAD-Alternatives Task Force (TF) was convened to evaluate alternative system candidates and the course of action to meet the AW-SHORAD requirement if the ROLAND program was terminated. The TF results were to be presented at a pre-ASARC to the ASARC scheduled for September 1976. In addition to the DA Staff, the TF included membership from TRADOC, DARCOM, and MICOM.

The ROLAND Special ASARC/DSARC "Tasker" was published on August 12, 1976, announcing the September 16, 1976, Special ASARC and the September 21, Special DSARC. The purpose of the review was to decide whether to approve a restructured ROLAND program or to give guidance on an alternative course of action if the restructured program is not approved. Principal information needs of the ASARC were described as schedule, funding, and risk aspects of the restructured program and the alternatives thereto. (Portions of the tasking memorandum are provided in Attachment A of this Appendix).

Because of the importance of the ROLAND ASARC and DSARC and the broad Congressional implications, the Under Secretary of the Army was invited to attend the review.

No decision was rendered at the September 20, 1976, Special ASARC. Instead, the ASARC Secretary was tasked to compile alternatives and to solicit the choices of each ASARC principal. The results were provided to the VCSA at a second (reduced membership) meeting on September 23, 1976. After reviewing the comments of the ASARC principals and considering new information on costs, guidance from the VCSA and the Under Secretary of the Army included a recommendation to present DSARC with Alternative A (17 battery corps buy).

Lists of ASARC attendees for the September 20 and 23 reviews are provided in Figures J7 and J8, respectively.

On September 10, 1976, the DDR&E informed the Army that the Special DSARC would be held on September 24. The proposed agenda included the Army's description of the current program status and the recommended restructuring including resultant milestones, development equipment quantities, and costs; a brief by the D/DDR&E(T&E) on the adequacy of the test plan for the restructured program; and a CAIG evaluation of Army cost estimates. Attendees at the September 24, 1976, Special DSARC are listed in Figure J9.

On December 22, 1976, the Deputy Secretary of Defense approved, with modifications, the restructured program as presented to the DSARC Principles. The modifications included:

Mr. Augustine, USofA
GEN Kerwin, VCSA
GEN Deane, GC DARCOM
Mr. Brownman, ASA(I&L)
LTG Fuson, DCSLOG
LTG Cooksey, DCSRDA
Dr. Emerson, OASA(R&D)
Dr. Willard, ODUSA(OR)
Mr. Kearney, OGC
Mr. Trainor, ODCSRDA
Mr. Sherick, DCOA
MG Meyer, ADCSOPS
MG McGiffert, D, PA&E
MG Lewis, ODCSOPS
MG Keith, ODCSRDA
MG Lunn, CG, ADC
MG Peixotto, ODCSRDA
BG Burdeshaw, TRADOC
Mr. Hollis, OTEA
MG Rachmeler, OASA(I&L)
Dr. Honig, ODCSRDA
BG Donovan, OCLL
BG Hirsch, ODCSOPS

BG Ragano, PM ROLAND
Mr. Thomas, OASA(R&D)
Mr. Barnwell, ODCSLOG
COL DeMoss, ADC
COL Maloney, DARCOM
COL Austin, OTEA
COL Waible, ODCSRDA
COL Falter, ODCSOPS
Mr. Gibson, OCOA
LTC Harrison, OUSA
LTC Tedeschi, ODCSRDA
LTC Fedorochko, ODCSRDA
LTC Pryor, OASA(FM)
Mr. Frampton, PMO
Mr. Sims, PMO
Mr. Lang, PMO
MAJ Reed, ODCSRDA
MAJ Nowland, OSA
MAJ Kellerhalls, TRADOC
MAJ Vernon, OACSI
MAJ Garner, ODCSOPS

MAJ Rodgers, ODAS

FIGURE J7

Attendance List
ROLAND Special ASARC
September 20, 1976

Mr. Augustine, USofA
GEN Kerwin, VCSA
GEN Deane, CG, DARCOM
Mr. Miller, ASA(R&D)
LTG Cooksey, DCSRDA
LTG Camm, DCG, TRADOC
Mr. Trainor, ODCSRDA
Mr. Greiner, DASA(I&L)
Mr. Hardison, DUSA(OR)
Mr. Sherick, D, COA
Mr. Ablard, GC
Mr. Hobbs, D, ASA(FM)
MG Lewis, ODCSOPS
MG David, ADCSLOG
MG Lunn, CG, ADC & School
BG Donovan, OCLL
BG Ragano, PM ROLAND
COL Compton, PA&E
LTC(P) Tedeschi, ASARC Secy
MAJ(P) Reed, DASC
MAJ Nowland, OSA

FIGURE J8
Attendee List
ROLAND Special ASARC
September 23, 1976

ODDR&E	OASD(C)	OASD(I&L)	OPD&E
Dr. M. Currie	F. Wacker	F. Shrontz	T. Christie
R.E. Berry	C. Cardiff	J. Gansler	J. Finsterle
G. Sutherland	N. Eaton	M. Eyler	A. Cutchis
C. McKinley		L/Col. J. Akridge	
BG F. Palermo			
T. Kotonias			

DD(T&E)	CAIG	JCS	OASD(I)
LTG W.E. Lotz	M. Margolis	BG R. Winger	Dr. T. Curry
BG C.E. Graves	Maj J. Holeman	Col J. McGurk	
Col W.E. Buckon			

ARMY

N. Augustine, UndSecArmy
Gen W. Kerwin, VCS
Gen J. Deane, CG, DARCOM
E. Miller, ASA(R&D)
LTG H. Cooksey, DCSRDA
LTG F. Camm, DCG, TRADOC
J. Sherick, Dep Compt
R. Trainor, D,SRAO
MG E. Meyer, ADCSOPS
MG R. Lunn, CG, AD Cnt & Sch
BG F. Ragano, PM ROLAND
Mr. Frampton, Ofc of PM ROLAND
Maj L. Residori
Maj E. Vernon

DSMC

Maj J. Salvitti

Projectionist Booth

Maj Byron Reed

FIGURE J9

Attendance List
ROLAND DSARC
September 24, 1976

- The total RDT&E(TTF&T) program would be budgeted at $265M escalated dollars.[5] The PM should plan a $249M program effort with an additional $16M management reserve programmed for RDT&E cost risks.

- Total procurement program would be budgeted at about $1.5B for the approved requirement for rear area vital targets and corps defense.

- A fully funded ROLAND procurement plan should be structured and properly financed in the FY78/79 budget submission.

- Base plan on a DSARC III to be scheduled in April 1978.

Nearly twenty one months had elapsed since the first indications of cost and schedule problems in the TTF&T Phase and receipt of the DepSecDef approval to proceed with the restructured program. During this interval considerable progress had been made in the ROLAND program, progress that encouraged the principals to recommend its continuation. Examples of these accomplishments were:

- Drawing releases reached the 99% point;

- A complete U.S. missile had been built;

- Most of the fire unit components were at an advanced stage of completion;

- Technology transfer problems had largely been solved.

In addition, the Army felt that it had a solid management team in charge and that there were no alternative programs more attractive than the restructured ROLAND program for meeting the SHORAD requirement.

It took seven special reviews equivalent to ASARC/DSARC reviews, in addition to numerous high level discussions and briefings, to obtain OSD approval of the restructured program.

D. Special ASARC/OSD Review - May 1978, IPF Funding

The DSARC III, originally scheduled for April 1978, was rescheduled to about September 1978 due to delays in the joint test program. An OSD Review was scheduled for April 1978 to consider IPF funding. In a November 1977 message, DA initiated the preparations for the April Review and the ASARC/DSARC III. The schedule of significant events for the OSD Review and ASARC/DSARC III was as follows:

---

[5] Congress had established a not-to-exceed requirement of $265M.

Convene ROLAND AD HOC Working Group	December 14, 1977
MSRS Meeting	February 21, 1978
ASARC Prelim Review	March 14, 1978
Special ASARC	April 8, 1978
OSD Review	April 27, 1978
ASARC III Prelim Review	August 2, 1978
ASARC III	August 24, 1978
DSARC III	September 28, 1978

Prior to the convening of the ROLAND AD HOC Working Group, DA personnel discussed with OSD the purpose and scope of the April 1978 Review. ODDR&E personnel provided the following guidance:

- The DSARC principals are expected to attend.
- Update OSD on the current status of the US ROLAND program -- to include domestic and international aspects as well as doctrine and use.
- Provide Army obligation authority for $55M Initial Production Facility Funds.
- Discuss areas of OSD concern that have surfaced over the past year -- particularly those of interest to the ASD (PA&E).
- Present status of ROLAND, ROLAND support equipment, and ROLAND parts that are currently tied up in the international disagreements.
- Present status of ROLAND international agreements.
- ROLAND schedule -- to include costs, testing, potential slippage, etc.
- ROLAND use.
- ROLAND and how it fits into the AD family and how it ties into the current AD Mix Study.
- ROLAND Command and Control and how it will use the TSQ-73 system.
- Discuss plan for increased armor for ROLAND.
- ROLAND survivability.
- Present anti-ARM test program for ROLAND (where, what, when, by whom, how, duration, expectations, cost, etc.).

After hearing all of the topics proposed by the OSD staff for the April Review, the DA personnel were convinced that the Army had to be very careful with the review and that a Special

ASARC would be necessary in order to see that everything is covered before the OSD Revision.[6]

On January 12, 1978, subsequent to the DA/OSD staff meeting, ODDR&E sent a memorandum to the ASA(RDA) stating that the purpose of the OSD review was to evaluate the progress of the program prior to the Army commitment of IPF funds planned for May 1978. Main areas of concern to be covered were the recent DT/OT results, program schedule, expenditures, and cost to complete. As a result of the Review, OSD would concur or nonconcur in the commitment of IPF monies and would provide guidance on the agenda for DSARC III scheduled for late FY 1978.

The review dates slipped and the Army ROLAND Preliminary Review was held on May 8, 1978, the Special ASARC on May 11, and the OSD Program Review on May 31.

At the May 8 Preliminary Review, the proposed Army presentation to the OSD was reviewed and several actions were taken to cover expected areas of OSD concern. At the May 11 Special ASARC, the VCSA approved the PMs recommendation. The list of attendees is shown in Figure J10.

The OSD Program Review held on May 31, 1978, resulted in an Under Secretary of Defense June 3, 1978, memorandum to the ASA (RD&A) that approved the Army's plan for obligation of FY 1978 IPF and ES funds. The Under Secretary commented that the ROLAND Program properly reflected past OSD guidance and that the PM had presented a well integrated plan.

However, several requirements were included in the memorandum. One required the Army to modify its test program as briefed at the review, a second involved the DSARC III COEA structure with respect to alternatives to ROLAND, and the third was concerned with alternative support concepts, particularly for the European theater, to be presented to the OASD(MRA&L) prior to the DSARC III.

E. <u>ASARC/DSARC III, Production Decision</u>

The next ROLAND Program reviews, ASARC/DSARC III, were originally scheduled for mid-1978 as discussed in Section III, Part D of this report. However, the dates were changed to September 1978 due to delays in joint testing. The schedule slipped again when OT had not started until late fall and the test report was not expected to be available until early 1979.

In 1978, the PMO had outlined a detailed schedule that would lead to the ASARC/DSARC III and a ROLAND production decision.

---

[6] MFR, Subject, ROLAND, DAMA-RAC, December 6, 1977.

DARCOM	GEN Guthrie
	LTG Baer
	MG Means
TRADOC	MG Koehler
	COL Hunter
	Mr. Clark
ASA(RDS)	Dr. Dierre
	Mr. Thomas
ASA(IL&FM)	Mr. Gibbs
	Mr. Russ
DCSRDA	LTG Keith
	BG Shea
	BG Wagner
	COL Waible
	LTC Wharton
	MAJ Smith
DCSOPS	MG Wickham
	COL Bodine
	Mr. Riente
	LTC McLeod
DCSLOG	BG Nord
DUSA(OR)	Mr. Hardison
PA&E	Mr. Hamilton
	LTC Chen
GC	Mrs. Volner
	Mr. Nissel
	Mr. Gamboa
COA	LTG West
	Mr. McIntosh
DCSPER	MG Long
ACSI	COL Churchill
OCLL	BG Maurer
DAS	LTG McGiffert
ADAS	LTC Hadjis
DAIRO	BG Cockerham
SRAO	Dr. Trainor
	LTC Moore
	MAJ Lind
OTEA	Mr. Hollis
	LTC McGarry
PM, ROLAND	BG Ragano
	Mr. Harris
	Mr. Williams
	Mr. Sims
	Mr. Lawrence
	LTC Lee

FIGURE J10

Attendees
ROLAND Special ASARC
May 11, 1978

Revisions were made as the ASARC/DSARC III dates changed. The schedule shown in Figure J11 is the final iteration. ASARC/DSARC III Issues are listed in Figure J12 (These were issues that were anticipated by the Army).

A preliminary review was held by the Army on April 13, 1979. The attendees are listed in Figure J13. Guidance concerning the briefings to be presented to the ASARC was provided. A major requirement was that ODCSOPS present a briefing addressing the impact on RSI of alternative ASARC decisions to produce, terminate, or delay the ROLAND program.

The ASARC met on April 24, and concluded that the U.S. ROLAND system should enter production. The ASARC also confirmed that the stated requirement for a SHORADS against which the U.S. ROLAND system was developed, remains valid. Attendees are listed in Figure J14.

DSARC III was held on May 31, 1979. Attendees are listed in Figure J15. The Army knew the answer when the DSARC review ended. The SDDM was published on June 6, 1979: it contained no surprises. The SecDef granted approval to the Army to enter into the FY79 and FY80 low-rate production program as presented to the DSARC. He also stated that the ROLAND acquisition cost estimates, current progress, and performance were satisfactory for limited production. The SDDM required that the Army present to OSD (MRA&L) within 120 days the ROLAND support concepts and, within 45 days, a TEMP detailing the reliability program would be submitted to the Director, Test and Evaluation. Finally, a DSARC IIIB would be required before ROLAND could enter full production.

The Army had received the desired production decision, but not without a great deal of effort and in spite of a lack of support for ROLAND from some elements of the Army. The program office had worked hard to satisfy everyone before the DSARC met. The PM made an estimated 30 ASARC/DSARC oriented trips to Washington as part of his effort to "get every one lined up ahead of time". The Chief, Technical Management Division, stated that he spent 13 weeks in Washington. His staff spent 60-70% of their effort for 13 weeks, weekends included. At the program management office, 3 personnel worked full-time for six months in order to orchestrate the DSARC preparations--nearly everyone else in the office was involved to some extent in the DSARC review.

Army support for ROLAND was not unaminous. Both DARCOM and TRADOC had periods of supporting and periods of not supporting ROLAND. At the Special ASARC in September 1976, three principals, including the DARCOM CG, voted to terminate the program. At the April 1979 ASARC III, CG TRADOC, arguing that ROLAND was not cost effective, voted to terminate the program.[7] In spite

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[7] TRADOC had manpower and training problems once it was decided that HAWK would not be removed from the AD family.

ASARC/DSARC III SCHEDULE

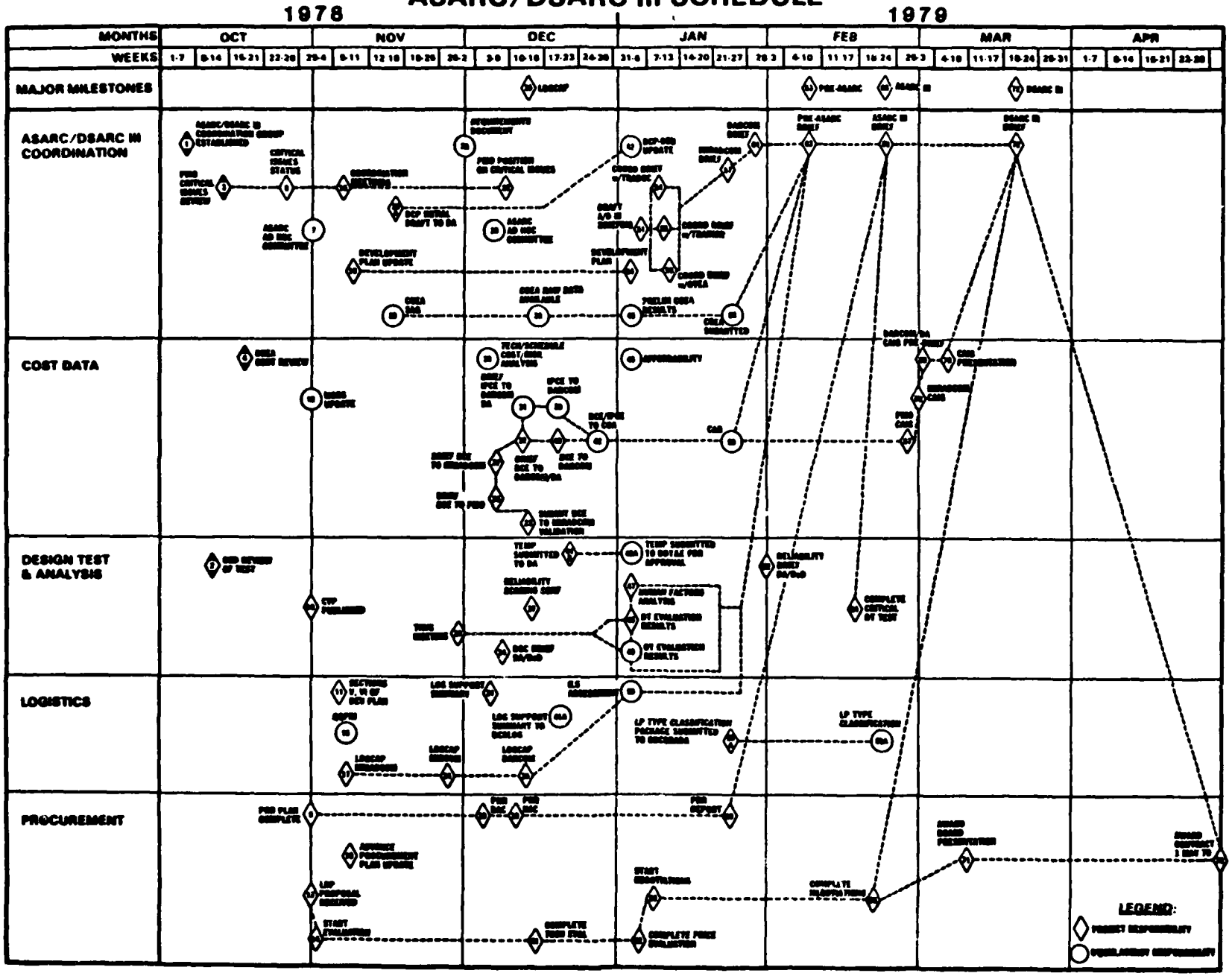

FIGURE J-11

RSI Implications
Adequacy of TDP for Production

HAWK - ROLAND RFI
Capability Against Helicopters
ROLSIM Validation
Have Critical ROC Performance Requirements Been Met?
Human Factor Engineering Briefing
HFE Analysis Paper
Internal Fire Unit Communications
Plans/Results of Production Readiness Review
Does the US ROLAND Warrant Immediate Fielding?

BCE
Cost/Risk Analysis
COEA
IPCE
PTUPC Status
DCP (Coordination)
MSRS
Technical Schedule and Cost Risk Analyses
GAO/DAS Issues

Approval of Army Procurement Plan
Plans for Negotiation and Award of LRP Contract

Completion of Plans for Training Logistics Support
Joint Logistics Acceptable to FR/GE/US
BOIP II (Final)
ILS Assessment Paper (Issues)
Classroom Trainer
Materiel Fielding Plan
Type Classification for LP
Is Personnel Data from QQPRI & BOIP Adequate?
Have Total System Support Requirements Been Identified?
Have Units/Personnel that ROLAND will Replace Been Identified?
Identify Alternative Support Concepts for European Theater

Environmental Test Results
Flight Test Results
Reliability
System Performance vs Requirements in the ROC, DCP, MSRS
Plans for Confirmatory Tests
CPT II Approval
EPR Status
Has Test Program been Modified in Accordance with USDRE
5 Jun 78 Memo?
Is RAM Data Credible?

FIGURE J12

ASARC/DSARC III Issues

OASA(RDA)
Mr. Stohlman
COL Hannon

OASA(ILFM)
Mr. Russ
COL O'Quinn

ODUSA(OR)
Mr. Hardison
Dr. Willard

OGC
MAJ Gamboa

DARCOM
Dr. Haley
BG(P) Sheridan
BG Lax, (PM)
COL Huggins
Mr. Harris (PMO)
Mr. Williams (PMO)
Mr. Sims (PMO)
Mr. Dihm (PMO)
Mr. O'Neill (AMSAA)
Mr. Bone (OMEW)

ODCSRDA
MG Lunn
BG Skibbie
Col Waible
LTC Butler

ODCSOPS
MG Richardson
LTC McLeod
Mr. Riente

ODCSLOG
MG Nord
Mr. Henne

ODCSPER
COL Neuberger
LTC Ganey

PAED
LTC Xenos
LTC Hite

OCA
Mr. Allen
Dr. Honig
Mr. McIntosh

TRADOC
BG(P) Oblinger
COL Cook
COL Hunter (TSM)
COL Rinehard
MAJ Jones

OTEA
Mr. Hollis
COL Smith
LTC McGarry

OACSI
LTC Tannenbaum

DAIRO
BG(P) Dyke
LTC Archibald

SRAO
COL Balzhiser
LTC Moore
LTC Anderson

FIGURE J13

Attendees
ROLAND ASARC III
Preliminary Review
April 13, 1979

OSA
MAJ Benton

OUSA
Dr. LaBerge
LTC Hyde

OASA(RDA)
Dr. Pierre
COL Hannon

OASA(ILFM)
Mr. Gibbs
Mr. Russ
COL O'Quinn

OASA(MRA)
Mr. Manning

OGC
Ms. Volner
MAJ Gamboa

ODUSA(OR)
Mr. Hardison

DARCOM
GEN Guthrie
LTG Baer
BG Lax (PM)
Mr. Harris (PMO)
Mr. Williams (PMO)

OCSA
GEN Kroesen
LTC Henry

ODCSRDA
LTG Keith
MG LUnn
MG Akers
COL Waible
LTC Butler

ODCSOPS
LTG Meyer
MG Scott
MG Richardson
BG Dyke
Mr. Vandiver
COL Anderson

ODCSLOG
MG Knopnicki
Mr. Barnwell

ODCSPER
MG Long
BG Cannon

OCA
LTG West
Mr. McIntosh

FIGURE J14

Attendees
ROLAND ASARC III
April 24, 1979

OUSDRE
Dr. Perry (Chairman)
Dr. Dinneen
Mr. Moore
Mr. Church
Mr. Bernard
Mr. Kotonias

ASD(C)
Mr. Wacker
Mr. Beckner

ASD(ISA)
MG Bowman
COL Richardson

ASD(MRA&L)
Dr. Nelson
Mr. Meth

ASD(PA&E)
Mr. Murray
Mrs. Cutchis

ADV TO SEC DEF ON NATO
LG Groves*

ODUSD (Policy)
Mr. Steivers

JCS
LG Lawson

NSC
Mr. Thomson

DIA
Mr. Katz

CAIG
Mr. Margolis
Mr. Yourtee

DDT&E
Adm. Linder
BG Burdeshaw

DIR., INTERNATIONAL PROGRAMS
Dr. Garber

ARMY
Dr. LaBerge, UndSecArmy
GEN Guthrie, CDR DARCOM
Dr. Pierre, ASA(RDA)
LG Meyer, DCSOPS
MG Koehler, TRADOC
MG Lunn, ADCSRDA
MG Scott, ADCSOPS
BG Lax, PM
Dr. Willard, ODUSA(OR)
COL Anderson, ODCSOPS
COL Hunter, TSM

ASST. FOR PROGRAM PLANNING
Mr. Callaway

DSMC
Mr. Ballou

FIGURE J15

Attendees
ROLAND DSARC III
May 31, 1979

of this recommendation by the user, the ASARC decided to proceed with ROLAND. The other ASARC principals questioned the validity of the COEA, emphasized the implied international commitment, and expressed satisfaction with the progress of ROLAND.

The cost effectiveness issue attracted Congressional attention and was the subject of letters from USA and ASA(RDA) explaining the ASARC decision and soliciting Congressional support for ROLAND. Also mentioned in the letters were the facts that ROLAND was available -- alternatives were not -- and the international commitments which would contribute most markedly to the NATO Air Defense arena in which interoperability is essential to success.

F. Full Production Decision

The SDDM resulting from the DSARC III stated a requirement for a DSARC IIIB to obtain full production authority. This review was scheduled for March 1981 as shown in Figure J16, ASARC/DSARC IIIB Schedule, prepared by the program office in December 1979. However, the DSARC IIIB requirement was later waived because the T&E and reliability requirements were satisified through HQDA and OSD meetings.

Figure J17, U.S. ROLAND Program History, summarizes the reviews and events in the US ROLAND Program between 1973 and 1979.

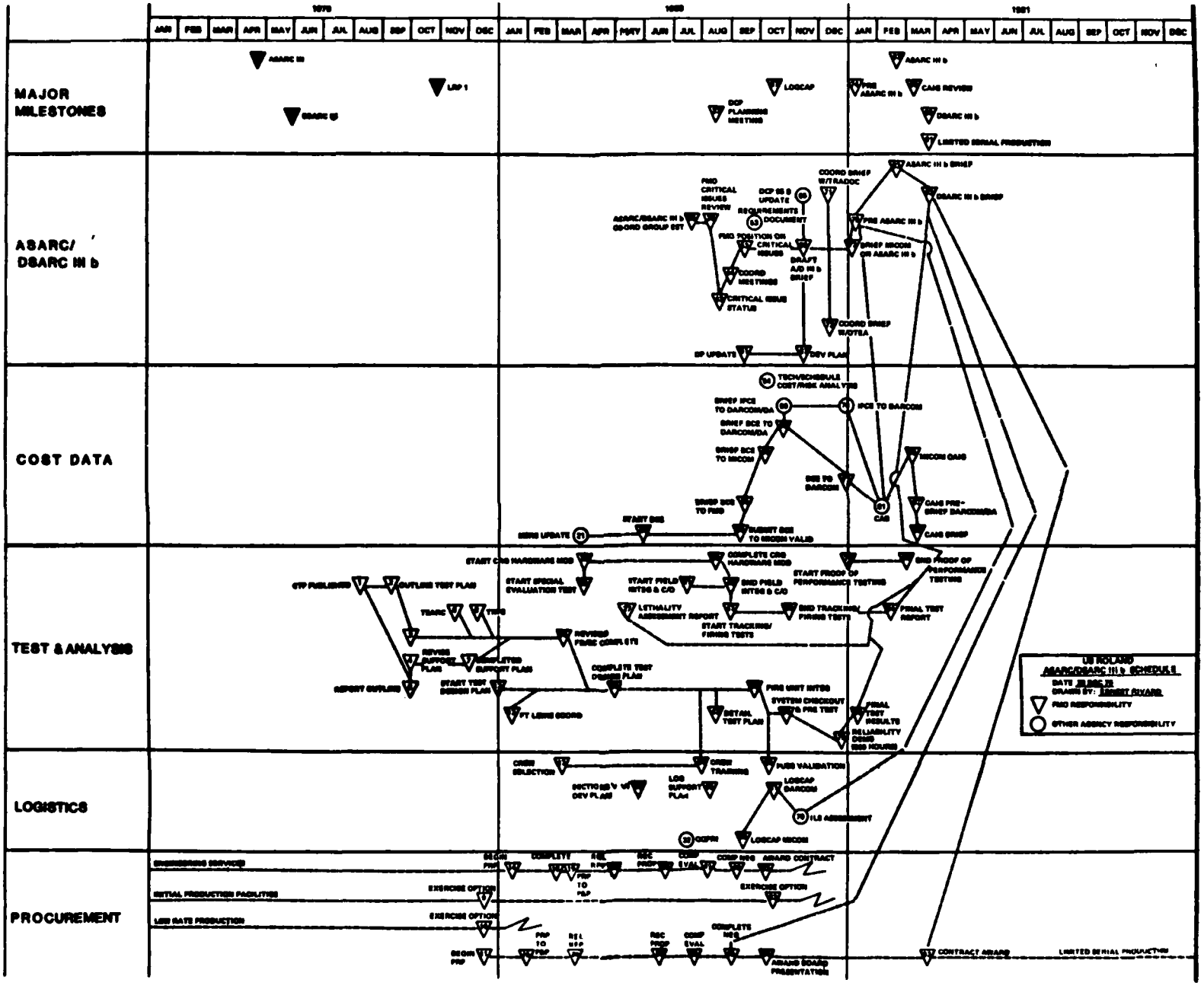
1979
1980
1981
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
MAJOR MILESTONES
ASARC III
LRP 1
DSARC III
LOGCAP
DCP PLANNING MEETING
ASARC III b
PRE ASARC III b
CAIG REVIEW
DSARC III b
LIMITED SERIAL PRODUCTION
ASARC/ DSARC III b
ASARC III b BRIEF
DSARC III b BRIEF
COORD BRIEF W/TRADOC
PRO CRITICAL ISSUES REVIEW
DCP 85 B UPDATE
REQUIREMENTS DOCUMENT
ASARC/DSARC III b CO-ORD GROUP EST
PRO POSITION ON CRITICAL ISSUES
BRIEF MICOM OR ASARC III b
DRAFT A/B III b BRIEF
COORD MEETINGS
CRITICAL ISSUE STATUS
COORD BRIEF W/OTSA
SP UPDATE
DEV PLAN
COST DATA
TECH/SCHEDULE COST/RISK ANALYSIS
BRIEF IPCS TO DARCOM/DA
IPCS TO DARCOM
BRIEF BCE TO DARCOM/DA
BRIEF BCE TO MICOM
MICOM GAIG
BCE TO DARCOM
CAIG
GAIG PRE-BRIEF DARCOM/DA
BRIEF BCE TO PMO
MERS UPDATE
START BCE
INSERT BCE TO MICOM VALID
CAIG BRIEF
TEST & ANALYSIS
START CAIG HARDWARE MOD
COMPLETE CAIG HARDWARE MOD
START PROOF OF PERFORMANCE TESTING
END PROOF OF PERFORMANCE TESTING
CTP PUBLISHED
OUTLINE TEST PLAN
START SPECIAL EVALUATION TEST
START FIELD INTGS & C/O
END FIELD INTGS & C/O
LETHALITY ASSESSMENT REPORT
START TRACKING/ FIRING TESTS
END TRACKING/ FIRING TESTS
FINAL TEST REPORT
TEARC
TRIPS
REVISED FIRST CONF CTP
REVISED SUPPORT PLAN
COMPLETED SUPPORT PLAN
COMPLETE TEST DESIGN PLAN
REPORT OUTLINE
START TEST DESIGN PLAN
FIRST UNIT INTGS
SYSTEM CHECKOUT & PRE TEST
FINAL TEST RESULTS
RELIABILITY DEMO (800 HOURS)
FT LEAD COORD
DETAIL TEST PLAN
US ROLAND
ASARC/DSARC III b SCHEDULE
DATE 30 DEC 79
DRAWN BY: ROBERT ROVARE
PMO RESPONSIBILITY
OTHER AGENCY RESPONSIBILITY
LOGISTICS
CREW SELECTION
CREW TRAINING
PUBS VALIDATION
SECTION 32 DEV PLAN
LOG SUPPORT PLAN
LOGCAP DARCOM
ILS ASSESSMENT
LOGCAP MICOM
PROCUREMENT
ENGINEERING SERVICES
BEGIN PMP
COMPLETE
REL PMP
REC PROP
COMP EVAL
COMP NEG
AWARD CONTRACT
PMP TO PMP
INITIAL PRODUCTION FACILITIES
EXERCISE OPTION
LOW RATE PRODUCTION
COMPLETE NEG
AWARD BOARD PRESENTATION
CONTRACT AWARD
LIMITED SERIAL PRODUCTION

FIGURE J-16

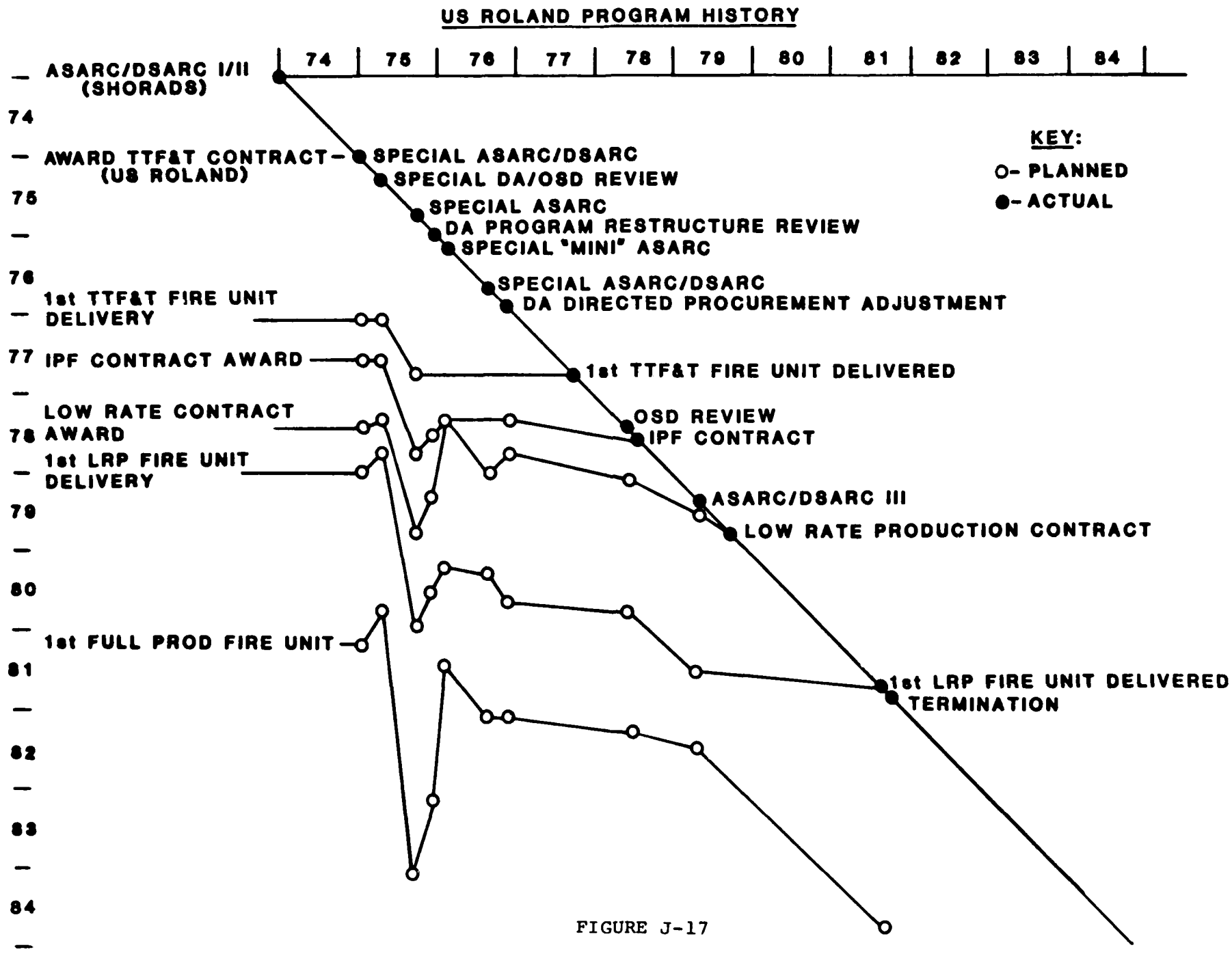
US ROLAND PROGRAM HISTORY
74
75
76
77
78
79
80
81
82
83
84
ASARC/DSARC I/II (SHORADS)
AWARD TTF&T CONTRACT (US ROLAND)
SPECIAL ASARC/DSARC
SPECIAL DA/OSD REVIEW
SPECIAL ASARC
DA PROGRAM RESTRUCTURE REVIEW
SPECIAL "MINI" ASARC
SPECIAL ASARC/DSARC
DA DIRECTED PROCUREMENT ADJUSTMENT
1st TTF&T FIRE UNIT DELIVERY
IPF CONTRACT AWARD
1st TTF&T FIRE UNIT DELIVERED
LOW RATE CONTRACT AWARD
OSD REVIEW
IPF CONTRACT
1st LRP FIRE UNIT DELIVERY
ASARC/DSARC III
LOW RATE PRODUCTION CONTRACT
1st FULL PROD FIRE UNIT
1st LRP FIRE UNIT DELIVERED
TERMINATION
KEY:
O- PLANNED
●- ACTUAL

FIGURE J-17

IV. PROGRAM STATUS

Figure J18 reflects the planned versus actual fire unit procurements since ASARC/DSARC III (May 1979) when the plan was to field 4 ROLAND Battalions (180 fire units). Before the end of 1979, the planned procurement had dropped to 2 battalions and then to 1 battalion (4 batteries) based on the 1982 Presidential Budget (Democratic). In mid-1981, the planned quantity had risen to 4 battalions again (Amended 1982 Presidential Budget (Republican)), only to be terminated because of an affordability issue later in 1981 -- SecDef reversed his earlier decision and proposed that ROLAND be cancelled. At the time of this study (December 1982) plans are to procure 1 battalion of 3 batteries for assignment to the Rapid Deployment Force (described by some as an attempt to realize something out of the $1.1B ROLAND investment).

The initial low-rate production contract was awarded on October 30, 1979. The award of the contract had been delayed more than four months because FY79 procurement funds could not be released until the issue of FY80 procurement funds for U.S. ROLAND was resolved by the Congressional Joint Authorization Conference. The delay had a $10.4 million impact on the program that eventually led to the decision to continue low-rate production for a third year and to reduce the quantity to 95 fire units (2 battalions) instead of 180 fire units (4 battalions). This action was taken in spite of the fact that the Army had just revalidated the 4 battalions requirement in April 1979. Figure J19 provides the U.S. ROLAND Cost Summary as presented in 1975 and 1980.

US ROLAND PROGRAM HISTORY
FIRE UNIT PROCUREMENT

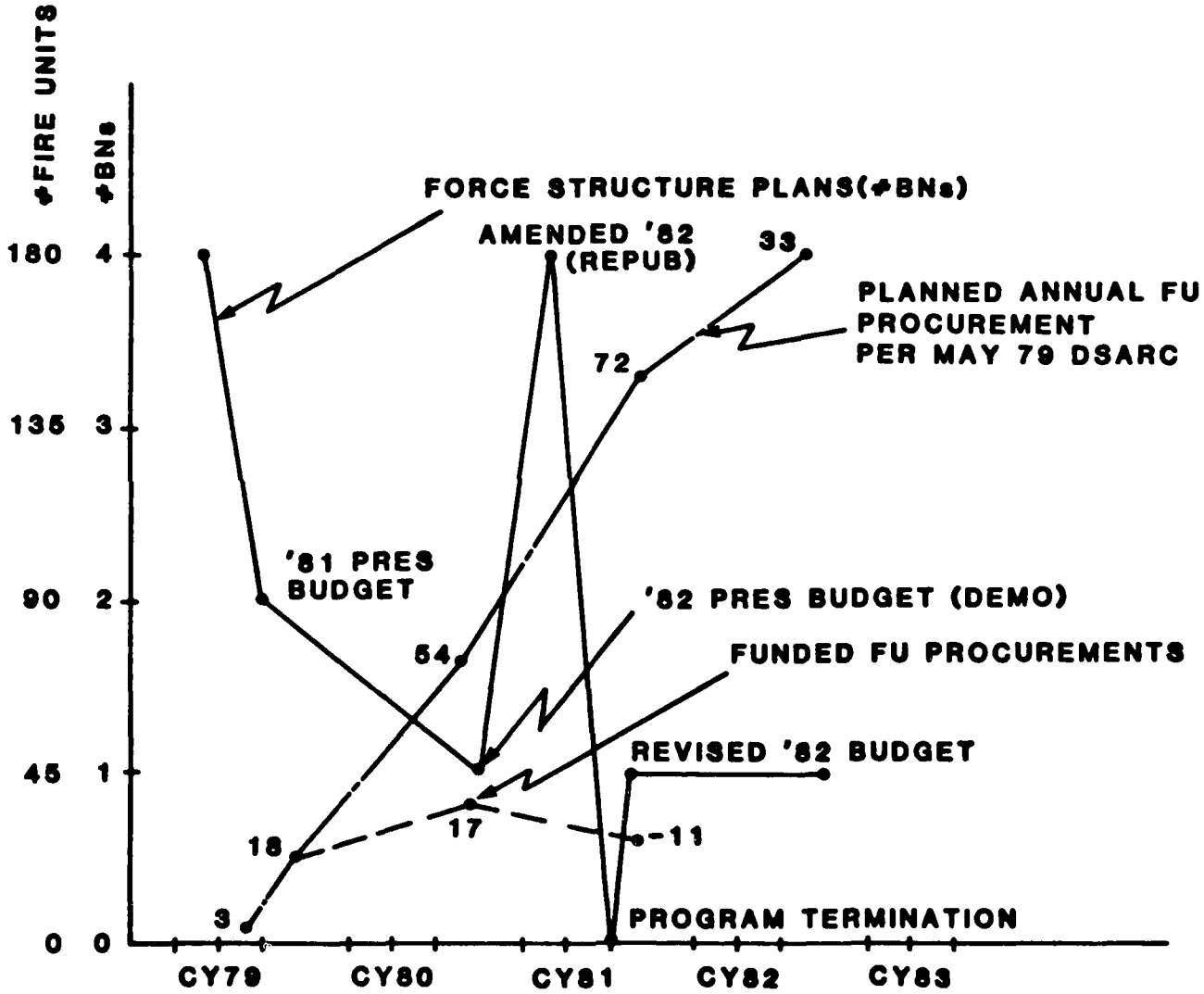

FIGURE J-18

US ROLAND PROGRAM COST SUMMARY
SOURCE: US ROLAND SELECTED ACQUISITION REPORTS
(DOLLARS IN MILLIONS)

	FY75 CONST $	ESCL'D $
DEVELOPMENT EST (JUN 75 SAR)		
TOTAL RDTE $	160.2	177.3
TOTAL PROC $	677.8	942.2
TOTAL PROG $	838.0	1119.5
TOTAL PROG FIRE UNIT QTY*	184	184
PROG UNIT COST (PER FIRE UNIT)	4.554	6.084
CURRENT EST (JUNE 80 SAR)		
TOTAL RDTE $	244.3	299.3
TOTAL PROC $	992.3	1639.5
TOTAL PROG $	1236.6	1938.8
TOTAL PROG FIRE UNIT QTY*	99	99
PROG UNIT COST (PER FIRE UNIT)	12.491	19.584

*INCLUDES 4 RDTE UNITS

FIGURE J-19

DEPARTMENT OF THE ARMY
OFFICE OF THE DEPUTY CHIEF OF STAFF
FOR RESEARCH, DEVELOPMENT, AND ACQUISITION
WASHINGTON, D.C. 20310

REPLY TO ATTENTION OF: DAMA-RAA

SUBJECT: ROLAND Special ASARC/DSARC 12 Aug 1976

SEE DISTRIBUTION

1. References:

a. AR 1000-1, Basic Policies for Systems Acquisition by the Department of the Army, 5 Nov 74.

b. AR 15-14, Systems Acquisition Review Council Procedures, 24 Jan 75.

2. Background:

a. An Army Systems Acquisition Review Council (ASARC) meeting is scheduled to review the ROLAND Missile program on 16 Sep 76. This will be a Special ASARC meeting.

b. The DSARC will also meet to review the ROLAND program about 21 Sep 76.

c. A Preliminary Review will be held 9 Sep 76.

d. The purpose of these reviews is to decide whether to approve a restructured ROLAND program or to give guidance on an alternative course of action if the restructured program is not approved.

e. This letter addresses coordination of activities in preparation for the Special ASARC.

3. Purpose: This letter outlines actions necessary in preparation for the ASARC and assigns responsibilities as appropriate. The intent is to assist responsible agencies in synthesizing information required by the ASARC and subsequent DSARC into a comprehensive decision package.

4. Concept: The principal information needs of the ASARC concern the schedule, funding and risk aspects of the restructured program and the alternatives thereto. In view of the short time frame documentation will be kept to a minimum.

a. A draft revision of DCP No. 95 will be required.

b. No re-validation of the requirement for ROLAND will be required. Therefore no COEA is required.

c. An ad hoc ASARC/DSARC working group chaired by the DASC and consisting of representatives of DARCOM, PM ROLAND, TRADOC, COA, DCSOPS, DCSRDA and ACSI will meet as required to determine if all requirements for the ASARC/DSARC are being adequately met.

d. A threat presentation will be required against which to assess the restructured program and the alternatives.

e. The Project Manager will present the restructured program options to include analysis of technical, schedule and cost risks.

f. A baseline cost estimate and independent parametric cost estimate will be prepared and submitted in accordance with instructions issued separately by COA. The BCE will include an investment cost matrix time phased by appropriation in current year (inflated) dollars. COA will present a comparison of these studies and the COA position in the form of a Cost Analysis Brief.

g. An affordability presentation will be required.

h. A SHORAD Alternatives Task Force will present alternative candidate systems and/or courses of action.

i. A listing of required documentation is at Inclosure 1. A schedule of events is at Inclosure 2. The tentative agenda for the Preliminary Review/ASARC is at Inclosure 3.

5. Responsibilities:

a. Commander, US Army Development and Readiness Command.

(1) Provide documentation listed in Inclosure 1 to HQDA (ATTN: DAMA-WSM and DAMA-PP) as required.

(2) Provide representation to the SHORAD Alternatives Task Force.

(3) Provide representation to the ASARC/DSARC Working Group, name to be provided to DAMA-WSM-A NLT 12 Aug 76.

(4) Provide cost and performance data to TRADOC and the Army Staff as required.

(5) Consult TECOM, and OTEA as necessary on adequacy of test program.

(6) Coordinate with DA DCSLOG and logistics agencies in preparation of portion of ASARC/DSARC briefing on logistics/maintenance testing and supportability.

(7) Coordinate with TRADOC in preparation of that portion of ASARC/DSARC briefing that will mention deployment of US ROLAND in the Divisions.

(8) Present briefings as indicated in Inclosure 3.

b. Commander, US Army Training and Doctrine Command.

(1) Assist USADARCOM as required in revising the DCP.

(2) Provide representation to the SHORAD Alternatives Task Force.

(3) Provide representation to the ASARC/DSARC Working Group, name to be provided to DAMA-WSM-A NLT 12 Aug 76.

c. Comptroller of the Army.

(1) Coordinate preparation of the Baseline Cost Estimate and Independent Parametric Cost Estimate.

(2) Review/Validate BCE and IPCE and present analyses in a Cost Analysis Brief (Inclosures 1 and 3).

(3) Coordinate the development of and present a cost analysis briefing to the CAIG in advance of the DSARC.

(4) Provide representation to the SHORAD Alternatives Task Force.

(5) Provide representation to the ASARC/DSARC Working Group, name to be provided to DAMA-WSM NLT 12 Aug 76.

d. Deputy Chief of Staff for Operations and Plans.

(1) Provide representation to the SHORAD Alternatives Task Force. Assist the Task Force as required in interpretation of the ROC regarding alternative courses of action.

(2) Provide representation to the ASARC/DSARC Working Group, name to be provided to DAMA-WSM-A NLT 12 Aug 76.

e. Assistant Chief of Staff for Intelligence.

(1) Provide representation to the SHORAD Alternatives Task Force.

(2) Provide representation to the ASARC/DSARC Working Group, name to be provided to DAMA-WSM-A NLT 12 Aug 76.

(3) Brief the threat at the Preliminary Review and the ASARC (Inclosure 3).

f. Deputy Chief of Staff for Logistics.

(1) Provide representation to the SHORAD Alternatives Task Force.

(2) Assist DARCOM as required in assuring adequacy of logistics testing.

g. Deputy Chief of Staff for Research, Development and Acquisition.

(1) Provide affordability analysis and briefing as in Inclosure 1 and 3 (DAMA-PP).

(2) Provide briefing on alternative candidate systems and/or courses of action as in Inclosure 3 (SHORAD Alternatives Task Force).

h. TECOM. Be prepared to advise on adequacy of test program.

i. OTEA. Be prepared to advise on adequacy of test program.

6. Coordination:

a. ROLAND DASC - MAJ Byron Reed, DAMA-WSM, AVN 227-6407

b. SRAO Analyst - Mr. Robert Stimson, DAMA-RAA, AVN 227-0472

c. ROLAND FISO - MAJ Jay Garner, DAMO-RQA, AVN 225-3676

DAMA-RAA
SUBJECT: ROLAND Special ASARC/DSARC

d. ROLAND Cost Analyst - LTC Arthur Griffin, DACA-CAM, AVN 227-0965

e. ROLAND Threat Analyst - MAJ Edwin Vernon, DAMI-TA, AVN 222-6165

R. J. Trainor

3 Incl
as

RICHARD J. TRAINOR
Director
Systems Review and
Analysis Office

DISTRIBUTION:

DACS-DPZ-A
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DCSPER (Info)
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CDRUSAOTEA
CDRUSAMICOM
CDRUSALEA

CF:
ASA(RDD)
ASA(IEL)
ASA(FM)
DUSA(OR)
CDR,USALEA

ROLAND SPECIAL ASARC
REQUIRED DOCUMENTATION

DOCUMENT	AGENCY FURNISHING	SUSPENSE DATE	AGENCY FURNISHED	NO COPIES
DCP	DARCOM	Note 1	DAMA-WSM-A	Note 1
Technical, Schedule and Cost Risk Analyses*	DARCOM	3 Sep 76	DAMA-WSM-A	Note 1
BCE	DARCOM	20 Aug 76	COA/DAMA-PP	Note 2
IPCE	COA	20 Aug 76	COA/DAMA-PP	Note 2
Cost Analysis Brief (CAB)*	COA	3 Sep 76	DAMA-WSM-A/ PP	4
Affordability Analysis	DAMA-PP	3 Sep 76	DAMA-RAA	25

*Also furnish Executive Summary of this document in 25 copies to HQDA (ATTN: DAMA-WSM-A). NLT 3 Sep 76. The technical, schedule and cost risk analyses can be in abbreviated form.

NOTES: 1. Instructions issued separately by DAMA-WSM-A.

2. Instructions issued separately by COA.

Incl 1

SCHEDULE OF MAJOR EVENTS
ROLAND SPECIAL ASARC

EVENT	PLANNING DATE
Initiate Preparation of Service Draft DCP	In Process
SHORAD Alternatives Task Force Convenes	In Process
BCE/IPCE to HQDA	20 Aug 76
Technical, Schedule and Cost Risk Analyses Submitted to HQDA	3 Sep 76
Affordability Analysis submitted	3 Sep 76
Preliminary Review	9 Sep 76
ASARC	16 Sep 76
Service Draft DCP Submitted to OSD	17 Sep 76
CAIG Briefing	o/a 17 Sep 76
DSARC	o/a 21 Sep 76

Incl 2

APPENDIX K

COPPERHEAD
PROGRAM STUDY REPORT

I. SYSTEM DESCRIPTION

The number of artillery rounds required for a kill against armored vehicles and other point targets, mobile or stationary, is too high for cost effective operations. To improve the accuracy of the artillery round and realize a high probability of a first round kill, some type of guidance must be provided in the artillery projectile. The most effective demonstrable type of guidance currently available for artillery projectiles is semi-active laser guidance.

The 155mm Cannon Launched Guided Projectile (CLGP) is equipped with a terminal guidance system and is launched from conventional howitzers into a ballistic trajectory. During flight, the target is illuminated by a laser designator. The seeker, in the ogive of the projectile, acquires the laser signature. The on board computer continuously refines the terminal trajectory and provides guidance to the control surfaces, causing the CLGP to home in on the target within the maneuvering limits (footprint) of the projectile. Figure K1 shows the 155mm CLGP with its fins and wings extended as in the flying position.

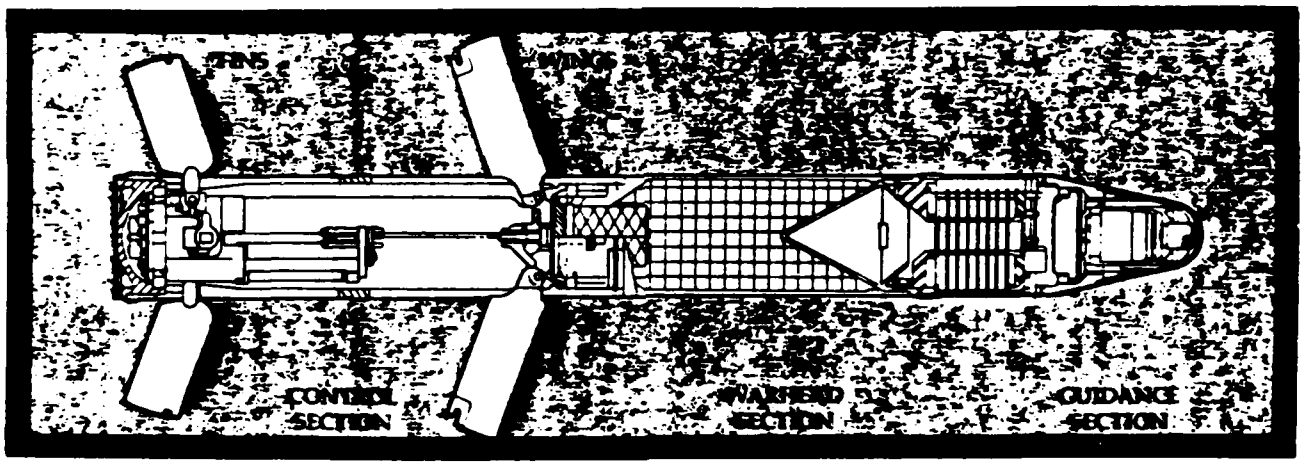


FIGURE K1
COPPERHEAD

Target illumination may be provided by an airborne observer, a ground observer using the ground Laser Locator Designator (GLLD) which is also being developed by the Army for Copperhead and guided missiles such as Hellfire, or by the Remotely Piloted Vehicle (RPV), another target acquisition system currently under development by the Army. Figure K2 shows CLGP employment with the target illuminated by the RPV.

The 155mm CLGP was conceived by the engineering staff of Rodman Laboratories in 1970. Feasibility studies were conducted during 1971 by the U.S. Army Missile Command, U.S. Army

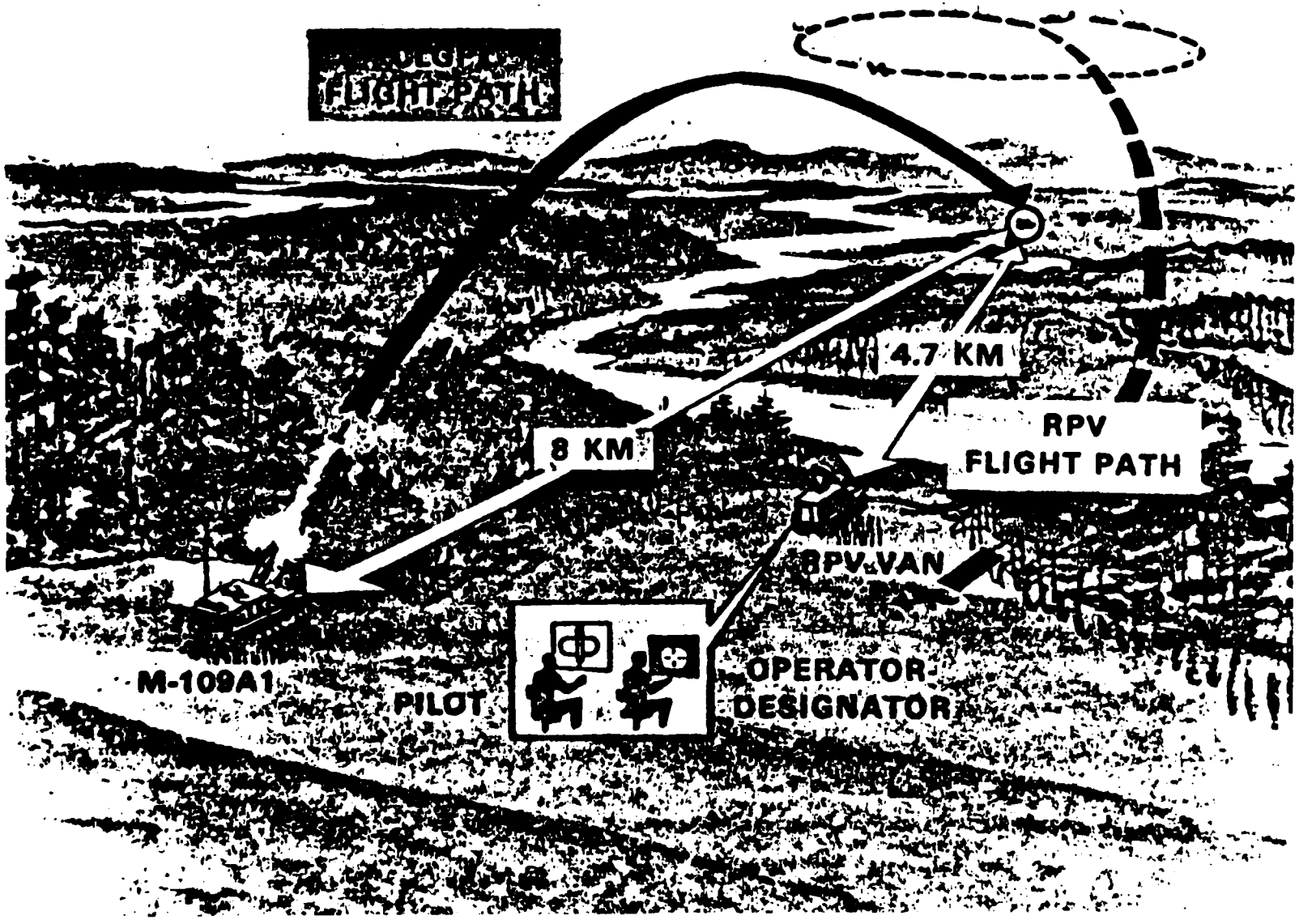

FLIGHT PATH
4.7 KM
8 KM
RPV
FLIGHT PATH
RPV VAN
M-109A1
PILOT
OPERATOR
DESIGNATOR

FIGURE K-2

Picatinney Arsenal, Rodman Laboratories, and the U.S. Naval Weapons Laboratory at Dahlgren, VA under the direction of the Army Project Manager, Cannon Artillery Weapons Systems.

In order to simplify hardening of the guidance and control equipment in the projectile to resist the launch acceleration and minimize the additional training needs for the gun crew, the CLGP was designed to be fired in an inactive state. This required the incorporation of special equipment to activate and govern the sequential initiation of various devices in the round. An acceleration-sensitive battery, initiated by firing the projectile, supplies power for projectile guidance and control, as well as initiating and operating a timer which controls the operational sequence. The current Copperhead round contains over 12,000 parts.

A trajectory selection provides an option for flying at a lower altitude to allow longer times under a cloud ceiling for acquisition and guidance. The normal ballistic trajectory mode is used for shorter range missions and/or good weather conditions.

Technical problems that had to be overcome included packaging the equipment in a 155mm (approximately 6" diameter) artillery projectile, hardening the equipment to resist the firing acceleration (in the order of 9000 g's, which is much higher than that experienced by a missile), and achieving the reliability necessary to meet the desired probability of a first round kill.

II. INITIAL PROGRAM SUMMARY

In February 1972, the Army awarded contracts for a competitive advanced development phase to Martin Marietta Aerospace and Texas Instruments Incorporated. Each contractor was to design and fabricate 12 projectiles for Army tests. The Martin Marietta projectiles proved to be superior, and the company was awarded the Engineering Development (ED) contract in July 1975.

The acquisition plan for Copperhead at the start of ED in 1975 is shown in Figure K3.

The Copperhead program, as described in DCP #119 in 1975, had a Design-to-Unit-Production-Cost (DTUPC) goal of $5,515 (FY75 Constant Dollars). The RDT&E costs, in escalated dollars, were estimated to be $118.4M.

CLGP ACQUISITION SCHEDULE-1975

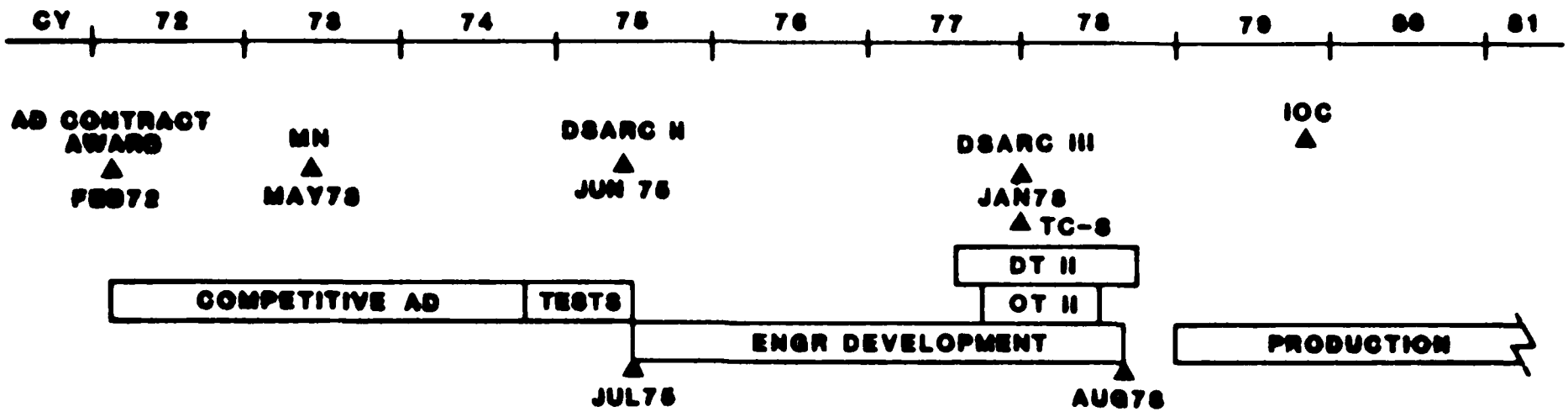


FIGURE K-3

III. PROGRAM EVOLUTION

A. Initiation of Competitive Advanced Development Phase

Following the March 1970 approval of the Qualitative Materiel Development Directive, the Copperhead project was turned over to PM-CAWS for RDT&E management.

A Request for Quotation (RFQ) was released in July 1971. Proposals were received from six companies and AD contracts awarded to two contractors (Texas Instruments and Martin Marrieta) on February 9, 1972.

The Copperhead Materiel Need (MN) was approved by HQDA on May 2, 1973.

B. Engineering Development - DSARC II

In 1975, the Copperhead project was still assigned to the Cannon Artillery Weapon Systems (CAWS) program, a tenant at the Rock Island Arsenal, reporting directly to the CG DARCOM. Other projects managed by PM-CAWS included the Rocket Assisted Projectile (RAP) and the M198 155mm Howitzer.

The ASARC/DSARC II was held to determine if Copperhead was ready to progress to Engineering Development. Also at issue was the possibility of a Saboted 5" Guided Projectile, under development by the U.S. Navy, satisfying the Army 155mm requirement. The Navy had been independently developing 5" and 8" guided projectiles while the Army was developing the 155mm (6") GLGP. Tests, required by OSD, were conducted in early 1975 and indicated that the Army program would be delayed about two years if it went with the Navy 5" program. The DDR&E had urged that the Army program not be delayed in favor of the Navy 5" program but did question the extent of the Army/Navy information exchange.

Following a January 1975 OSD Program Review, the DDR&E sent a five page memorandum to the Secretaries of the Army and Navy which included the following comments:

- Concur with the high priority which the Army places on its CLGP program and in which one contractor has demonstrated substantial success.
- Continued development of the CLGP should be vigorously pursued.
- R&D to reduce procurement costs is required.
- Army will prepare a separate DCP providing for an independent 155mm program with data exchange.

- Navy will prepare a separate DCP for the 5"/8" GP Program.
- Plan for a future fly-off of the 155mm CLGP and a 5" saboted round.
- A/N/MC prepare a joint report on the 8" guidance configuration.

The DSARC II was held on June 19, 1975. A list of attendees is shown in Figure K4. Little data existed in the Army or OSD files concerning the ASARC/DSARC II. Because the PM-CAWS office moved the year after DSARC II with nearly a 100% personnel turnover in the process, little ASARC II information was available.

The SDDM was issued on July 15, 1975. The CLGP project was approved to enter ED, but with the following conditions:

- Emphasize strong cost reduction.
- Look at possible use of Navy saboted 5" projectile.
- Structure program to reduce risk within the first 15 months of AD design changes (forward plan to OSD by October 1, 1975).
- Be prepared at DSARC III to address reductions in other artillery ammunition and the associated logistic structure.
- Conduct an expanded COEA.
- Include Marines in Army Project Office (USMC interested in CLGPs also).

C. Special Joint Review

1. Background

In September 1976, the CAWS Program Office moved from Rock Island, IL to Picatinney Arsenal in Dover, NJ. Very few of the professional personnel moved with the office. Only five people assigned to the office for more than one year made the move, and only one was a division chief. Six personnel were recruited from other Rock Island organizations shortly before the move. One of these filled the position of a division chief who did not move. In the case of four of the other five divisions, not one member made the move.

Congress reduced CLGP program funding for FY 76 and FY 7T from a total of $24.8M to $17.0M. This action required that the ED phase be restructured. A modified ED contract was signed on 25 June, 1976. It provided for a 44 month ED phase (an extension of 7 months) with completion scheduled for March 1979. In July 1976 the AAO was reduced from 132,650 to 110,236 projectiles.

ODDR&E
R. Parker (Chairman)
S. Peterson
B/Gen. C. Spence
D. Fredericksen
G. Sutherland
Dr. R. Schwartz
Lt. Col. W. Whitaker

OASD(I&L)
F. Meyers
M. Eyler
Lt. Col. J. Peterson

OASD(C)
T. McClary
D. Hessler
J. Dietz
R. Dominquez
J. Friedl

OASD(PA&E)
L. Sullivan
J. Finsterle
Dr. R. Kneece
G. Hall

JCS
Col. J. McGurk

DD(T&E)
Lt. Gen. W. Lotz
B/Gen. W. Whitlatch
Col. J. Barron

Army
N. Augustine, USA
Gen. W. Kerwin, VCS
Lt. Gen. H. Cooksey, DCSRDA
Dr. W. Payne, Dep USA
Dr. K.C. Emerson, Actg ASA(R&D)
M/Gen. G. Sammett, DCG(AMC)
M/Gen. E. Ott, TRADOC
A. Golub, ODSCOPS
Col. S. Post, PM Cannon Acty
Lt. Col. Williams, TRADOC
R. Trainor, ODCSRDA
Col. R. Blum, ODCSRDA
Col. F. Ragano, USAMC
Lt. Col. Jones, ODCSRDA
Lt. Col. Field, ODCSOPS
Lt. Col. Huggin, USAMC
Maj. Mooney, USAMC
Maj. Ayres, TRADOC
Capt. D. Broscha, AML
Lt. Col. J. Farrington, D/PM

CAIG
Maj. C. Broshous

ASD(I)
D. Hamilton
M. Goulder

Navy
Col. E. Sholuts, HQMC
Capt. T. Meeks, OP-982
Cdr. L. Smith, OP-3546

FIGURE K4
DSARC II - ATTENDEES
June 19, 1975

In the FY 78 Authorization Bill, the Congress imposed several requirements on the Army CLGP and the Navy 5" GP projects. Included were:

- o Funds limited to $52.1M and designated to go to the DDR&E rather than directly to the services.
- o No FY 78 obligations without a plan to:
  - oo Conduct ED for both rounds
  - oo Achieve maximum component commonality
  - oo Validate technical data package in-house
  - oo IOC both projectiles before 1 January 1980.

On February 28, 1977, the DDR&E directed the Army to assume responsibility for all semi-active laser cannon and gun guided projectiles, i.e., 5", 8", and 155 mm.

On August 23, 1977, a DSARC II was held for the U.S. Navy 5" and 8" Guided Projectile Project to determine if they were ready to enter Engineering Development. Because of the commonality between this project and the Army Copperhead project, a review of its status was also required. In addition, the impact of the Congressional requirements on both projects was to be reviewed.

A joint Army/Navy System Acquisition Review Council met to prepare for the DSARC. Although little documentation was found, the Army PM at the time described the scene this way: "All of the Army military and civilian principals were lined up on one side of the table and all of the Navy principals on the other. The two-stars and below had to sit along the walls."

The Army position at the A/NSARC (not unaminous) regarding the Congressional language was that its requirements would be difficult to fulfill. The January 1, 1980, IOC, regardless of funding, could not be achieved without abandoning sound development practices and subverting a reasonable definition of IOC. The Army would consider reprogramming to achieve additional prudent and reasonable objectives.

The pre-DSARC OSD position was that the technical risks associated with using the Navy 5" round as the common round were unacceptably high as DoD's only GP program. In addition, IOC would be delayed by 2 to 3 years and costs would be greater than if the separate Army/Navy programs were continued. Following the August 23, 1977, DSARC, a SDDM was issued on November 14. FSD for the Navy 5" and 8" projectiles was approved and an NLT IOC date was established: the Army was to continue as scheduled on the Copperhead project; both the Army and Navy were to cooperate and push for the maximum practical component and production facility

commonality (the Navy was directed to go to the Martin Marietta); and a Joint Office was to be set up at PM-CAWS (Figure K5).

Preparations for this DSARC had been extensive but not as demanding as for a Copperhead Milestone Review. The PM-CAWS (a Colonel) had been with the program for approximately one year but had not had previous DSARC experience. Because of the recent move, few of the project personnel had more than one year's experience with the project. The CAWS Program Office personnel assisted in the DSARC preparations which began months in advance. Reviews were held at all levels ranging from the Armaments R&D Command at Picatinney, to HQDARCOM, HQDA, and OSD, plus coordination with the Navy in their GP project.

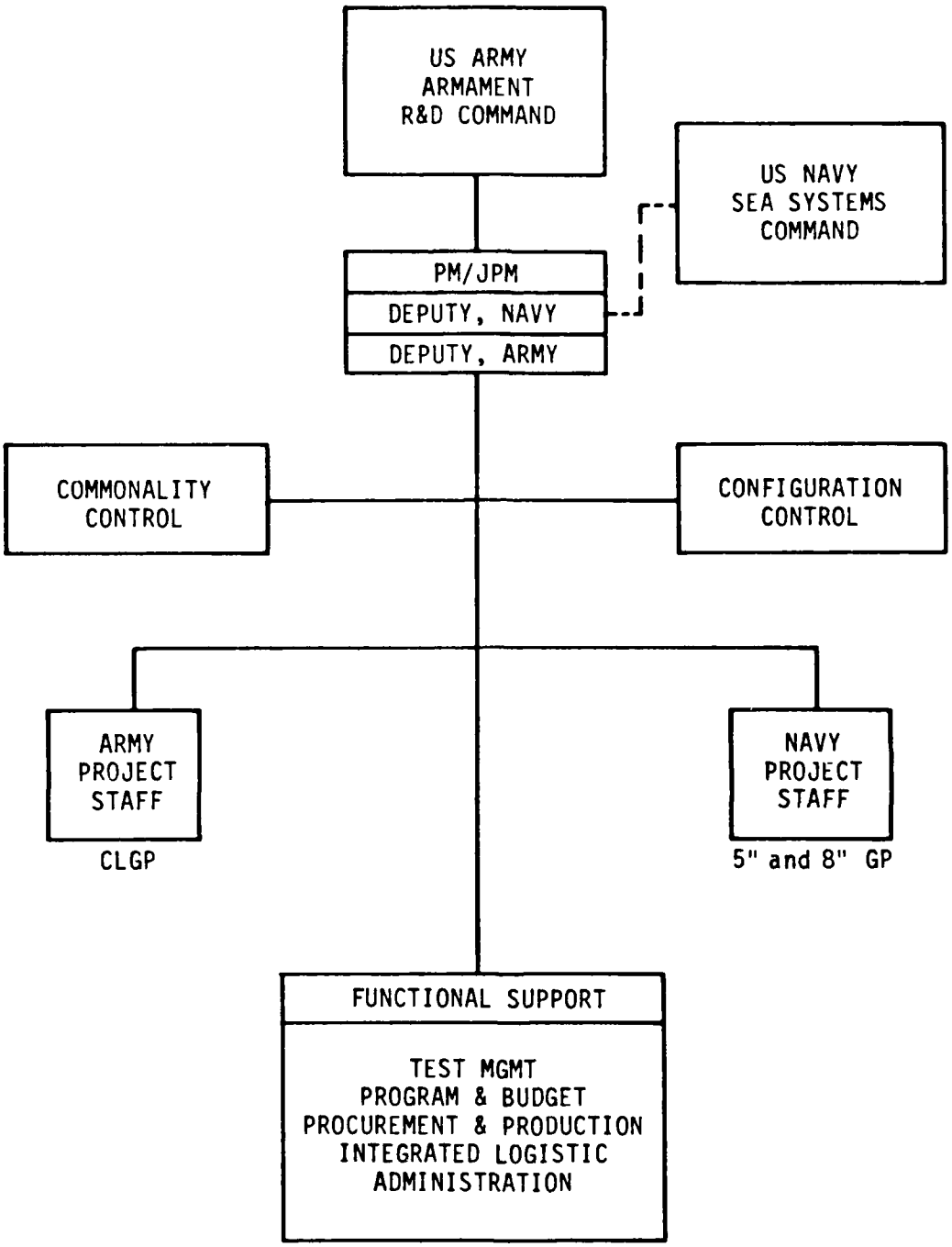
The issues at the DSARC were clear and the review directly addressed them. The results were favorable: the Army was to continue the separate CLGP project and continue with the original schedule.

D. Production Decision - DSARC III

ASARC III was held on September 7, 1979, following a preliminary review on August 28. The PM had wanted the ASARC several months earlier because he needed the production decision. However, the schedule slipped due to the inclusion of the GLLD in the review, problems with the COEA, and other problems at HQDA. Although they had DTUPC and reliability concerns, the ASARC supported the CLGP production decision. The VCSA decision was that the projectile be Type Classified-Standard and enter production. He also suggested that those (Congressmen) having reservations be invited to observe the remaining DT firings. The ASA(R&D) said that the Army would accept Copperhead with the reliability achieved. Attendees are listed in Figure K6.

There were further delays and the DSARC III was not held until November 6, 1979. Contributing to the delay was the fact that the COEA, TEMP, and DCP were not provided to OSD until late September and early October. At a DSARC pre-brief on October 30, 1979, the Army was informed that a production decision was not assured.

Some of the issues identified on November 1, to the Army (Figure K7) were resolved but two were not. Training, competition, and affordabiity questions were resolved before the DSARC. The operational utility and reliability issues could not be resolved between the Army and the OSD staff. The Copperhead requirement was being considered "all-weather" rather than "adverse weather dependent" in spite of the MN requirements upon which it was based. Reliability, one part of the Single Shot Kill Probability (SSKP) equation, was not achieving its goal, although the SSKP was achieved and the CEP was less than one-half of the MN requirement.



COPPERHEAD
JOINT PROGRAM OFFICE

FIGURE K-5

DARCOM

LTG Baer
MG Light
COL Phillip (PM)
COL Pelligrini
COL Fadel
Mr. Barnart
Mr. Zimpo

OASA(RDA)

Dr. Yore
COL Hannon

ODCSLOG

MG Nord
Mr. Dolan

OTEA

Mr. Hollis
LTC Catlett

PAED

LTC(P) Xenos
LTC Rogers

ODUSA(OR)

Dr. Fallin

OUSofA

LTC(P) Arnold

DAIRO

LTC Dalgleish

OGC

MAJ Gamboa

ODCSRDA

MG Wagner
BG Maloney
BG Skibbie
COL Townsend
LTC Zimmerman
LTC Humes

ODCSOPS

MG Richardson
BG Kenyon
LTC York

TRADOC

BG Dinges
COL Stone
COL Fitzpatrick
MAJ Vaughn

ODCSPER

COL Neuberger
SGM Monty

OASA(IL&FM)

Mr. Russ
LTC Perkins

OCA

Mr. Clark

OACSI

COL Baldwin

OACSAC

MAJ Johnson

SRAO

COL Balzhiser
LTC Click
MAJ Cotner

Figure K6
ATTENDEES
COPPERHEAD ASARC III
September 7, 1979

MEMORANDUM FOR DISTRIBUTION 1 November 1979

SUBJECT: Copperhead Pre-DSARC

A pre-briefing for the DSARC principals was held on 30 Oct 79 in preparation for the 6 Nov 79 Copperhead Milestone III DSARC meeting. The following issues were discussed:

1. Does Copperhead have sufficient utility and is it ef fective, given the limitations inherent to 1.06 micron electro-optical systems?

2. Is Copperhead affordable in light of the very low production rate programmed in the FYDP?

3. Should Copperhead have a second source for production?

4. Is Copperhead ready for production?

5. Is the Copperhead round reliable?

6. Is there adequate troop training planned for the Copperhead System?

In addition to discussing the above issues at the DSARC, Dr. LaBerge requested that the Army be prepared to discuss a program alternative which would provide a test quantity of reasonable size to demonstrate reliability with no production commitment or authorization beyond that initial test quantity of rounds. An additional program alternative is to produce a test quantity as above, with sufficient continuing production to equip a rapidly deployable force. The Army should also be prepared to discuss what production rate is desirable and can be programmed and budgeted once the reliability of Copperhead is demonstrated.

Figure K7

DSARC III Issues

The Army's COEA was updated for DSARC III. It acknowledged that Copperhead was a weather dependent system. Some of the COEA conclusions were as follows:

- o CLGP will make a cost-effective contribution to the force.
- o Full potential of the system would be denied in Europe (visibility restraints).
- o Easily employable with the RDF.
- o Will increase the number of kills,increase survivability, capitalize on the existing critical manpower assets, reduce artillery ammunition expenditures, and create a synergistic effect with direct fire systems.

Following the DSARC III, the SDDM was issued on December 15, 1979. Production was approved but at a rate not to exceed 200/month until 0.8 reliability was demonstrated based on 75 production round verification test firings. After demonstrating 0.8 reliability, the Army could proceed to full rate production. At the same time the Army was to proceed with efforts to reach 0.9 reliability. Also, the Army was to provide several plans dealing with reliability growth, test and evaluation, and other program management areas to USDR&E within 90 days.

The DSARC III attendees are listed in Figure K8. The Copperhead production decision had been achieved, but not without great effort and not without a production limiting condition. The decision was also late (the Army's fault) which delayed the start of production and extended the ED phase. Preparations for the DSARC III had begun twelve months earlier and developed into an intense effort for the last six months.

DSARC issues were not formally identified, so the Army tried to anticipate and prepare for all possible questions. Preparing briefings, walking the halls of the Pentagon in an attempt to "get everyone on board", responding to questions, and preparing the documentation required for a DSARC Production Milestone took the full-time effort of six project office personnel plus the support of the rest of the office personnel (25) on an as needed basis. On going efforts that also had to be managed were DT/OT II, contractual matters, planning for next phase, and facilitization.

An Operations Center (War Room) was established by the PM, as described in the Lesson Learned Report provided in Attachment of this Appendix. There were 4 or 5 full team prebriefs as well as countless individual briefings given at AARDCOM, DARCOM, DA, and OSD. HQDARCOM personnel generally come to DA for a combined briefing but special subject briefs were also held at HQDARCOM. Over 2 feet of vuegraphs at $35 each plus preparation cost were used.

OUSDR&E

Dr. LaBerge
Mr. Trimble
Mr. Moore
Dr. Pastrick

ASD(C)

Mr. Wacker
Mr. Harshman

ASD(ISA)

Col. Holtzclaw

ASD(MRA&L)

Dr. Pirie
Mr. Meth

ASD(PA&E)

Mr. Murray
Mr. FInsterle

ADV TO SECDEF ON NATO

Gen. Groves

ODUSD(Policy)

Col Sewall

JCS

RAdm Paddock

CAIG

Mr. Margolis
LTC Yourtee

D,DT&E

Gen. Bunyard

DIA

Dr. Katz

DSMC

Col. Rambo

ARMY

Gen. Vessey, CSA
Gen. Guthrie, DARCOM
Dr. Pierre, ASA(RDA)
LTG Keith, DCSRDA
Mr. Hardison, DUSA(OR)
MG Scott, ADCSOPS
MG Merritt, TRADOC
Col. Philipp, PM
Maj. Vaughn, TSM Rep
Mr. Whitely, PM, GLD Rep.

NAVY

RADM Masterson
Capt. Mecili

Figure K8
CLGP
DSARC III ATTENDEES
November 6, 1979

The following task list, prepared by the project office, reveals the extent of pre-ASARC/DSARC III requirements. The list includes both those that are on-going and those specifically required for the reviews.

PRE ASARC/DSARC III TASKS

1. Baseline Cost Estimation
2. Support AARADCOM Independent Parametric Cost Estimate
3. Participate in Cost and Operational Effectiveness Analysis
4. Support OT II
5. Conduct DT II
6. Surveillance, Stockpile Reliability and Failure Scoring Plans and Operations
7. Configuration Control Board
8. Test Integration Working Group
9. Rationalization, Standardization, and Interoperability
10. ASARC III - Coordination, Special Studies, Pre-Briefings
11. DSARC III - BCE/IPCE, T&E, PRR, Principals Presentations
12. LOGCAP
13. Procurement Strategy - Development and Approval
14. Production Estimate - RFP, Evaluation, Negotiation
15. GLLD Interface
16. Alternate Designator Interface
17. Independent Technical Data Package Validation
18. Commonality
19. Public Law 95-79 and 95-184 - Ceiling on Obligation and IOC Data
20. Negotiate and Restructure Contract

IV. PROGRAM STATUS

The 50 month ED phase was completed in November 1979 with the production decision. The production contract was not negotiated until March 1980 because of lengthy negotiations resulting from (among other things) the delayed DSARC III decision. Initial production facilitization completion was postponed from October 1980 to February 1981, and later to August 1981.

Initial production deliveries commenced in October 1981 and IOC was achieved in April 1982, the same time that the 75 round Reliability Demonstration requirement was completed (achieved reliability -- 69%).

A second year buy of 2,100 rounds for $72.9M was negotiated in March 1981. Production, which had been limited by the SecDef at 200 rounds/month (30% of the desired level) will terminate when the FY82 funds are spent. Congress had originally indicated that it would deny the Army request for $168.6M for 7,629 rounds in the FY83 Defense Authorization Bill (retaining only $15M for program termination). However, in December 1982, noting the "confusion which seems to surround the program at the present time," the House Appropriations Committee said that it would consider a request to use the $15M for continued production instead of termination if the Army decides to seek follow-on production funds. Copperhead is not a completely dead issue because its reliability has improved in recent tests, reaching the 80% standard set earlier by DOD.

The Copperhead project has cost $630M through six years of R&D and three years of production. The Army will end up with only 8,750 rounds, a tenth of the recently planned quantity and only about 5% of the stockpile contemplated in the early 70s. The 8,750 rounds are earmarked for the Rapid Deployment Force.

ATTACHMENT A

COPPERHEAD MILESTONE III

LESSON LEARNED

As part of the preparations to acquire the MILESTONE III Initial Production approval decision, an Operations Center (War Room) was established where daily meetings could be held, schedules and milestones could be tracked, performance/progress could be assessed and problems could be easily anticipated. The Center was activated approximately six months prior to the scheduled ASARC/DSARC and was located in a private, medium-sized room. The walls of our Center were devoted to the following subject matter:

(a) A Briefing Wall consisting of specific subject matter tied to a separate person responsible who would develop a set of time-scaled submilestones which could be tracked and would assure attainment of our objective. The following represents a spectrum of the activities tracked:

(1) Basic Performance
(2) Battlefield Environment
(3) Range Performance
(4) Environmental Qualification
(5) Operational Test II
(6) Cold Weather Performance
(7) HELBAT VII
(8) Drag/Nuclear Testing
(9) Acquisition Plan
(10) Producibility
(11) Human Factors Engineering Analysis
(12) Cost and Operational Effectiveness
(13) Technical Data Package
(14) Budget Cost Estimate/Independent Parametric Cost Estimate
(15) Firing Data Refinement (FADAC)
(16) Integrated Logistics Support
(17) Production Readiness Review
(18) Electromagnetic Radiation Effects
(19) Documentation/Functional Configuration Audit

(b) Testing hardware availability and the ever evolving testing schedules to satisfy design fixes, arctic, tropic, environmental and DT/OT II testing covered the remaining wall areas.

Daily meetings were held in the Operations Center which lasted approximately forty minutes. The routine went something like this: first, a review of the Briefing Wall; then, an update of hardware deliveries and testing schedules, followed by a review of the Directed Actions outstanding which would fallout before, during and after the various subject presentations were made. The Directed Actions were documented immediately after each meeting and delivered to all project personnel and to each functional organization supporting the project. They contained the specific action to be accomplished, the person responsible for accomplishment and a suspense date by which it was to be completed.

The above briefly outlines our internal intensive project management system for insuring effective communication. In order to insure that the higher headquarters decision makers were as knowledgeable as we were reference project status, Briefing Books were prepared. The books with the briefing were given to DARCOM, DA and OSD. In addition, all questions posed by these levels of management were answered, in writing, before we started our series of pre-ASARC, ASARC and pre-pre-DSARC, pre-DSARC and DSARC briefings.

The Briefing Books covered the following subject matter and reflected a name and telephone number where answers to questions could be had.

(1) System Specification Compliance
(2) System Compliance
(3) Human Factors Engineering Analysis
(4) Technical Data Package
(5) Production Readiness Review
(6) Special Producibility Efforts
(7) Test and Evaluation Assessment
(8) Integrated Logistics Support
(9) Rationalization, Standardization and Interoperability
(10) Decision Risk Analysis
(11) Design to Unit Production Cost
(12) Budget Cost Estimate
(13) Countermeasures/Counter-Countermeasures
(14) Obscurants
(15) Warhead Status
(16) Fuze Status
(17) Firing Status

They were bound together into volumes and taken to Washington where each expert effected a briefing and subsequently answered the unresolved issues via formal communications from the PM/JPM (with the bottom line solicitation for any additional information) to insure that the decision makers (and their staffs) were fully informed of project status. The Briefing Book Volumes were left behind as reference tools to be used by DARCOM, DA and OSD during the countdown period to ASARC/DSARC. This technique proved very effective since the COPPERHEAD passed its MILESTONE III test by receiving Type Classification status as the M712 at the ASARC and the release for limited production at the DSARC.

APPENDIX L

SOTAS
PROGRAM STUDY REPORT

I. SYSTEM DESCRIPTION

The Standoff Target Acquisition System (SOTAS) consisted of a moving target indicator (MTI) radar mounted on a BLACK HAWK helicopter, a ground positioning system, a data link, and several ground stations. The SOTAS helicopter flies well behind friendly lines and looks deep into enemy territory, locating and tracking enemy vehicular and airborne movement. Target location, speed, and direction of movement can be displayed in real time at the ground stations, enabling commanders to position their forces so as to meet an attacking enemy more advantageously, and to target the enemy for fire by a wide variety of Army and Air Force weapons. Four helicopters and their associated ground-based support equipment can provide coverage of a division's area of interest. The relationship of the SOTAS elements are shown in Figure L1.

The SOTAS development plan provided for the initiation of an engineering development phase lasting twenty-eight months followed by a competitive procurement phase and an IOC in FY 83. The program required an interface with the Army BLACK HAWK helicopter program and its prime contractor, Sikorsky, because the helicopter would carry the airborne SOTAS station. It also required an interface with the Joint MICNs (air-to-ground common data link) project which would provide the data link for SOTAS as well as for the Army Remotely Piloted Vehicle (RPV) Program and the Air Force Precision Location Strike System (PLSS). Finally, the SOTAS prime contractor in ED would be responsible for the development and fabrication of the radar and the ground stations and the complete system integration. The radar antenna could have either a mechanical scan or an electronic scan (E-scan) capability with the Army recommending initial use of the mechnical radar with concurrent development for future testing and production of the E-scan radar.

SOTAS

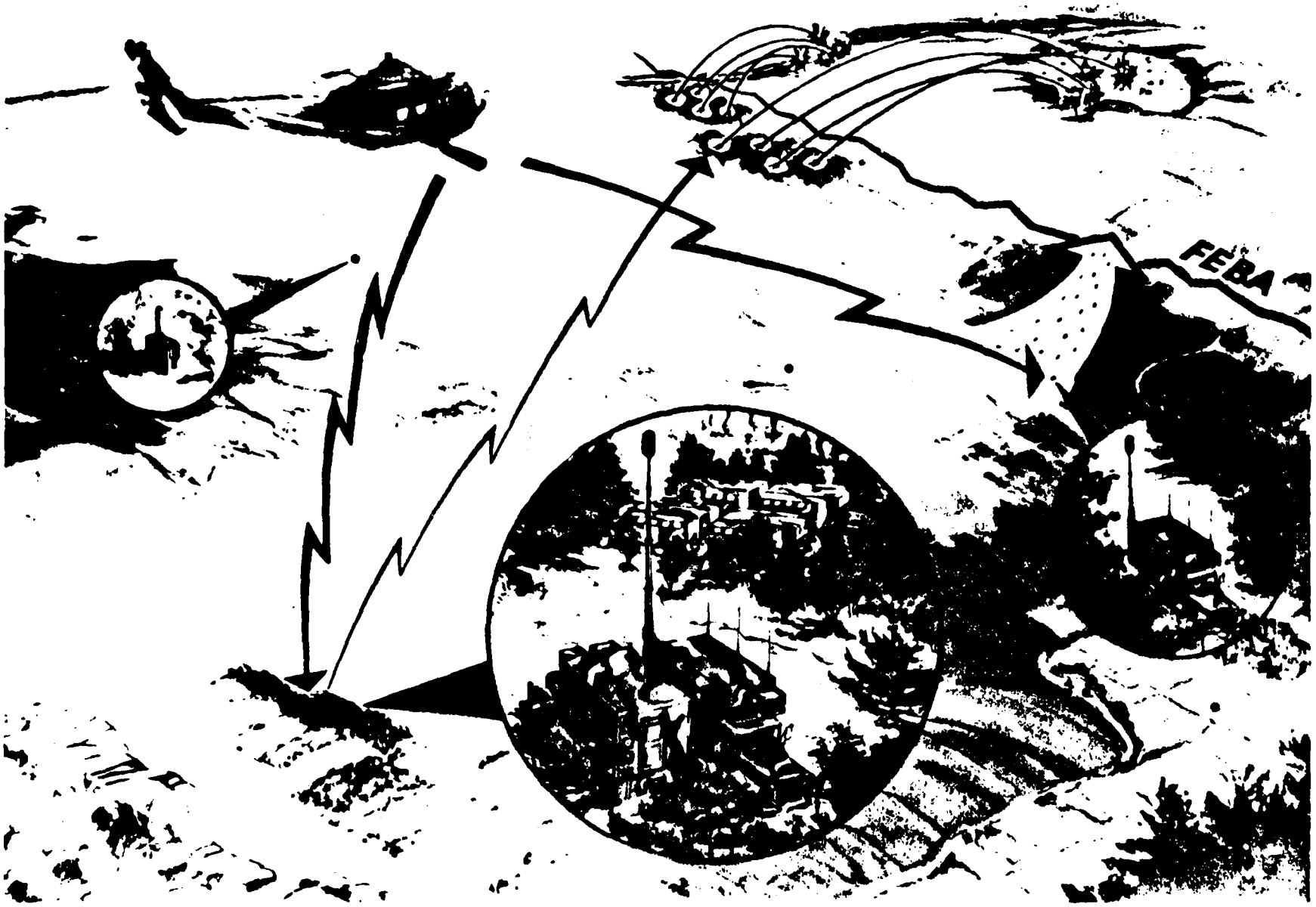


Figure L1

II. INITIAL PROGRAM SUMMARY

A. Background

The SOTAS program began in 1974 when the DDR&E requested that the Army evaluate the low visibility anti-armor capability. A DA Study Advisory Group was established in July 1974, and a testbed SOTAS system was assembled under contract to General Dynamics to demonstrate the concept.

By June 1975, SOTAS tests were being conducted at the U.S. Army Combat Developments and Experimentation Command. The results were encouraging enough to motivate the Under Secretary of Army to request that the program be accelerated. Joint Army/Air Force SOTAS/Advanced Location Strike System (ALSS) tests were conducted at White Sands Missile Range in November 1975. In 1976, the SOTAS testbed system was demonstrated in Korea and it was utilized in the Reforger 76 field exercise in Europe.

Based on strong user support and promising field demonstrations, DA directed in May 1977 the early fielding of SOTAS to USAREUR. A few months later it directed that a 1-2 year acceleration of the IOC date be investigated and that the new UH-60A (BLACK HAWK) helicopter be used for the airborne station. Later in 1977 SOTAS participated in Reforger 77.

The SOTAS program had its first series of Army and OSD reviews in March and July 1978 to determine if the system was ready to proceed from AD to ED and, if so, how to execute the ED program (ASARC/DSARC II).

B. Acquisiton Strategy

The SOTAS acquisition strategy at the time of the ASARC/DSARC II is shown at Figure L2. The ED contractor was to be responsible for total system design, hardware fabrication, system integration, training support, and DT/OT II support. The ED contractor would also provide an ED system and the first five production systems. A production contractor (to be determined) would provide the remainder of the AAO.

The development philosophy included setting an objective IOC (FY84), pacing the program by proof of principal of the radar, releasing non-radar parts of program only as needed to meet IOC, and considering 1985 use of data by both USA and USAF.

C. Costs

Cost for the SOTAS program varied depending upon which source was used. Figure L3 shows the ASARC/DSARC II time frame sunk, R&D, investment, and O&S costs as estimated by the Baseline Cost Estimate (BCE), Independent Cost Estimate (ICE), and

SOTAS ACQUISITION SCHEDULE-1978

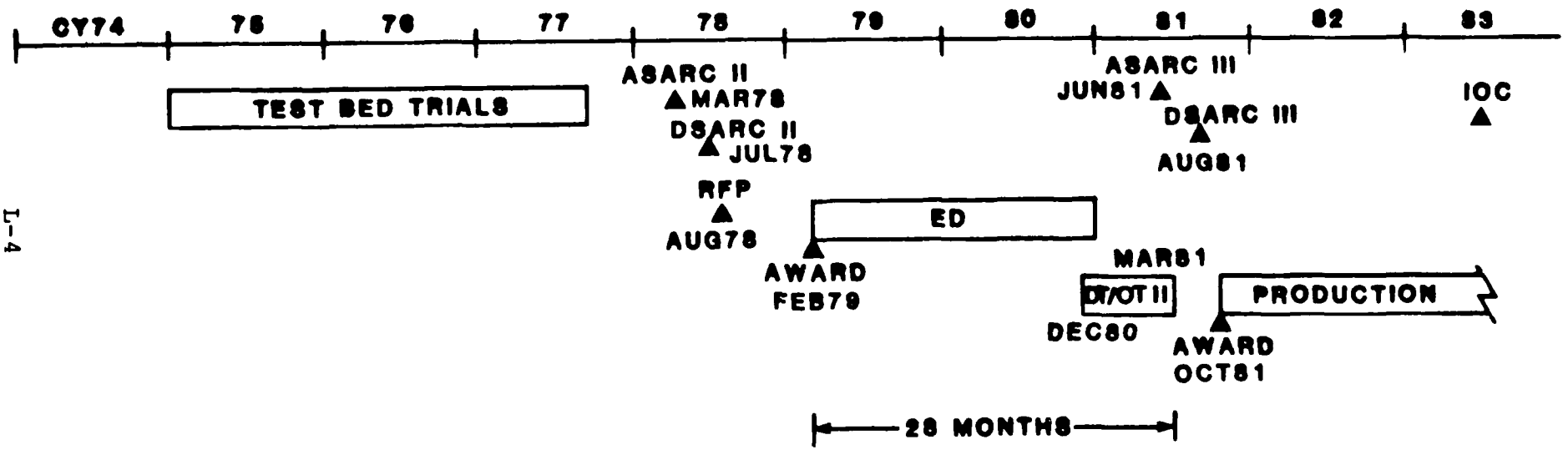


Figure L2

SOTAS
LIFE CYCLE COST ESTIMATES
(CONSTANT FY79 $ IN MILLIONS)

	BCE	ICE	COA POSN
SUNK	(45)	(45)	(45)
R&D	195 1/	135	170 2/
INVESTMENT	575	620	690
O&S	1075	950	1240
TOTAL TO COMPLETE	1845	1705	2100

1/ INCLUDES 9.2M TRACE

2/ INCLUDES 14.5M TRACE

Figure L3

Comptroller of the Army (COA). Investment cost was based on a procurement quantity of 123 aircraft, 24 primary ground stations, and 136 secondary ground stations.

III. PROGRAM EVOLUTION

A. ASARC/DSARC II

A Preliminary ASARC was held on March 8, 1978, and the ASARC II was held on March 23, 1978, to determine the readiness of SOTAS to progress to Engineering Development (ED) and, if so, how to execute the ED Program. Prior to this date, the SOTAS project had not had an ASARC or DSARC. The ASARC Agenda is shown in Figure L4 and the ASARC attendees are listed in Figure L5.

The ASARC supported SOTAS progression to ED because the concept had proven its worth in field tests and exercises although they felt that the COEA was inconclusive and affordability had not been proven. The ASARC also supported the PM's recommended alternative for the ED Program; i.e., initiate ED using the AN/APS-XX radar (Mechanical Scan Antenna) and build four Electronic Scan Antennas which would be tested during DT/OT-II.

The ASARC recommendations that SOTAS proceed to ED and that Alternative 2, as proposed by the PM, be adopted were approved by the Secretary of the Army. The briefing was restructured to update the COEA and an affordability review was conducted in preparation for the DSARC II.

The DSARC II was held on August 4, 1978, four months after the ASARC. The delay was at the request of the Army, in order that the issues raised at the ASARC could be addressed. The attendees are listed in Figure L6.

The DepSecDef Decision Memorandum was published on August 31, 1978. Although the Army's request to initiate full-scale ED was approved, several conditions were placed on the Army. These included the following:

- The USDRE will be notified any time the cumulative program costs exceed the planned program costs by fifteen percent, when major milestones are completed as much as six months late, or when estimated or measured performance parameters breach DCP thresholds.

- Conduct a comprehensive review of the baseline Reconnaissance Surveillance and Target Acquisition (RSTA) systems used in the COEA and perform a detailed trade-off analysis using the SOTAS COEA methodology to determine the effects on operational effectiveness of deleting various RSTA systems and combinations of systems with SOTAS in operation and submit a report within nine months.

- Assess interoperability among these RSTA systems and their compatibility with conceptual fusion/analysis

Introduction	PM	5 Min
User Briefing	TRADOC	30 Min
o Review of - Mission Element Need - Threat - Operational Concept - User Evaluation of Testing o COEA		
Developer Briefing	DARCOM (PM)	25 Min
o System/Program Alternatives o Rationalization/Standardization/ Interoperability o Developer Evaluation and Testing o Cost, Schedule, Risk		
Cost Analysis Brief	OCOA	5 Min
Affordability	PAE	10 Min
Discussion	Chairman	45 Min

FIGURE L4

Agenda
SOTAS ASARC II
March 23, 1978

VCSA	GEN Kerwin
DARCOM	GEN Guthrie
	Mr. Crawford
TRADOC	LTG Thurman
	COL Bayer
	COL Rajala
	Mr. Mathiason
ASA(RDA)	Dr. Pierre
	Mr. Friedrich
	MAJ Hollander
ASA(IL&FM)	Mr. Gibbs
	Mr. Russ
	COL Sauer
DCSRDA	MG Feir
	MG Akers
	BG Maloney
	LTC Mitchell
DCSOPS	MG Richardson
	MG Myer
	Mr. Vandiver
	MAJ Kail
DCSLOG	MG DeHaven
DUSA(OR)	Mr. Woodall
PA&E	Mr. Hamilton
	LTC Mitchell
GC	Mrs. Volner
COA	Mr. Allen
	Mr. Hogan
OTEA	MG Becton
	COL Sebastian
DCSPER	BG Moore
OCLL	MAJ Tingle
SRAO	COL Balzhiser
	LTC Bertelkamp
	MAJ Lind
OSA	MAJ Benton
OUSofA	LTC Stanford
PM, SOTAS	COL Cianciolo
	Mr. Kenneally
TSM, SOTAS	COL Brofer
PM, BLACKHAWK	COL Kenyon
ADAS	LTC Hadjis
DAA	Mr. Zimmerman
ACSI	BG Smith
DAIRO	BG Cockerham

FIGURE L5

Attendees
SOTAS ASARC II
March 23, 1978

OUSDRE

Dr. Dinneen
RADM Linder
Mr. Moore
Mr. Bernard
Maj. Lopes
Col. Minich

JCS

BG Vesser, Jr.
LTC Burden

U.S. Army

Dr. Pierre
GEN Kroesen
LTG Baer
LTG Keith
MG Richardson
Dr. Trainor
BG Stubblebine
BG Maloney
Mr. Woodall
COL Clanciolo
CPT Killackey
Mr. Kenneally
LTC Mitchell
COL Brofer

ASD (C)

Mr. Eaton
Mr. Laughlin

MG Bowman
LTC Richardson

ASD(MRA&L)

Dr. Nelson
Mr. Shorey
Mr. McGrath

ASD(PA&E)

Mr. Christie
Mr. Finsterle
Mr. Krulak
Mr. Tramsue OT&E

DEF SYS MGT COLLEGE

Mr. Freedman

NATO

Amb Komer
Mr. Keech

CAIG

Mr. Margolis
Mr. Yourtee

ODUSD (P)

Bader

DIA

CAPT Ore, USN

DCI

Mr. Koehler

FIGURE L6

Attendees
SOTAS DSARC III
August 4, 1978

systems and fire control systems. Within nine months, submit a report detailing results of this assessment and specifying SOTAS interoperability procedures/operations.

- Assign a logistics manager to the program within ninety days.

- Program sufficient developmental and operational test time prior to DSARC III to establish compliance with logistics, reliability, maintainability and availability goals with high confidence levels.

- Analyze alternatives for achieving the SOTAS system availability requirements by trading off the number of helicopters in a SOTAS system, repair sites for both aircraft and ground stations, and spares concepts. Minimization of manpower, skill levels and costs shall be major considerations. The analysis results and recommendations for alternative logistic and support concepts, with cost/operational impacts, will be submitted within twelve months. Final decisions on system configuration, logistic and support concepts will be made at DSARC III.

- Prepare an RSI plan for a U.S. initiative to get the Allies to use the SOTAS capability to the maximum extent possible. Identify specific milestones and describe plans to accomplish each milestone. In addition to the RSI plan, prepare a draft document that defines the RSTA needs of each NATO Ally, address the effectiveness of SOTAS in filling those needs, and outline alternative plans for each country to obtain the SOTAS capability. This document should be suitable for presentation to the Conference of National Armaments Directors (CNAD) by USDRE. Submit the RSI plan and the requirements document within thirty days.

- Establish a design-to-cost goal for the complete system, including the UH-60A BLACK HAWK helicopters, of $20M (FY79$) each for twenty-four division systems.

Several of the above conditions originated from a Logistics Analysis of SOTAS that had been performed by the DOD Product Engineering Services Office, Logistics Review Division, for DSARC III. However, although RSI was addressed, there was no reference to systems proposed by other services (notably, the AF Pave Mover Project which, although trailing SOTAS, had similar capabilities). The DSARC (and the OSD staff) had apparently taken a narrow one-service look at SOTAS.

Other than the requirements to program sufficient DT and OT time prior to DSARC III and to notify OSD when major milestones are completed as much as six months late, the Army's accelerated program was not questioned. The SOTAS DCP # 169 was signed in November 1978.

The Army did not fund the project at the DSARC approved level. Because the program was already based on an optimistic schedule, the impact of not fully funding it was severe. An accelerated schedule requires higher not lower funding levels.

Motorola Company's Government Electronics Division was selected as the prime contractor, responsible for the new MTI radar and the airborne and ground stations. In addition, Motorola was to be responsible for total system integration; e.g., helicopter, radar, data link and stations. It was the first systems integration contract Motorola had received and apparently it was not well understood, because the issue of who was the "integrator" -- the Army or Motorola -- was not settled until late in the ED Phase.

B. Cost and Schedule Thresholds Breached

In the face of both cost and schedule threshold breaches, and for the coming Congressional budget hearings, the DepSecDef informed the Army on December 8, 1980, that he proposed a review of SOTAS for the DSARC Principals to be held in the February/ March 1981 time frame. He also asked for a personal briefing later in December so that he could discuss and agree with the Army on the alternatives the Army would entertain in the SOTAS review.

A preliminary review was held on February 20, 1981, to resolve outstanding issues and clarify decision alternatives to be presented to the ASARC. Highlights of the preliminary review were that, although the user stated that the system must be fielded, there were cost, required quantity, affordability, and management issues to be answered. In addition, the Pave Mover/SOTAS relationship was not addressed (Pave Mover was an USAF airborne radar project that would combine surveillance and weapon guidance against moving targets). Preliminary review are attendees listed in Figure L7.

In view of the SOTAS problems, DARCOM had appointed an Army-wide Blue Ribbon Panel to assess the situation. The conclusions of the panel are noted below:

- Specifications were not over-designed;
- There were no design deficiencies;
- Some risks exist but they appear under control;
- The revised schedule provides sufficient time;
- Areasof high technical risk have been reduced to moderate levels.

After delays, the ASARC was held on April 17, 1981, in order to establish an Army position on a restructured SOTAS program for

ODCSOPS

MG Mahaffey
LTC(P) Forster

DARCOM

Dr. Haley

OASA(RDA)

Dr. Epstein

ODCSLOG

Mr. Cribbins

OCA

Mr. Allen
Dr. Honig

OASA(ILFM)

Mr. McIntosh

ODUSA(OR)

MAJ Zeigler

PMO

COL Davis
Mr. Burnstein
Mr. Shuhandler
Mr. Buannic

TSM

COL O'Kane

DAIRO

LTC Hamilton

ODCSRDA

MG Merryman
BG Mason
Mr. Woodall
COL Huggin
LTC Lunsford
MAJ Vollrath

TRADOC

MG Vuono
BG Teal
Mr. Mathiason
COL Gardner
COL Yelverton

OACSI

BG Wilmot
MAJ Craig

ODCSPER

Dr. West
CPT Morris

PAED

Mr. Hobbs
LTC Souvenir

OGC

CPT Whealy

OTEA

LTC LaCaze

OCE

Mr. Yentzer

SRAO

Mr. McGregor
Mr. Soobert
LTC Click

FIGURE L7

Attendees
SOTAS Preliminary Review
February 20, 1981

the DSARC review which was scheduled for May 21, 1981. (Agenda is presented in Figure L8.) Opening remarks acknowledged that SOTAS was in trouble in four Congressional committees, the schedule had slipped about two years, and the project cost growth had been sizable. During discussions, the user stated that the ROC was still valid and SOTAS must be fielded; the COA reported that the program had substantial cost risk (see Figure L9 for COA cost recommendations); the afforability of SOTAS was termed doubtful; and the PM argued that cost risk was low, technical risk was low except for the radar which was moderate, and the schedule risk was low to moderate. The PM recommended continuation of the DSARC approved program-restructured (Alternative 1). (Other options were an alternative program with reduced capability, a parallel reduced capability program, and termination.) The four alternatives are summarized as follows:

> Alternative 1: The current ED program is one-third complete (22 months into the program) with problem areas identified and actions taken to resolve them. It provides a supportable production system with a basis for growth potential; however, it costs more and takes longer then the original DSARC II estimate.
>
> Alternative 2: The reduced capability program relies heavily on contractor experience in fielding the existing testbed systems. However, it does not meet the Army's operational requirements, has no growth potential, does not save significant money, and would be fielded later. Additionally, the cost and schedule risks in undertaking this alternative are high.
>
> Alternative 3: The parallel effort retains the stability of the existing program and additionally provides a one-time, quick-reaction, limited capability for potential Rapid Deployment Force (RDF) use. However, it increases R&D costs, requiring a major reprogramming or supplemental budget action for FY82.
>
> Alternative 4: Termination of the SOTAS program would save R&D funds; however, the validated Army need for division surveillance and target acquisition capability would not be satisfied.

All members present (see Figure L1^) agreed that the program should continue as recommended by the PM (ED Phase total 56 months). The VCSA said that if the ASARC approved the program, the Secretary or the Chief of Staff would have to find the additional money or else change the program. He also directed that actual programmed costs and estimates be brought in-line (no deltas), management be gotten under total control to make it work effectively, coordinate with the Air Force to insure that interface requirements for PAVE MOVER are satisfied, and explain the rationale for the Army decision to Congress.

- SYSTEM DESCRIPTION		
- O&O CONCEPT		
- COEA REVIEW		
DEVELOPER	PM	35 MIN
- PROGRAM STATUS		
- SYSTEM PERFORMANCE		
- COST		
- RISK ASSESSMENT		
- OPTIONS FOR CONSIDERATION		
o ALTERNATIVE PROGRAM		
o PARALLEL EFFORT		
o E-SCAN CAPABILITIES		
o DATA LINK SUBSYSTEMS		
- INTEROPERABILITY		
- RECOMMENDATIONS		
SPECIAL COMMITTEE REPORT	DUSA (OR)	10 MIN
ILS ASSESSMENT	DCSLOG	5 MIN
COST ASSESSMENT	OCA	5 MIN
AFFORDABILITY	PAED	5 MIN
DISCUSSION	ALL ATTENDEES	105 MIN

FIGURE L8

SOTAS ASARC Decision Review
Agenda

SOTAS
RECOMMENDED ARMY POSITION
SOTAS LIFE CYCLE COSTS

	CONSTANT FY82	CURRENT DOLLARS
RESEARCH & DEVELOPMENT	$ 323M	$ 358M
INVESTMENT	1399M	1934M
OPERATING & SUPPORT	2984M	6546M
TOTAL TO COMPLETE	$4706M	$8838M
SUNK	196M	147M
TOTAL	$4902M	$8985M

Figure L9

OGC
Mr. Hunt
CPT Whealy

DUSA(OR)
Mr. Hollis

OASA(RDA)
Mr. Daoulas
Dr. Epstein
Ms. Hoeber

AFMCO
MG Anson

ODCSRDA
LTC Keith
MG Skibbie
Mr. Woodall
COL Saunders
COL Huggins
LTC Lunsford
MAJ Vollrath

ODCSLOG
Mr. Cribbins

OASA(ILFM)
MG Brady
BG Kenyon

OASA(ILFM)
Mr. Wallace

OCA
LTG West
Dr. Honig

PMO
COL Crawford, Briefer
Mr. Keannealy
LTC Spinosa

TSM
COL O'Kane, Briefer

VCSA
Gen Vessey

ODAS
LTG Lee
LTC Howard

ACSI
MG Thompson

DARCOM
Gen Guthrie
Dr. Haley
MG Stubblebine
MG Paige

OTEA
MG Kirwan

PAED
MG Roddy
LTC Souvenir

ODCSPER
COL Gingras

TRADOC
MG Vuono
COL Gardner

OCLL
LTC Chase

OCE
MAJ Brown

DAIRO
LTC Hamilton

SRAO
Mr. McGregor
LTC Vance, ASARC Ex Sec
Mr. Soobert

FIGURE L10

Attendees
SOTAS Special ASARC
April 17, 1981

The Army had taken many management actions to keep the SOTAS project alive. These are listed in Figure L11. In addition, the SOTAS Program had solicited high level support within the Army as indicated by the following quotes:

- "I want to express my strong support for this program. SOTAS ... has ... high priority ... other means fall short. The Army's need is urgent."

  Gen. Rogers, SACEUR, 18 May 81

- "All divisions need ...SOTAS ... keystone of extended battlefield concept ... SOTAS ... should proceed. We need the capability now."

  Gen. Shoemaker, CDR FORSCOM, 15 April 81

- "Search for ways to expedite acquisition of SOTAS."

  Gen. Kroesen, CINCUSAREUR, 4 Mar 81

- "Strongly restate the importance we place on this vital program."

  Gen Starry, CDR TRADOC, 5 Mar 81

- "I urge that SOTAS be produced as fast as possible."

  LTG Becton, CDR VIII Corps, 19 Feb 81

Finally, the Army would argue for continuation of the restructured program because:

- SOTAS provides a significant contribution to the Army's combat capability.
- There has been demonstrated technical progress.
- Less capable approaches are not cost effective and have limited potential.
- Cost and schedule are under control.

The Army also had the support of the Defense Science Board which had conducted its own study of SOTAS.

On May 21, 1981, the DSARC principals held a special review of the SOTAS program of the cost and schedule problems. In a May 14 pre-brief, the DSARC members were informed of the principal issues that should be addressed by the Army. The following nine issues were identified:

1. Isthe SOTAS Program cost effective in an ECM environment?

- DARCOM Blue Ribbon Panel
- Increase PMO By 17 Personnel Spaces
- Functional Support Improved
- Changed Army Management/Leadership
- SOTAS Selected for DARCOM/Program Cost Control System
- Motorola C/SCSC Validation June 1981
- Program Fully Funded in POM
- Antenna Producibility MM&T Planned
- Very High Priority Army Program
- Adequate Management Reserve (TRACE)
- Restructured Baseline October 1980
- Modified Systems and Procedures To Meet C/SCSC
- Capital Expenditures For Plant And Test Equipment
- Management Control Personnel Increased
- Senior Management Attention To Program
- Evaluating Restructured Management
- Recruiting Additional Systems Engieners

FIGURE L11

Army Management Actions

2. Is the Army's preferred alternative fully funded?

3. Has an effective lower cost system been defined? Does one exist?

4. Should a pre-planned product improvement approach be considered?

5. Should production quantity reduction be considered to counteract cost growths?

6. What management actions have been or could be taken to ensure that the program cost and schedule are under control?

7. Is adequate test and logistics development time built into the restructured program?

8. What are the established availability objectives, support items to be delivered, and test equipment development schedule?

9. Should the SOTAS Program be continued? If yes, should the Army's restructured program be approved or should a lower cost program be defined? If no, what other programs can be adjusted to accomplish the SOTAS mission?

   (Note: There was no mention of the potentially redundant AF program, Pave Mover.)

Two months after the DSARC review, the SDDM was issued (July 22, 1981). The DepSecDef, while admitting the Army's need for the system, expressed concern over the cost and schedule in spite of the Army's commendable efforts to overcome the impact of erroneous initial estimates, poor management, and lack of program control. Therefore, he gave the Army 60 days to submit for USDRE approval, revised SOTAS program options which included the following features:

- Shorten the development schedule - fielding beginning NLT 1984.

- Re-examine the radar subsystem.

- Make arrangements for accomplishing systems integration by other than the present prime contractor.

- Reassess the number of ground and airborne systems to be acquired.

- Reduce the acquisition cost substantially below that provided in the Army's restructured program.

Finally, the DepSecDef pointed out that support beyond the 60 day period would depend upon the acceptablity of the program which the Army structures.

C. Response to the SDDM

The Army issued a "Tasker" on July 28, 1981, establishing an Ad Hoc Working Group (AHWG), outlining the requirements and responsibilities, and identifying points of contact.

On September 16, 1981, the SOTAS Decision Review, chaired by the VCSA, was held to document an Army position in response to the July 22, 1981, SOTAS SDDM. At the conclusion of the discussion, the Army position, as endorsed by the VCSA, was as follows:

- Other alternatives do exist at about the same cost and performance but at greater schedule risk.
- E-scan antenna will be given up.
- ECCM will be developed - can be reduced or eliminated at ASARC III.
- Can live with 61 airborne systems - down from 82.
- Cannot reduce number of ground stations.
- Defer decision on how to allocate aircraft.
- Can save approximately 24% of acquisition costs if no monies are allocated to management reserve.
- Can promise ED prototypes only by 1984.

A briefing of the Army position was scheduled for September 17, 1981. The Secretary of the Army memorandum to the DepSecDef in September 1981 documented the Army position.

IV. PROGRAM STATUS

Following the September 1981 ASARC, there was a two month period of Congressional, OSD, DA, and PM reviews and discussions that culminated in the Motorola contract being terminated because it would not accept a fixed price contract and Congress (HASC) eliminating SOTAS from the budget. However, Congress provided the Army with $5M to keep the SOTAS effort going as the Battlefield Data System (BDS). Then early in 1982, OSD established the Joint Surveillance Target Attack Radar System (J-STARS). J-STARS is managed by the Air Force with an Army Deputy Program Manager and an OSD committee (Steering Group) attempting to see that the requirements of both services are being satisfied. The J-STARS program, as of December 1982, was planning to release an RFP for a new radar, to possibly use the MICNS data link, to use the SOTAS (BDS) ground stations, and to use fixed wing aircraft instead of helicopters.

The SOTAS (now BDS) Program Management Office personnel are now working with J-STARS but have not moved to the J-STARS location. The PM-SOTAS retired in October 1982 after a short period as DPM J-STARS. The new Army DPM J-STARS is a former DARCOM staff officer who had been involved with the SOTAS project.

APPENDIX M

AV-8B
PROGRAM STUDY REPORT

I. SYSTEM DESCRIPTION

The AV-8B ADVANCED HARRIER, a derivative of the AV-8A HARRIER, is a fixed-wing aircraft that can take off and land vertically or with a short ground roll. This aircraft is being designed to fulfill a Marine Corps requirement for responsive close air support and flexible basing capabilities so that the aircraft can be located close to an expanding battlefield. The AV-8B is depicted in Figures M1 and M2. Aircraft specifications, compared with the AV-8A, are provided in Table M1.

The AV-8A is a single-engine, single-seat aircraft characterized by a moderately swept high wing, two large engine inlets, a bicycle type landing gear with outriggers near the wing tips, and two rotatable engine exhaust nozzles on each side of the fuselage. The AV-8A is powered by a Rolls-Royce F402-RR-402 (Pegasus 11) engine. Because the AV-8A flies in both wingborne and jetborne modes, it is equipped with both aerodynamic controls and a reaction control system. The reaction controls become effective when the engine nozzles are deflected. Thrust for the reaction controls is produced from air bled from the engine's high pressure compressor and ducted to the ends of the fuselage and wings. Generally speaking, the performance characteristics of the AV-8A are comparable to other non-V/STOL light attack, transonic aircraft under similar conditions. However, if runway length becomes a limiting factor, other aircraft may not be able to take off or land, whereas the AV-8A can execute a vertical or short takeoff and landing from relatively austere sites. This unique feature provides the USMC responsive, close-air support of ground forces during all phases of amphibious and beachhead operations without extensive base development. The AV-8A has been employed in numerous major field exercises, has been deployed aboard an aircraft carrier and amphibious assault ships of the LPH class, and has operated from other air capable ships.

The AV-8B, a derivative of the AV-8A, better fulfills USMC requirements by combining enhanced flexibility, longer range, heavier payload, and close-in fighter ability at a significantly lower cost than an all new V/STOL aircraft. A raised and enlarged cockpit is incorporated into a larger forward fuselage, improving pilot vision and providing more usable space for a modernized airborne avionics system. Advanced avionics will provide greater weapon delivery accuracy, enhanced effectiveness and reduced pilot work load. Improved reliability and maintainability result in increased operational readiness.

Modifications to the AV-8 wing, use of lightweight composite materials, and improvements in controlling engine thrust should enhance AV-8B effectiveness without the need for an engine change. There are configuration changes to about 90% of the AV-8A components; hence, there is about 10% commonality.

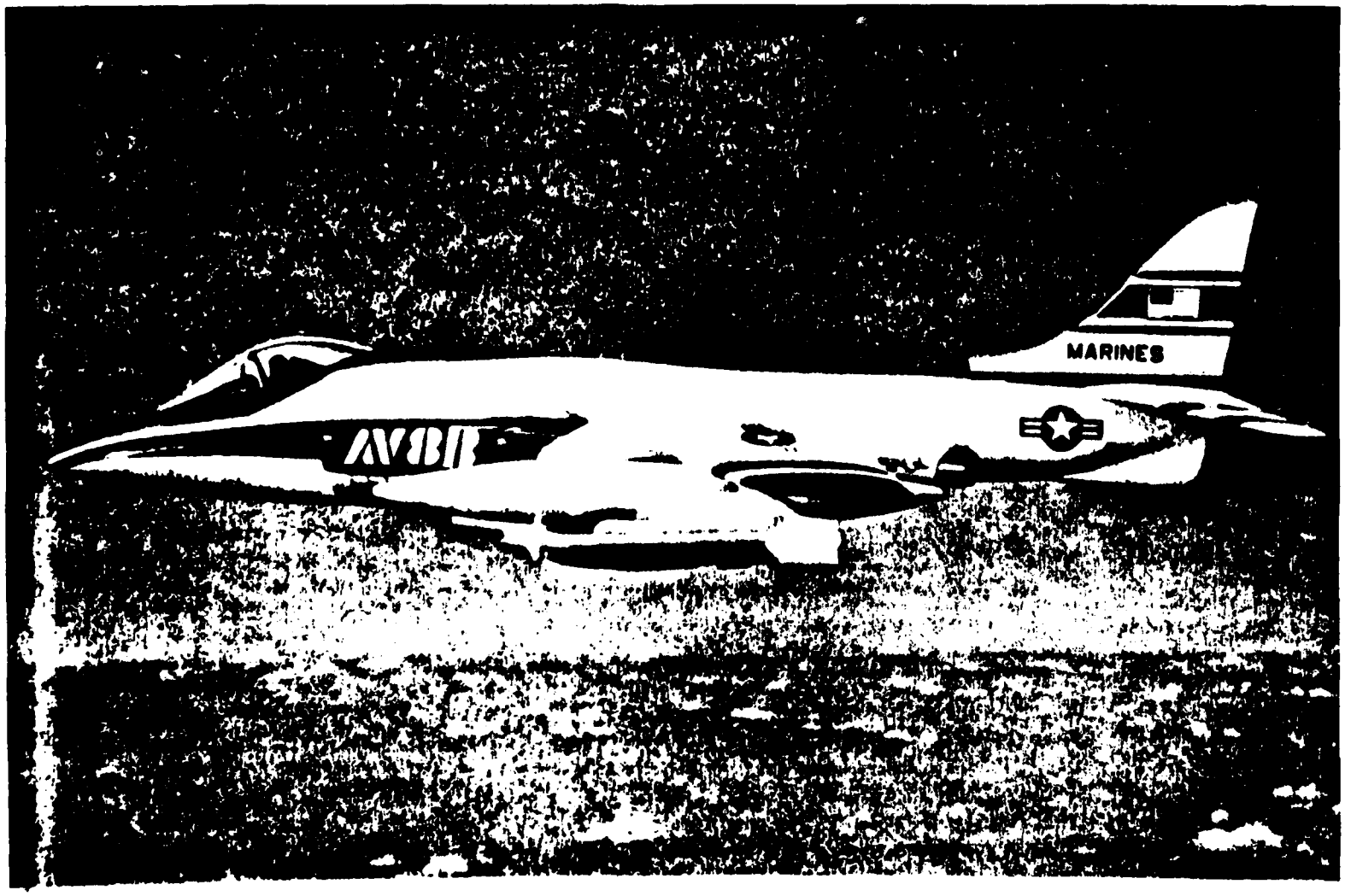


Figure - M1: Advanced Harrier AV-8B

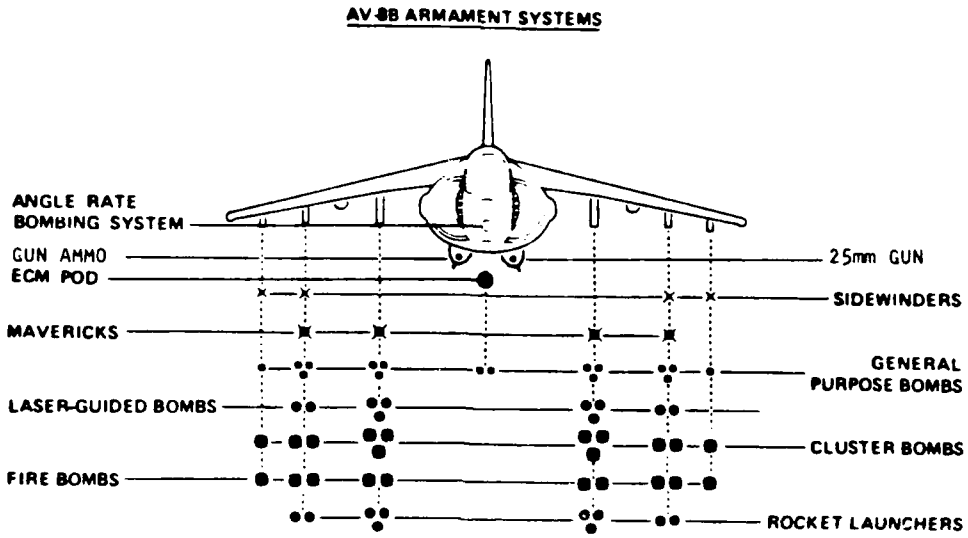


Figure - M2:
AV-8B ARMAMENT SYSTEMS

TABLE M1

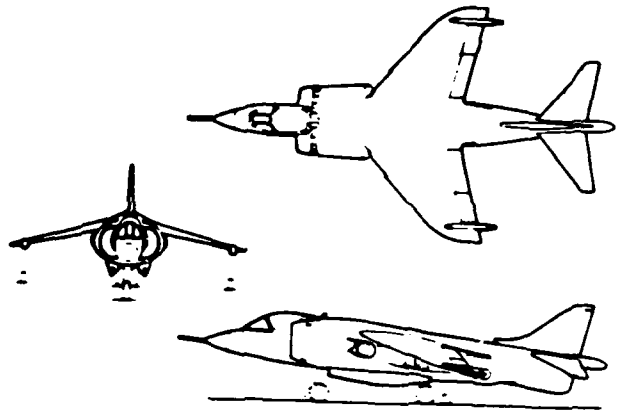
AV-8B SPECIFICATIONS COMPARED WITH THOSE OF THE AV-8A

	AV-8A	AV-8B
Wing Span (ft)	25.27	30.33
Length (ft)	45.55	46.33
Height (ft)	11.25	11.65
Weight, empty (lbs.)	12,400	12,750
Max Takeoff (Tropical Day)	17,050 VTO	19,185 VTO
Weight (lbs.)	22,300 STO	29,750 STO
Max Speed (KTS)	600	565
Service Ceiling	50,000	50,000
Ferry Range, Unrefueled (Miles)	1,170	2,460
Internal Fuel (lbs.)	5,160	7,915
External Fuel (lbs.)	3,920	7,914
Engine Thrust (lbs.)	20,975 (minimum)	21,450 (minimum)
Manufacturer	British Aerospace	McDonnell Douglas

COMPARISON OF THE AV-8A, YAV-8B, AND THE AV-8B

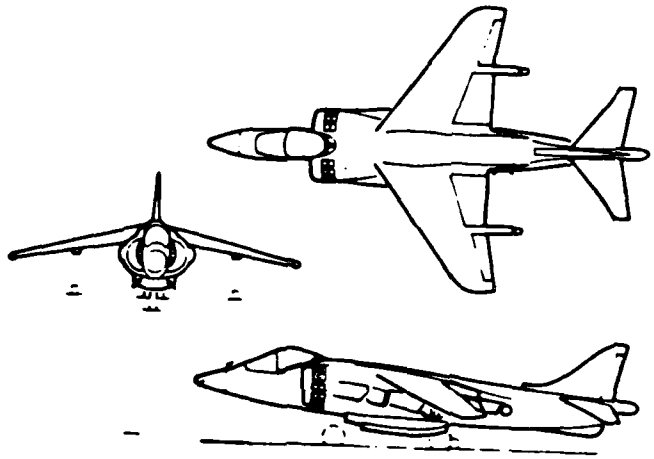
AV-8A

HEIGHT 11.25 FT
LENGTH 46.55 FT
WIDTH 25.27 FT



AV-8B

HEIGHT 11.85 FT
LENGTH 46.33 FT
WIDTH 30.33 FT



YAV-8B

HEIGHT 11.25 FT
LENGTH 49.56 FT
WIDTH 30.33 FT

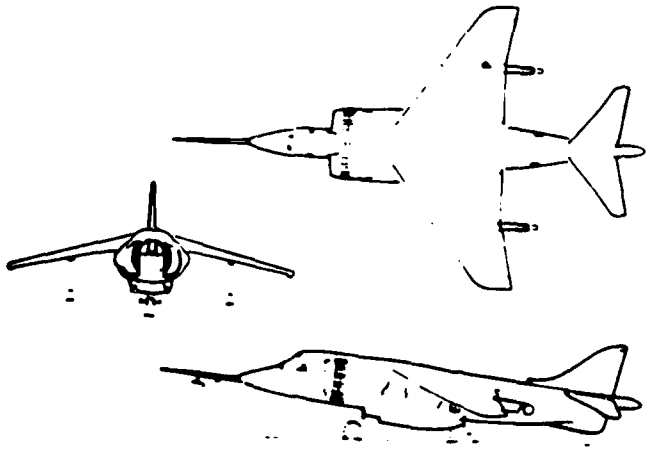
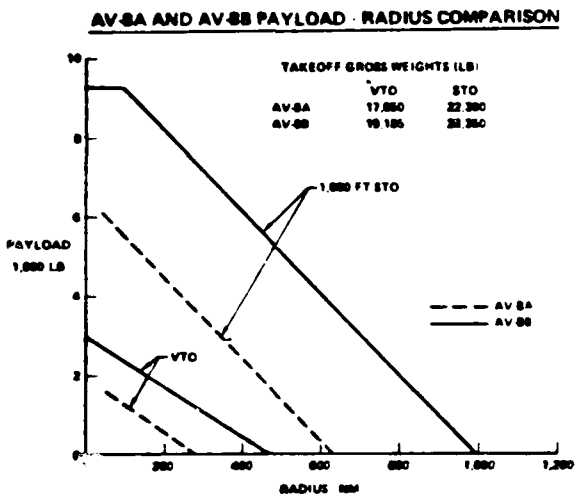


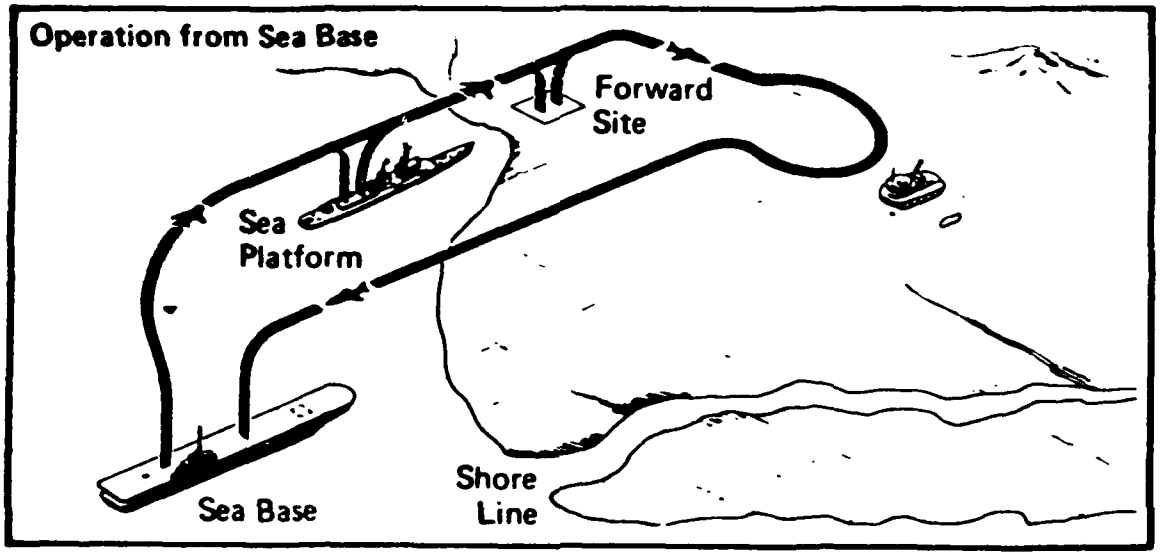
Figure - M3: Comparison of AV-8 Types



Note: VTO is vertical takeoff and STO is short takeoff.

Figure - M4: Payload-Range Comparison

BASING FLEXIBILITY IS A UNIQUE ADVANTAGE OF VSTOL



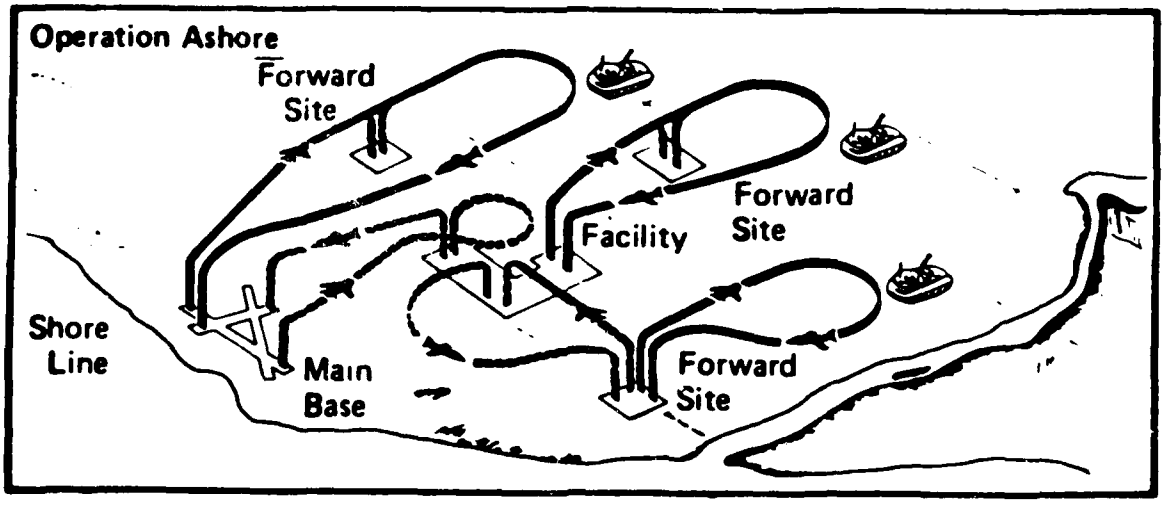
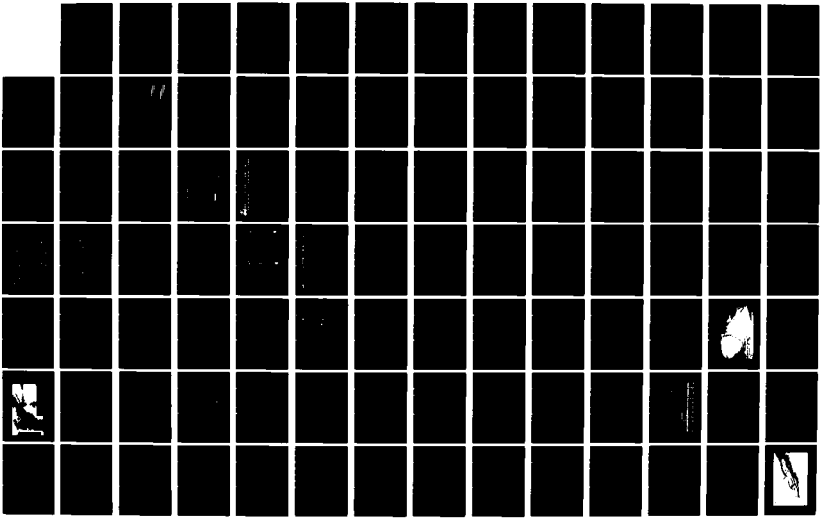
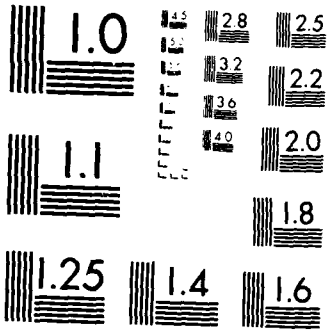


Figure - M5: Basing Flexibility

AD-A129 797 EVALUATION OF THE EFFECTIVENESS OF THE DEFENSE SYSTEMS ACQUISITION REVIEW..(U) INFORMATION SPECTRUM INC ARLINGTON VA D D ACKER 04 APR 83 2/3

UNCLASSIFIED ISI-V-3824-03-VOL-2-PT-2 MDA903-82-G-0055 F/G 5/1 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963 A

II. INITIAL PROGRAM SUMMARY

The AV-8B program started as a prototype development program in 1976 to create a new model that would perform significantly better than the deployed AV-8A. The AV-8A was developed in the United Kingdom and entered service with the Royal Air Force in 1969. The U.S. Navy purchased 102 AV-8A HARRIERS in the early 1970s for use as a Marine Corps close-air support aircraft. The Marine Corps planned to modernize its close-air support squadrons in the 1980s with some 330-odd AV-8B ADVANCED HARRIERs as a major step in its intended conversion to an all V/STOL air arm.

The AV-8B is designed to combine the AV-8A V/STOL capability with modern U.S. technology and design to achieve an improved range-payload capability. The improved capability is to be achieved by incorporating a new, super-critical composite material wing; installing lift improvement devices on the bottom of the fuselage; modifying the engine inlet configuration; and, by including advanced avionics, bombing system, reliability, and maintainability.

McDonnell Douglas is the prime contractor for the AV-8B development with British Aerospace an associate contractor. Under the terms of a Memorandum of Understanding (MOU) between the U.S. and the U.K., signed in July 1981, the share of costs, work and future orders is as shown in Figure M6.

In May of 1973, the Commandant of the Marine Corps issued a Specific Operational Requirement (SOR) for an advanced V/STOL aircraft to replace all of the Marine Corps' light attack planes, AV-8A and A-4M. In October 1975, a revision to the SOR stated the need for additional two-seat V/STOL trainer aircraft.

A draft Development Concept Paper #160, "AVX USMC Light Attack Aircraft (AV-8B)" was circulated for coordination on March 10, 1976.

The development program laid out in DCP #160 was addressed in 5 phases, as depicted in Figure M7. These phases can be summarized as follows:

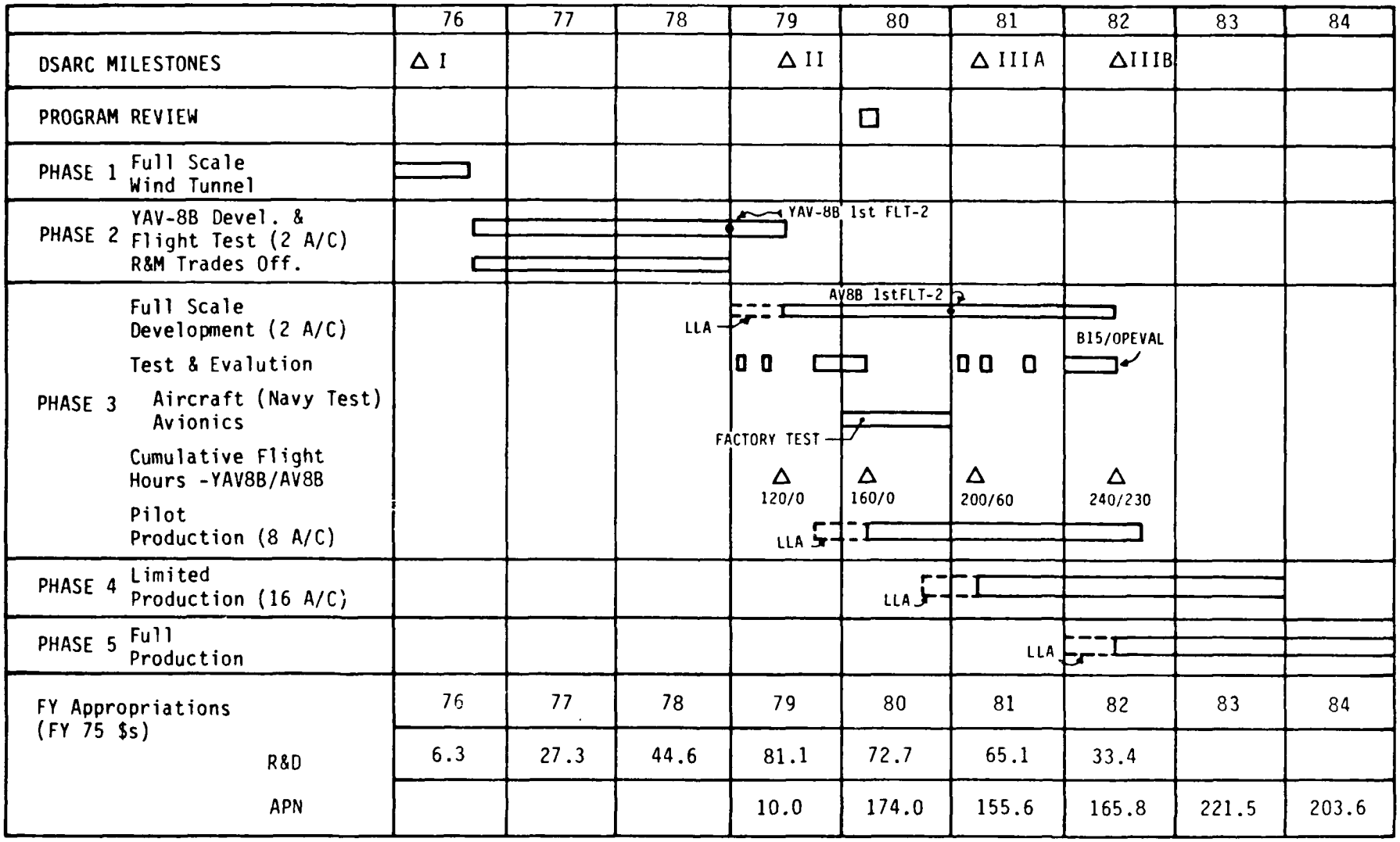
- Phase 1: Full scale wind tunnel test and contract definition for a Flight Demonstration Program using an AV-8A modified to a YAV-8B configuration. The objectives of this phase were to resolve the lift loss caused by flow interference of the forward engine nozzle efflux and the pylons, and to optimize the wing, nozzle, flap, and pylon configuration.

- Phase 2: Flight Demonstration Program to start in October 1976 using two AV-8A aircraft modified

	Research & Development Cost	Production		Third Country Sales
		Airframe	Engine	
United States McDonnell Douglas Pratt & Whitney	approx 90%	60	25	Same as U.S. production
United Kingdom British Aerospace Rolls Royce	approx 10%	40	75	same as U.K. production

FIGURE M6

AV-8B Development and Production Program
Relative Shares (Percent)



DEVELOPMENT PLAN

Figure - M7: ADVANCED HARRIER AV8B (3-76)

to an YAV-8B configuration. First flight in this phase was planned in late 1978. This program was intended to demonstrate performance, stability and control, and handling characteristics.

- Phase 3: Full Scale Development (FSD) and Pilot Production. This phase included engineering development and IOT&E prior to DSARC III. Eight AV-8B were to be built in pilot production run.

- Phase 4: Limited production of 16 aircraft to follow DSARC IIIA (tentatively scheduled for March 1981).

- Phase 5: Full Production to follow OPEVAL and DSARC IIIB (tentatively scheduled for June 1982).

III. PROGRAM EVOLUTION

A. DSARC Milestone I

As noted in Section II, DCP #160 was circulated for coordination on March 10, 1976.

The date for the DSARC Milestone I program initiation review was set for March 25, 1976, by a memo from DDR&E dated March 15, 1976.

During the period between March 10 and 25 an undated internal ODDR&E memo listed several issues for the DSARC and proposed a significantly different funding profile. This funding profile is presented in Table M2. The issues raised by the memo included the following:

- Is a V/STOL aircraft the most effective weapon system for the USMC in a Close Air Support mission?
- Should the AV-8B be a DSARC Program?
- What degree of foreign participation is desired?
- What should be the split between Rolls Royce and Pratt and Whitney on engine development and procurement?
- Should the AV-8B be developed with a composite or a metal wing?
- What type and caliber of gun should be put in the AV-8B?

Three points emerge from a cursory review of the funding profile in the memo. First, the estimate of required funds has increased to a total of about $3.2 Billion. Second, two additional FSD aircraft are specified and the number of limited production aircraft are reduced to 12 from 16. Finally, full production would most likely start at a later date, leading to a later IOC date.

Another undated memo of this same period, this one from ASD (PA&E), addressed a different set of issues for the DSARC. The PA&E issues included the following:

- Force issue -- number of attack aircraft required.
- Requirement for V/STOL.
- Reliability and maintainability.
- Logistical impact of AV-8B on the Marine Amphibious Force (MAF).

TABLE M2

AV-8B FUNDING PROFILE - FROM UNDATED ODDR&E MEMO -1976

CY	76	77	78	79	80	81	82	83	TOTAL
FYDP	6.3	33.0	59.8	122.0	109.4	72.2	-		
R&D Flight Demo Phase Requirement	7.2	33.0	48.6	30.5	-	-	-	-	119.3
R&D FSD Requirement	-	-	8.9	81.3	108.1	85.2	54.1	-	337.6
APN Requirement	-	-	-	-	194.0	208.7	279.0	267.0	2696.6
Aircraft Delivery	-	-	-	2*	-	2**	8	12	336

* YAV-8B Flight Demo Aircraft

** Full Scale Development, Full System AV-8Bs

- o Cost -- both procurement and O&M.

The DSARC met on March 25, 1976. A list of those attending is provided in Figure M8. The list of issues to be presented to the DSARC as compiled by the Executive Secretary of the DSARC included the following:

- o Is performance improved over the AV-8A?
- o Is a V/STOL aircraft the most effective weapon system for the USMC close air support mission?
- o Should the AV-8B be a DSARC program?
- o What degree of foreign participation is desired (U.K. vendors)?
  - oo Considerations
    - -- Economic constraints
    - -- Logistics supply in an emergency
    - -- NATO interdependence
    - -- Off-set arrangements
- o Type of wing -- composite or metal?
  - oo Considerations
    - -- Risk
    - -- Life Cycle Costs
    - -- Corrosion resistance
    - -- Reliability
- o Type and caliber of gun.
- o Production schedule for limited production lot (delete 8 aircraft).

An internal OPNAV memo of March 26 provided a list of issues actually discussed at the DSARC as follows:

- o Engine procurement.
- o Funding of Pre-Production Aircraft -- APN or RDT&E?
- o Production rate -- too low.
- o CAIG cost issues.
- o UK-US production agreements.
- o T&E -- concurrency and demonstrated reliability.
- o Aircraft guns -- caliber/velocity.
- o Composite wing risks.
- o Impact of AV-8B on other Navy V/STOL programs.
- o Attrition rates.
- o AV-8B costs.

An SDDM covering decisions reached at the DSARC I meeting was not issued until May. In the interim, a memo from ASD (PA&E) to the DSARC Chairman raised 4 issues. These were:

DDR&E

D. Currie (Chair)
J. Porter
LCdr. R. Spane
G. Sutherland

ASD (C)

T. McClary
N. Eaton
R. Dominguez

JCS

B. Gen. E. Parnell

CAIG

M. Margolis
LCdr. D. Pilling

DD (T&E)

Lt Gen. Lotz
Maj Gen. W. Whitlatch
Capt. J. Rice

Exec Sec (DSARC)

E. J. Nucci

ASD (I&L)

J. Gansler
F. Trogden
T. Baldwin
Col. E. Eaton
J. Fox

ASD (PA&E)

E. Aldridge
T. Christie
R. Speir

Navy

Dr. D. Potter, Und. Sec. Navy
J. Bowers, ASN (I&L)
H. Marcy, ASN (R&D)
Dr. P. Waterman, DASN (R&D)
VAdm D. Davis, OP-090
RADM H. Arnold, OP-981
VAdm W. Houser, OP-05
Lt Gen. T. Miller, DCS (Avia) HQMC
RAdm. F. Peterson, VCNM
RAdm. R. Miller, NAVAIR, Vice Cdr.
J. Kammerer, OP-96
Lt Col. C. Thompson, OASN 9R&D)
Lt Col. S. Lewis, PMA, Presenter
Lt Col. O'Dare, OP-506C4, Slides
Lt Gen. S. Jaskilka, Asst Cmdt Marcorps

FIGURE M8

AV-8B DSARC I Attendance List
March 25, 1976

- Marines should take a position on the need for trainer versions of the AV-8B.

- The MENS (Mission Essential Needs Statement) was poor and improper.

- There was conflicting data on the O&S costs.

- More detailed rationale on the planning factors used by the Marines was required.

The SDDM was issued on May 12, 1976, and approved the start of the Flight Demonstration Phase with direction to ensure that other options remained viable until DSARC II. This approval was contingent upon several conditions, as listed below:

- Specific instructions on the content of FSD effort and production rate.

- Require a DDR&E Program Review in late 1976 to determine advisability of proceeding with composite wing development.

- Establish OSD/Navy working group to verify O&S costs.

- Commitments on degree of foreign participation delayed until after DSARC II, preliminary negotiations should proceed.

- Identified various improvement efforts to be evaluated prior to DSARC II (Canopy, gun, maintenance aids, etc.).

- Push for early emphasis on R&M.

- Specify DTC, indicate type of contract and nature of incentives (details for DCP).

A revised DCP #160 "AVX USMC Light Attack Aircraft (AV-8B)", dated September 24, 1976, was circulated for coordination by ODDR&E on September 29. The purpose of this DCP was given as providing AV-8B detailed design, prototype development and viable alternatives for AVX Full Scale Development.

Changes to the development plan shown in Figure M7 include the following items:

- Avionics - extends from 1/10/78 to 12/31/80.
- Pilot production - slips 12 months.
- Full scale production starts 3/82.
- Funding profile changes (see following):

FY	76	77	78	79	80	81	82	83	84
R&D	6.3	28.3	49.0	120.5	86.4	58.9	48.5	7.0	
APN						201.6	218.6	239.1	198.8

B. The F/A-18 -- AV-8B Issue

In 1977, under a new administration, the Secretary of Defense decided that the F/A-18, a conventional takeoff and landing aircraft intended to replace certain other Navy and Marine Corps aircraft, would be acquired as the Marine Corps' new light attack aircraft unless the AV-8B could be shown to be a more cost-effective alternative. A detailed account of this controversy is presented in a GAO report, PSAD 79-22 of 30 January 1979, titled "Is the AV-8B Advanced Harrier Aircraft Ready for Full-Scale Development?" In essence, the OSD turned against the AV-8B and refused to fund its continued development while Congress supported the Marines. A summary of key points affecting the AV-8B is presented in an action chronology in Table M3.

The GAO report of January 1979 considered two main points. One was the SecDef direction, in July 1978, for a flyoff between the AV-8B and the F/A-18. In order to conduct such a flyoff, SecDef would have had to authorize FSD for the AV-8B in 1979 to produce a full system prototype to take part. The GAO felt that this was the wrong reason for authorization of FSD.

The second major issue in the GAO report was the considerable growth in the estimated cost to develop and produce the AV-8B and the difference in estimated cost depending on whether or not the IOC date is 1984 or 1985. A funding profile comparing IOC dates of 1984 and 1985 is shown in Table M4. AV-8B program cost growth is presented in Table M5. A comparison of the development schedules required to support IOC dates of 1984 or 1985 is shown on Figure M9.

C. DSARC Milestone II

The DSARC Milestone II review had been scheduled initially for mid-1979. A revised DCP #160 was coordinated in September 1976. There is one memo indicating that a revision to the DCP was in progress in April 1978. Preparation for DSARC II apparently began in October 1978. A chronological listing of events from October 1978 through DSARC II is provided in Table M6.

As noted in the sequence of events related to the F/A-18/AV-8B Issue in Table M3, all AV-8B funds were released to COMNAVAIRSYSCOM on April 4, 1979. Almost immediately thereafter, on April 6, 1979, activity began in earnest for a DSARC II. As

Table M3

Chronology

May 12, 1976	-	DSARC I Decision Memorandum signed.
	-	Authorized Flight Demonstration Phase with 2 YAV-8B prototype aircraft.
October 1, 1978	-	Congress appropriated $173M for AV-8B development in FY79 budget. This included $50M Advanced Development and $123M FSD. DoD had requested only $35M for FSD.
Early December	-	$203M for FSD in FY80 Budget in "Ba[illegible] 1" - the 2nd of 10 priority levels.
Late December	-	Final FY80 budget decisions by Secl[illegible] and the 1978 President re-adjusted pri[illegible]ties. Deleted AV-8B funding.
January 15, 1979	-	First YAV-8B entered flight program at NATS, PAXRVR. Flight Demo Phase by both prototype aircraft to be completed by June 1979.
January 16, 1979	-	Navy defers $108M of $123M appropriated for FSD in FY79.
January 19, 1979	-	Congressmen Ichord and Dickenson send letter to SecDef that any action to delay or terminate AV-8B program in FY79 would be considered contrary to the action and intent of Congress. Congress intends to review the AV-8B budget during the FY80 budget hearings.
January 25, 1979	-	SecDef's Annual/Report on FY80 Budget to Congress states that due to limits on funding and needs for other aircraft, OSD has decided to terminate AV-8B R&D. The dual mission F/A-18 is almost sure to be the replacement Marine light attack aircraft.
January 26, 1979	-	USDR&E memo to ASN (RE&S) - can allocate $15M of FY79 FSD funds for additional advanced development activity.
February 6, 1979	-	DepSecDef letter to Senator Stennis and Congressman Price - provides history of FY80 AV-8B budget since May 77.

Table M3 (Continued)

February 7, 1979	-	SecDef testifies to House Appropriations Committee that OSD plans DSARC II on AV-8B in late Spring to evaluate results to date.
February 15, 1979	-	USDR&E letter to Senators Stennis and Magnuson, Congressmen Whitten and Price states that the Navy had been given authority to use $15M of FY79 funds for advanced development instead of previously planned start of FSD.
February 28, 1979	-	Representative Addabbo - Chairman, Defense Subcommittee, HAC, in letter to SecDef urges obligation of all FY79 AV-8B funds.
March 5, 1979	-	Senator Magnuson., SAC, to USDR&E - requests more information on deferred AV-8B funds.
March 14, 1979	-	Comptroller General notifies Senate and House that the deferral of AV-8B funds was not reported pursuant to the Impoundment Control Act of 1974.
March 15, 1979	-	Senator Hart, Senate Armed Services Committee, introduces resolution disapproving deferral of AV-8B funds.
	-	Senator Cannon, SASC, advised the DoD of hearings in the near future on the deferral.
March 19, 1979	-	USDR&E sends letter to Senator Magnuson providing requested information.
March 21, 1979	-	DepSecDef advises SECNAV that $54M of AV-8B funds would be released.
March 23, 1979	-	USDR&E approves release of funds for initial AV-8B long lead FSD activity.
March 27, 1979	-	ASN (RE&S) requests ASN (FM) to release all FY79 AV-8B funds.
April 4, 1979	-	All AV-8B funds released to COMNAVAIRSYSCOM.

Table - M4:

AV-8B FUNDING PROFILES: FULL-SCALE DEVELOPMENT AND PRODUCTION

IOC FISCAL YEAR		($ MILLIONS)											
		1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	
1984	FULL SCALE DEVELOPMENT	123.0	225.0	200.0	110.0	20.0							678.0
	PRODUCTION		32.0	386.9	431.4	693.6	697.7	654.8	691.7	688.9	343.7	--	4620.7
	(QUANTITY OF PRODUCTION AIRCRAFT)			(12)	(24)	(54)	(54)	(54)	(54)	(54)	(30)		(336)
	TOTAL	123.0	257.0	586.9	541.4	713.6	697.7	654.8	691.7	688.9	343.7		5298.7
1985	FULL-SCALE DEVELOPMENT	123.0	202.0	212.0	117.0	34.0	10.0						698.0
	PRODUCTION			33.7	440.4	461.4	753.3	738.0	690.1	729.1	726.1	362.3	4934.4
	(QUANTITY OF PRODUCTION AIRCRAFT)				(12)	(24)	(54)	(54)	(54)	(54)	(54)	(30)	(336)
	TOTAL	123.0	202.0	245.7	557.4	495.4	763.3	738.0	690.1	729.1	726.1	362.3	5632.4

TABLE M5

AV-8B PROGRAM COST GROWTH FROM 1976 to 1978

This table reflects the growth which has occurred in estimated acquisition cost since the program was reviewed at DSARC I.

	Estimate		Cost	Percent
	Jan. 1976	Sept. 1978	Growth	Increase
	(000,000 omitted)			
Prototype development	$ 119	$ 144	$ 25	21.0
Full-Scale development	337	698	361	107.1
Total development	a/456	842	386	84.6
Production (336 aircraft)	b/3,753	4,934	1,179	31.4
Total program	$4,209	$5,776	$1,565	37.2
Program unit cost	$12.37	$16.89	$ 4.52	36.5

a/ The January 1976 estimate was based on fabrication of two, rather than four, engineering models during the course of full-scale development.

b/ An earlier, less carefully developed, constant 1975 dollar estimate of $1,967 million was presented at the DSARC I review. In constant 1975 dollars, the $3,753 million figure is about $2,060 million.

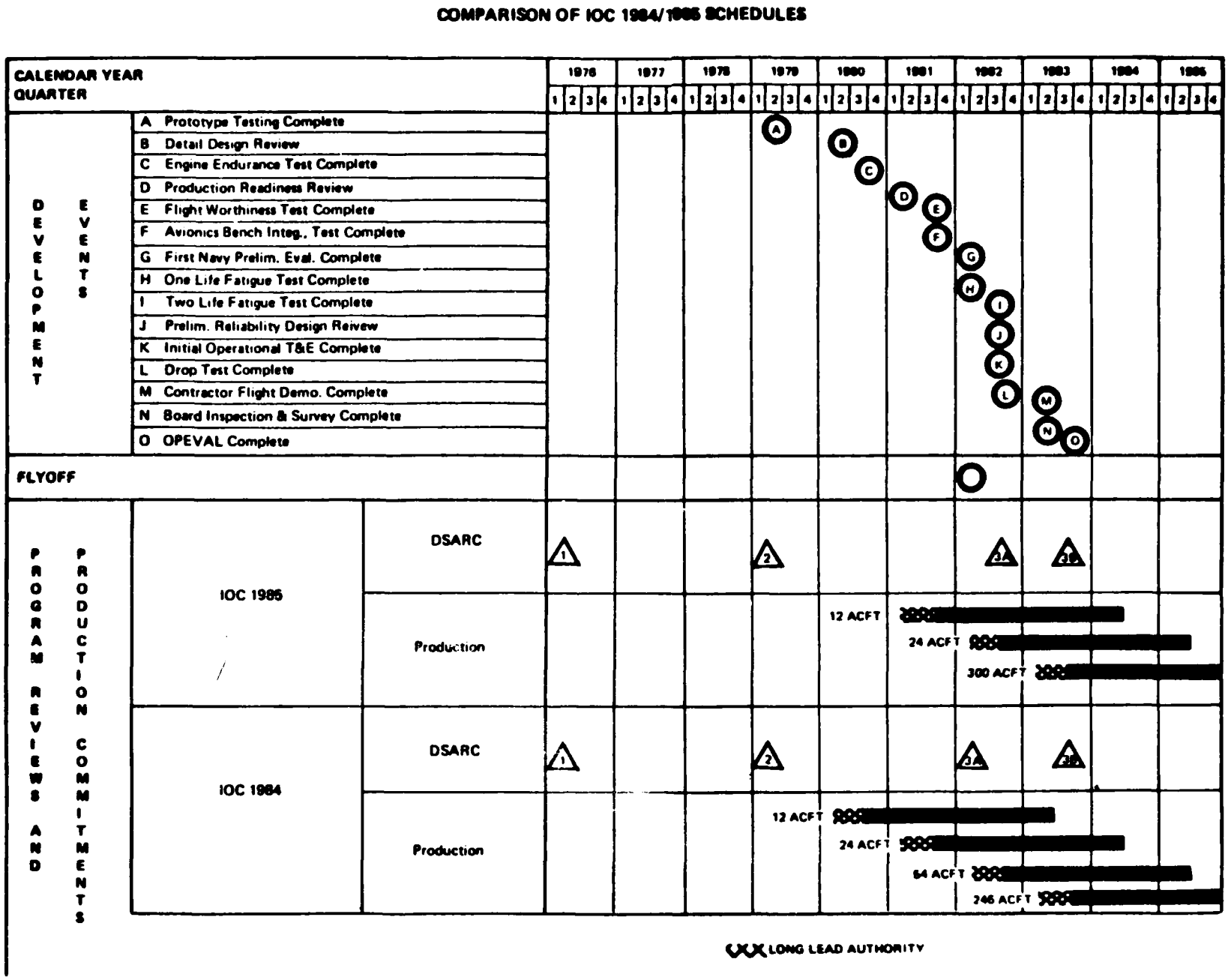


Figure - M9: Comparison of Development Schedules

Table M6

Chronology of Events Leading to DSARC II

Date	Event	Comment
October 4, 1978	Project Manager preparing presentation to CEB	
October 20, 1978	CEB requested by OP05.	
November 11, 1978	CEB scheduled week 27 Nov. DON Review 4 Dec. DSARC 2 April 1979	
November15, 1978	Pre-CEB Briefing	Decisions: o Another CEB prior DSARC o Why spend money on FSD if pilot production is not anticipated o Why changes since DSARC I o Show CNO full costs in Resource Annex o No need to do DON Review To cover: oo Detailed analysis of cost growth oo Explanation of procurement numbers oo Provision for another CEB prior to DSARC II
November 21, 1978	CEB Briefing Scheduled 27 Nov.	
November 27, 1978	CEB	o No decision memo in record

Table M6 (Continued)

Date	Event	Comment
March 30, 1979	ASN (RE&S) memo restructured activity leading to DSARC II tentatively scheduled June 1979	
April 6, 1979	Memo from OP-05	Schedules pre-CEB week 30 April and CEB week 14 May
April 12, 1979	"Draft" DCP	Circulated in OSD. 336 Aircraft FY80 Budget = 0 PDM 81 is first time funds appear in FYDP.
April 23, 1979	OASD (MRA&L) memo	Comments on DCP 160: o More info on T&E o Greater stress on manpower requirements o Much greater specificity
April 26, 1979	CNM ARB	Issues: o More work on gun analysis and wing o Definition of IOC vs operational readiness o Funding and Cost Analysis o No R&D funds FY 80-84 o No procurement in FYDP o Otherwise, a strong program
May 3, 1979	Pre-CEB	Decision: Program not sufficiently defined to present to CNO at CEB

Table M6 (Continued)

Date	Event	Comment
May 4, 1979	OP-90 memo	Guidance to revise funding and procurement figures.
May 10, 1979	OP-090 memo	Reemphasizes that all issues that will be raised at DSARC II must be addressed at CEB
May 10, 1979	OASN (RE&S) memo	Schedules: o Pre-DNSARC - 29 May o DNSARC - 1 June (based on 17 May CEB) o Also addresses contract options
May 4, 1979 May 16, 1979	Mini CEB's	Major issue - total number of aircraft not resolved. Rescheduled 24 May.
May 25, 1979	CEB	Issues still not resolved. CEB rescheduled 12 June 1979.
June 1, 1979	OP-05 memo	Requests rescheduling as follows: o Pre-DNSARC 25 June (week) o DNSARC 29 June o DSARC 31 July (week)
June 6, 1979	ASN (RE&S) memo	AV-8B Program Reviews 3 critical external milestones o 27 July PDM o 29 August APDM

Table M6 (Continued)

Date	Event	Comment
		o 20 September FY 81 Budget
		DSARC II removed from OSD calendar for comment DCP is submitted.
		Schedules:
		o Pre-DNSARC 15 June
		o DNSARC 20 June
June 13, 1979	AV-8B CEB	Establish 2 Alternatives:
		Alt. I - 322 aircraft (65TAV8B)
		Alt. II - 338 aircraft (24TAV-8B)
June 29, 1979	AV-8B DNSARC	Decisions:
		o AV-8B Program ready for OSD review.
		o SECNAV recommends program approval for FSD.
		o DCP forwarded for comment and coordination.
		o Navy recommends Alternative 3 of DCP 160 of 20 June 1979.
July 16, 1979	Pre-DSARC Brief	Navy presented two key issues and three alternatives.
		Issues: Is there a requirement for a V/STOL capability? Is

Table M6 (Continued)

Date	Event	Comment
		the AV-8B ready to enter FSD?
		DSARC group considered four key issues:
		o Is the AV-8B ready for FSD?
		- No significant problems.
		o Should the Aden 30 mm gun be replaced with the NAVAIR/GE 25mm gun?
		o Should additional funds be added to insure that reliability goals are met?
		- Would higher reliability goals result in lower life cycle cost?
		o Is the AV-8B affordable and cost effective?
		- Most significant issues.
		- Most questions.
July 20, 1979	DSARC II	Navy presented essentially the same briefing. USDR&E leaves meeting without decision, citing the affordability issue as unresolved.

indicated by the events in Table M6, the Navy and Marines were having difficulty in resolving the issue of the number of aircraft to procure, finally developing four alternatives.

The "For Coordination" draft of DCP #160 addressed two key issues: the requirement for a light attack V/STOL capability, and the readiness of the AV-8B to enter FSD.

Four funding profiles were presented as alternatives. These are summarized in the following table:

Alternative	Total Aircraft	Mix of Aircraft	Total Cost
1	322	257AV-8B/65TAV-8B	$7.0B
2	275	257AV-8B/18TAV-8B/	6.0B
3	334	275AV-8B/18TAV-8B/ 41TF/A-18	N/A
4	322	322 F/A-18	N/A

Alternate production schedules were developed for IOC dates in FY84, FY85 and FY86. The FY86 IOC was identified as the preferred plan. Technical, cost, and schedule risks were considered low. A DSARC Milestone III review was planned for September 1982 and a IIIB in September 1983. Pilot production included 12 aircraft and limited production included 24 aircraft.

On July 27, 1979, a memo from the ASN (RE&S) summarized comments made by the DSARC principals. These comments included:

- o PA&E - Resolve the cost issue. The CAIG has a better record than the service.
- o JCS - Supported the program.
- o CAIG - Cost estimating is difficult due to differences in British productivity and varying money exchanges rates.
- o NATO Advisor - Need additional sales for AV-8Bs to improve affordability.
- o DT&E - No test issues. Prototype successful. Development schedule O.K. High R&M goals a concern.
- o ASD (MRA&L) - High R&M goals questioned.

- o DDR&E - Meeting a failure. Technical worth resolved but not affordability. Cannot recommend decision to SecDef until cost estimates -- U.K. cost issues resolved. Must nail down other potential users.

- o CNM - Supported R&M program and goals. Stated that the affordability issue was addressed in DON POM and the estimates are the best quality available to the DON.

D. Congressional Action After DSARC II

Another Comptroller General's report to Congress, PSAD-80-23, "A Decision by the Secretary of Defense Is Needed on the AV-8B Aircraft Program," was issued on February 8, 1980. This report cited two funding actions by the Department of Defense as being the cause of much of the cost growth in the AV-8B program. The first action was the withholding of FY79 funds as discussed in Section III.B. The second was the decision in January 1979 not to request any fiscal year 1980 funds for the AV-8B.

The GAO report states that the initial impoundment of FY79 funds caused a 4-month delay in the progress of the program and was the critical event in precluding an IOC date in 1984. The Navy then shifted to a IOC 1985 date. The decision early in 1979 not to request FY80 funding was accompanied by the withdrawal of all AV-8B funds from the FYDP.

Congress did not accept the Navy DOD position on AV-8B funding in FY80 and appropriated $180M for the AV-8B R&D program. As a result of Congressional insistance, the AV-8B was reinstated in the FYDP but no procurement funds were provided until FY82. This action resulted in a second postponement of the IOC, now to 1986. A comparison of funding profiles to support various IOC dates is presented in Table M7. The GAO further charged that the delays in the IOC for the AV-8B have raised total acquisition costs by an average of $461 million per year of delay.

The GAO also believed that IOC date could be achieved in 1985 by immediate funding for procurement and by doubling the production rate. The estimate for the magnitude in savings for the earlier IOC date was $356 million through early funding and 15% for higher production rates (about $900 million) or a total of over $1.2 billion.

Table - M7:

AV-8B FUNDING PROFILES
AT VARIOUS INITIAL OPERATIONAL CAPABILITY MILESTONES

INITIAL OPERATIONAL CAPABILITY BY FISCAL YEAR		FISCAL YEAR FUNDING REQUIREMENTS IN MILLIONS												
		1976-79	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
1984:	DEVELOPMENT FUNDS	$267.0	$236.8	$210.5	$115.8	$23.3								$ 853.4
	PRODUCTION FUNDS		33.6	407.3	454.1	806.5	$861.4	$761.4	$804.3	$801.0	$399.7			5,329.3
														$6,182.7
1985:	DEVELOPMENT FUNDS	267.0	212.6	223.2	123.2	39.5	11.6							$ 877.1
	PRODUCTION FUNDS			35.5	463.6	536.5	930.0	858.1	935.2	847.8	844.3	$421.3		5,872.3
														$6,749.4
1986:	DEVELOPMENT FUNDS	267.0	180.0	243.8	164.8	64.2	37.8							$ 957.6
	PRODUCTION FUNDS				37.3	587.0	610.4	970.0	887.8	862.8	898.0	862.5	$440.6	6,148.4
														$7,106.0

(Note: These funding profiles reflect the acquisition of 4.5 AV-8B s per month or a total of 336 aircraft according to the current production plan.)

Note: Officials in the Office of the Secretary of Defense estimate that the AV-8B's procurement cost may be 20% greater than the costs presented above. They attribute their potential increase, in part, to the additional administrative charges inherent in multi-national weapon system contracts.

IV. PROGRAM STATUS

Early in 1981 the new administration directed the start of production of the AV-8B and included funds for initial production in a supplemental budget request. A program status review of the AV-8B for the staff of the DSARC principals was held on August 20, 1982. Highlights of that review include:

- Program is on cost/schedule/performance baseline.
- Four FSD Aircraft and one prototype have accumulated 296 hours by August 15, 1982.
- Technical problems seem minor and solvable.
- R&M threshold goals appear achieveable.

Unit cost estimates have continued to increase as shown in the following:

Date	Document	Number	Unit Cost
June '81	SAR	336	18.3
January '82	FYDP	336	21.6
	POM 84	336	23.3

A total of 27 TAV-8B are planned, including pipeline and attrition. Only 18 TAV-8 are included in the procurement plan while six will be conversions. The remaining three will be additional procurement in lieu of some AV-8Bs.

The President's FY83 Budget request included $114M for R&D, and $677M for Production ($74M LLT) ($192M initial spares) and a buy of 18 aircraft. Out year planning still falls short of the most economical procurement rate.

There has been no classic DSARC III Review. In the absence of a DSARC production decision, however, the Congress continues to support the AV-8B and the current administration has requested funding to carry out the program, although at a less than optimal rate. There appears to be no substantive issues beyond the issue of total buy and production rate. On the other hand, a SecDef decision memo might provide a better program stability and reduce the yearly decrements to the planned program now encountered in the PPBS process.

The AV-8B program office, PMA-257, has a small staff, currently three military, five professional civilian and two

secretarial. This is the result of a decision by the original Project Manager who took the program through DSARC I and II. His philosophy was to keep the office staff small so that he would be free to run the project, not the office. As the workload increases with production, two more positions will be added.

The AV-8B program has not changed very much technically since it began, nor have the total number of aircraft to be procured changed since 336 were planned for the pre-DSARC I phase; 336 remains the planning number. However, the mix of aircraft has changed several times as far as the number of trainer aircraft is concerned, from none originally to as many as 27 in a mix of TAV-8B and TAV-8A. This change was caused by an appreciation that increased training in two-seat aircraft was required to reduce the accident rate in V/STOL aircraft.

Cost growth has been the greatest single problem in the program. Some overly optimistic early cost estimates totaled only about $2 billion in FY76 $ for the whole program while more recent estimates approach $7 billion in FY80 $. The primary factor in this growth has been inflation, exacerbated by delays in start of production and stretch-out of the production runs.

The AV-8B programs stands out in singular fashion since it did not get DSARC approval to enter FSD, yet is approaching OPEVAL and has initial production funding. It is a program that encountered active OSD staff opposition, lukewarm support at times in the Navy, ran headlong into a much larger F/A-18 program, had its funds deferred and eliminated, and yet survived, even though at some cost.

APPENDIX N

LAMPS
PROGRAM STUDY REPORT

I. SYSTEM DESCRIPTION

LAMPS MK III is a Navy integrated ship/air weapon system in which a helicopter functions primarily as an extension of the organic ship surveillance and weapon delivery systems to support Anti-Submarine Warfare (ASW), and thus increases the effectiveness of surface combatants. The LAMPS MK III Weapon System will be integrated into FFG-7, CG-47, DD-963 and DDG-993 class ships.

The major secondary mission of LAMPS MK III is Anti-Ship Surveillance and Targeting (ASST), in which the helicopter provides a mobile and remote platform for radar and Electronic Warfare Support Measures (ESM). Other missions include naval gunfire spotting, search and rescue, communications relay, medical evacuation, and vertical replenishment.

The LAMPS MK III Air Subsystem, SH-60B SEAHAWK, consists of the helicopter, including airborne Recovery Assist, Secure and Traverse (RAST) components, and mission avionics. For ASW, the SH-60B SEAHAWK serves the ship as a remote platform for deployment of sonnbuoys, processing and display of acoustic information, display of Magnetic Anomaly Detection (MAD) sensor information, and torpedo attack. Radar and ESM are also employed as ASW sensors for detecting snorkels and electronic emitters. For ASST, the SH-60B SEAHAWK serves as an elevated platform for radar search and ESM.

The LAMPS MK III Ship Subsystem includes the ship electronics (the AN/SQQ-28(V) Sonar Signal Processing System and the AN/SRQ-4 Radio Terminal Set) and the helicopter support facilities (including the A/W-42U RAST and the A/W-37-1 Horizon Reference Set). The LAMPS MK III ship electronics provide sensor processing, tactical information and direction through the directional data link to the helicopter and assimilation of LAMPS MK III tactical information with information gained from other sensors.

II. INITIAL PROGRAM SUMMARY

The LAMPS project evolved in 1970 from an urgent requirement of the Chief of Naval Operations (CNO) for a program to develop a manned helicopter that supports and acts as an extension of the ship's weapon system. The helicopter was required to operate from destroyer and frigate class ships. This system was intended to consist of a new airframe equipped with advanced sensor systems. The sensors, processors, and display capabilities aboard the helicopter would enable the ship to extend its capabilities beyond the classic line-of-sight limitation for surface threats and distance limitations for acoustic detection, prosecution, and attack of surface and/or subsurface threats.

The first stage of the program, LAMPS MK I, involved installation of shipboard equipment and conversion of H-2 helicopters already in the inventory to a LAMPS configuration. This was a near term modification and production program to establish an early fleet capability. Fleet introduction for the LAMPS MK I occurred during October 1971. This was later referred to as "Interim" LAMPS. LAMPS MK I became operational in 1972.

The second stage of the program, LAMPS MK II, was planned using the same basic sensor equipment as the LAMPS MK I with a new helicopter platform. LAMPS MK II was conceptually successful. This stage was completed in FY72 but terminated prior to aircraft production.

The third and current stage of the program, LAMPS MK III, is a long range project. The planning for further development of the system began shortly after the termination of the LAMPS MK II stage program.

The LAMPS MK III project was partitioned into three distinct phases prior to the issuance of NAVMATINST 4000.20B of June 27, 1975, which redefined the program into five phases. Figure N1 translates the three phases into the redefined five phases.

OLD PHASES		NEW PHASES	
NO.	DESCRIPTION	NO.	DESCRIPTION
I	Initial Development	I	Concept Formulation
II	Pilot Production	II	Validation
III	Production	III	Full Scale Development
		IV	Production
		V	Deployment/Operation

FIGURE N1

LAMPS MK III Project Phases

The Concept Formulation Phase, Phase I, was fulfilled by the LAMPS MK I and MK II programs which satisfied the conceptual feasibility question by actual application of hardware as described in previous paragraphs.

The Validation Phase provided the necessary advanced development, test and evaluation to ensure a minimum risk, Full Scale Development (FSD) Phase. The Validation Phase time period was from June 1972 through November 1976. This phase was separated into two major test efforts: LAMPS MK III short range and LAMPS MK III extended mission.

The Navy was given permission to proceed to the FSD Phase by DoD in 1978 with a System Prime Contractor (SPC), an Air Vehicle Contractor, an Engine Contractor, and RAST and Visual Landing Aids (VLA) Contractors.

Currently, FSD is complete. Production of Lots I and II helicopters and Lots I, II and III of ship systems is in progress with the first production aircraft delivery scheduled for October 1983 and the first LAMPS MK III capable ship scheduled for February 1984. (FFG-8 has operated with the SH-60B during FSD.) Initial LAMPS MK III Ship/Air Weapon System operational deployment is scheduled for FY 84.

The earliest program schedule and funding profile which could be found for purposes of this study were those presented at DSARC IIA (July 19, 1973) (Figures N2 and N3). At this time, as shown in Figure N2, Initial Operating Capability (IOC) was scheduled for October 1981.

LAMPS MK III SCHEDULE

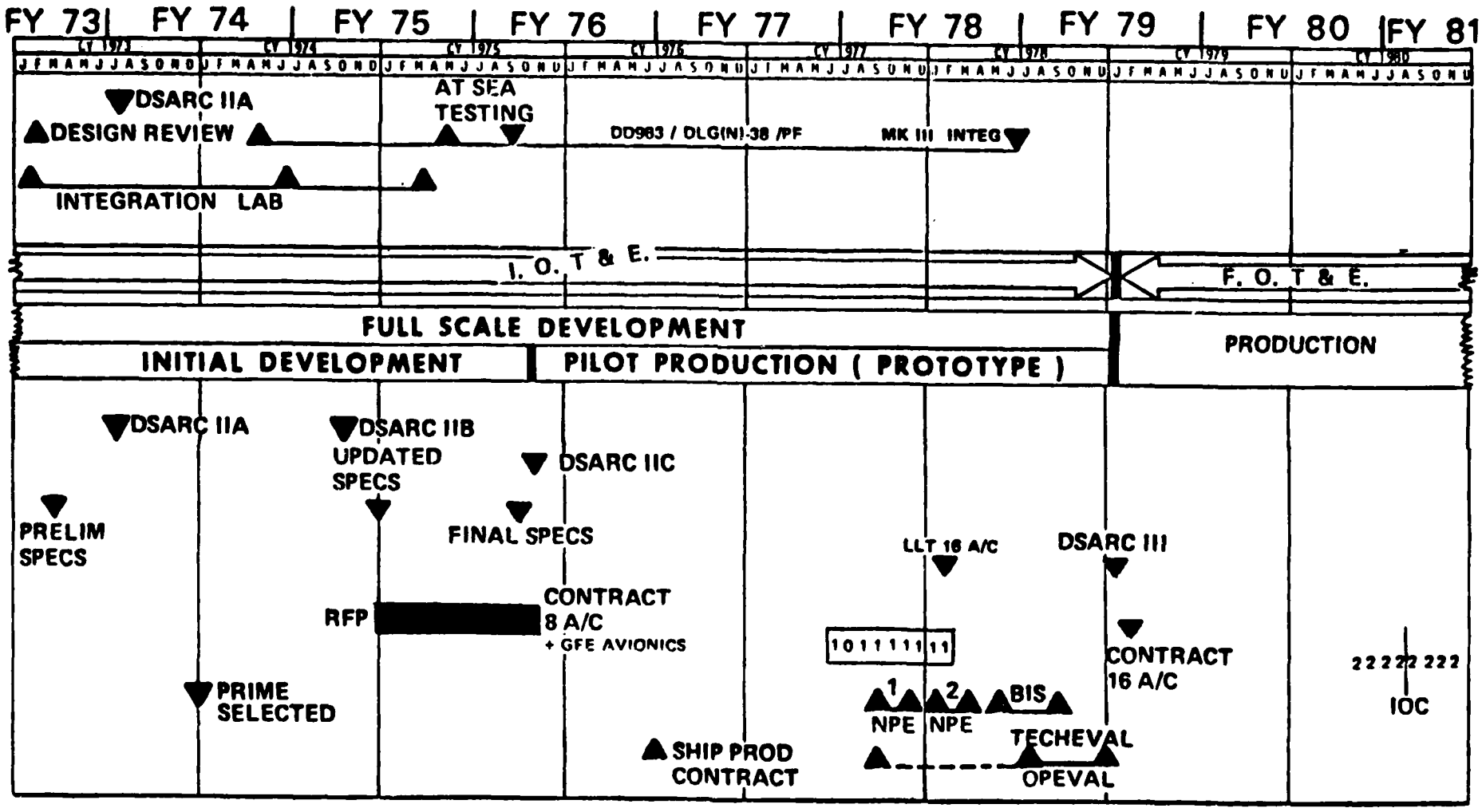


FIGURE N2

MK III TOTAL PROGRAM COSTS
ESCALATED FY 72 $ IN MILLIONS

FY	72	73	74	75	76	77	78	79
AIR SUBSYSTEM								
R & D	11	12	5	5	32	62	38	4
APN 111							10	148
APN 211							10	186
POM-75 APN							10	167
SHIP SUBSYSTEM								
R & D	7	7	4	6	7	4	5	4
TOTAL R & D	18	19	9	11	39	66	43	8
POM 75 R & D	18	19	9	11	39	66	43	8
			DSARC IIA	DSARC IIB	DSARC IIC			DSARC III

FIGURE N2

III. PROGRAM EVOLUTION

A. Initiation

In 1965, a Tentative Specific Operational Requirement (TSOR) called for the development of a manned helicopter to be operated from the decks of non-aviation ships, carrying information gathering and relaying equipment. In 1968, the requirement expanded to the Light Airborne Multi-Purpose System (LAMPS), a more sophisticated helicopter with greater performance capabilities providing for the integration of advanced avionics sytsems. CNO Conf. Msg. 252239Z Jul 1968 established the LAMPS program. On April 23, 1970, a Specific Operational Requirement (SOR) was issued and approved to address this requirement, specifying a ship-based aircraft that could localize, classify and attack submerged targets, and provide over-the-horizon detection classification and targeting for ship missile systems. NAVMATNOTE 5430 of September 8, 1970, established the LAMPS effort as a Chief of Naval Material (CNM) Designated Project (PM-15) with Capt. Spencer E. Robbins as Project Manager.

On November 9, 1970, NAVMAT Instruction 5430.43 was issued establishing the Ship and Air Systems Integration (SASI)-Project Designation PM-15. The organization structure is shown in Figure N4.

LAMPS MK I (SH-2F), using existing avionics and a utility helicopter airframe (KAMAN H-2) was the interim solution to this requirement. Fleet introduction of the MK I was made in October 1971. The LAMPS MK II program was planned as an interim improvement of the MK I pending the development of a more advanced MK III. However, the LAMPS MK II project was discontinued by CNO and Congressional action. The MK III project commenced in FY-72.

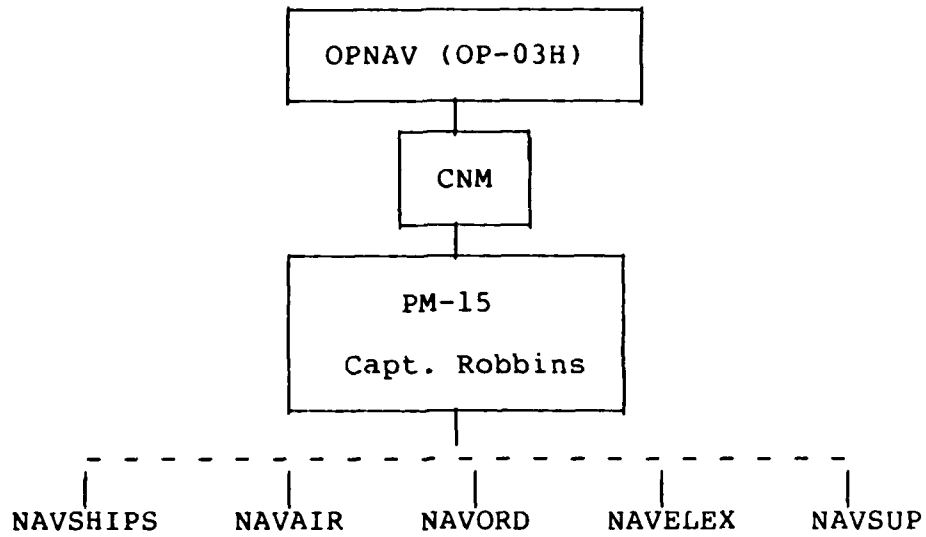


FIGURE N-4

Project PM-15 Organization Structure

B. DSARC I/II

On June 29, 1972, the LAMPS MK III DSARC I/II was held. It is believed that DSARC I/II were held concurrently since the LAMPS concept had already been approved with LAMPS MK I. The Project Manager (PM-15) at DSARC I/II was Captain T.C. Lonnquest, Jr., who had replaced the previous PM-15 (Captain Spencer Robbins) one month prior to the DSARC I/II (May 26, 1972). On July 11, 1972, a memorandum for the Secretary of Navy was issued by the Department of Defense, Mr. Kenneth Rush. The purpose of the memo was to state the conclusions from the DSARC meeting in summary form:

1. The Procurement of Aircraft and Missile, Navy funds for FY 1973 were released for the LAMPS MK I program. The Operational Appraisal should be completed as soon as possible and commitment of funds to configure MK I should be a minimum until completion and assessment of the Operational Appraisal is complete.

2. For the MK III there were several decisions reached such as:

   - Limit the funding until the design, testing, and prototype are complete.

- o While not a complete decision, it was stated that a "System Integrator" concept would be advantageous, such System Integrator being chosen from among applicants in industry. (This is first indication that a System Prime Contractor (SPC) would be designated).

- o It was also suggested that an earlier selection of the MK III helicopter be conducted.

The LAMPS MK III development program was undertaken to provide increased capabilities over the MK I with a weapon system to attain IOC in 1984. Under direction of NAVMAT (PM-15), the Naval Air Development Center (NADC), Warminster, Pennsylvania, developed LAMPS MK III system electronics and avionics and conducted a program utilizing an H-2 helicopter to validate the LAMPS 35 nautical mile range mission.

On April 24, 1973, NADC personnel briefed staff members in the Office of the Chief of Naval Operations on the status of the LAMPS program. The Vice Chief of Naval Operations, Admiral M. F. Weisner, attended the meeting, then prepared a list of decisions which was promulgated on April 27, 1973. In general the decisions were as follows:

- o The LAMPS MK I must proceed on schedule and be deliberately austere and affordable in numbers.

- o DSARC IIA should be held as soon as possible. OP-03 will construct a program for the DCP that reflects the funding profile. OP-090 is directed to insure that this program profile is incorporated into POM-75.

- o Continued analysis of a range of mission/task group alternatives should be pursued. This is for the purpose of assisting in making sound development decisions as the base R&D program proceeds.

- o OP-97 will, by May 25, 1973, provide impact and costs if the landing area and hangar are redesigned to accommodate (1) SH-3; (2) a LAMPS version of UTTAS, or (3) HSX (if feasible).

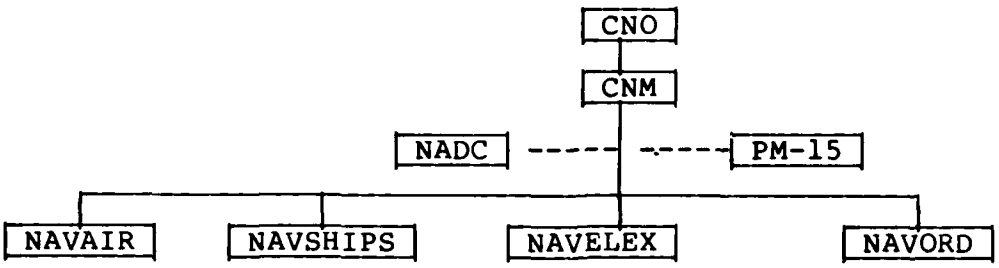
C. <u>DSARC IIA</u>

Planning for DSARC IIA commenced in early December 1972, (8 months prior to the actual review). On December 7, 1972, PM-15 Memorandum Ser. 143-PM-15 announced that a LAMPS MK III Development Design Review would be conducted from February 12 to 16, 1973. The purpose of the Design Review was to review work accomplished, and to verify and solidify a common Navy position on the MK III program to be presented at DSARC IIA. The details to be accomplished were also included in the memorandum.

In addition, a T&E Coordination Meeting, a LAMPS Design Document Review and a System Design Review Meeting were held prior to DSARC IIA.

In April 1973, Captain T.C. Lonnquest, Jr., was relieved as Project Manager of PM-15 by Captain R.M. Boh, Jr. (3 months prior to the DSARC IIA).

The Project Management during this period was structured as follows:



A summary of the personnel resources utilized was:

Project Office	9
NAVAIR	4
NAVSHIPS	2
NADC	125
OTHER	7
TOTAL	147

The LAMPS MK III DSARC IIA was conducted on July 19, 1973. The purpose of DSARC IIA was to obtain direction to continue the avionics/ship electronics suite development and obtain release of FY73 ($1.5M) and FY74 ($6.8M) funds. The issues during this period were: (1) elimination of concurrency (procurement of RDT&E and production aircraft together); (2) reduction of total program costs, and, (3) earlier selection of an airframe. The attendance at DSARC IIA is shown in Figure N-6.

The decisions were made on this meeting by the Deputy Secretary of Defense, W. P. Clements and sent to the Secretary of the Navy on August 14, 1973. These decisions were as follows:

"After reviewing the results of the 19 July LAMPS MK III DSARC IIA meeting, I am generally pleased with program progress and direction. You are hereby directed to proceed in accordance with DCP Alternative 1, subject to the following detailed guidance.

"1. A DSARC meeting shall be requested prior to the date at which the Navy wishes to issue RFP's for LAMPS MK III aircraft, and no such RFP's shall be

ODDR&E

Dr. M Currie
(Chairman)
D. Heebner
L/Gen R. Coffin
S. Petersson
G. Sutherland
W. O'Neil

OASD(I&L)

A. Mendolia
B/Gen R. Trogden
F. Myers
C. Oliver
L/Col J. Peterson

OASD(C)

T. McClary
D. Hessler
C. McFadden
S. Trodden

OD/DPA&E

L. Sullivan
Cdr R. Ailes
M. Leonard

JCS

B/Gen B. Lewis
Capt. F. Watson

ODDR&E(T&E)

L/Gen A. Starbird
B/Gen W. Daniel
Capt. J. McNerney
H. Thompson

CAIG

D. Srull

ASD(I)

Cdr D. Dennison

NAVY

J. Warner, Sec Navy
Dr. P. Waterman, A/ASN(R&D)
J. Bowers, ASN(I&L)
Adm I. Kidd, CNM
V/Adm W. Houserr, OP05
V/Adm W. Moran, OP098
V/Adm R. Adamson, OP03
V/Adm T. Hayward OP090
R/Adm D. Cox, CINCLANTFLT
R/Adm E. Waller, PM4
R/Adm S.Small, OP095B
R/Adm T. McClellan, NAVAIR
R/Adm R. Hoffman, OP03H
Mr. M. Seward, ASN(I&L)
Capt L. Thiel, NAVCOMPT
Capt J. Mingo, OP981
Capt A. Dorman, NAVAIR

DIA

G. Katz

ARMY

L/Col G. Ivy
(ACSFOR)

Briefers

Capt. R. Boh, PM15
Capt O. Gercken, PM15
Cdr G. Skezas, PM15

Figure N6

Attendance
LAMPS - DSARC IIA
July 19 1973

issued without Secretary of Defense approval subsequent to the meeting. This will constitute DSARC Milestone IIB.

"2. The Navy should develop plans for obtaining and evaluating operational and test data on interdependent systems such as SQS-26 sonar, towed array sonar and HARPOON. These plans should be submitted to the DD (T&E) by 1 October 1973 for OSD coordination.

"3. The Navy should complete adequate operational at-sea testing of the LAMPS-III configured H-2 prototypes to confirm operational effectiveness prior to DSARC Milestone IIB and should provide updates prior to DSARC IIC and DSARC III.

"4. At DSARC Milestone IIB the Navy shall present its firm conclusions regarding optimal sizing and capabilities of the LAMPS MK III airframe, avionics suite, and weapon and sensor stores. This configuration determination should be fully justified and based, to the maximum feasible extent, on T&E data.

"5. In order to provide early verification of the critical questions of ASW mission concept and adequacy of avionics capability and stores capacity, the Navy shall functionally stimulate the planned LAMPS MK III ASW mission operations, to the max imum extent feasible with existing aircraft such as the P-3C or S-2G, in at-sea tests. Results of these tests shall be reported to the DD (T&E) no later than June 30, 1974.

"6. The Navy shall submit, prior to the next DSARC, an analysis demonstrating that the selected configuration is competitive, on a cost and effectiveness basis, with principal non-LAMPS alternatives. The assumptions and plans for this analysis should be agreed to by you, DDR&E and DDPA&E.

"7. A revised schedule shall be prepared which makes full and explicit provision for retaining the option of selecting the UTTAS airframe as the basis for the LAMPS MK III airframe, without interference or conflict with the UTTAS program. The revised schedule shall conform to earlier guidance concerning limitation of procurement commitments prior to completion of adequate DT&E and OT&E. I will decide whether the UTTAS option is to be exercised, dropped, or retained as a possible option on the basis of the analysis to be presented prior to DSARC Milestone IIB.

"8. By the time of the next DSARC, the Navy should have prepared full financial data on this program in standard budget format, together with analyses of variances from prior estimtes and estimates of life-cycle costs.

"9. All LAMPS MK III R&D activities shall be transferred to the 6.3 RDT&E program category beginning with the FY 1975 budget and continuing through aircraft selector; at which point they shall be transferred to the 6.4 RDT&E program category.

"10. The DCP shall be revised prior to the next DSARC meeting. By separate action, I have directed release of all FY73 and FY74 funds previously deferred.

In response to direction from Adm. E. R. Zumwalt, Jr., in September 1973, CNO letter Serial 83P00 of October 2, 1973, modified the LAMPS MK III program and directed that the LAMPS mission be extended in range and on-station time while retaining the mission capabilities characterized by the NADC H2 MK III development activity. NADC awarded contracts totaling $6.6 million to industry for development of avionics items to achieve the new goals. APP PM-15-01-74, approved on November 23, 1973, was applicable as cited in NADC RAN clearance No. NADC 10306 was approved on November 23, 1973.

In January 1974, PM-15 was transferred to the Naval Air Systems Command.

As a result of a competitive source selection, a Systems Prime Contract No. N00019-74-C-0415, was awarded by NAVAIR to the International Business Machines (IBM) Corporation, Owego, New York, on April 3, 1974, in the amount of $13,835,494. Under terms of the SPC Phase I Contract, IBM provided system engineering and technical direction for LAMPS. The equipment developed under the NADC program was transferred to the SPC for use in extended mission testing utilizing an H-3 helicopter.

In September 1974, the CNO Executive Board reviewed the LAMPS Mk III program and reaffirmed the extended mission goal.

On July 1, 1975, PM-15 was abolished and the SASI Project was established as a joint NAVAIR/NAVSEA Project under the executive management of COMNAVAIRSYSCOM.

D. DSARC IIB

The LAMPS MK III DSARC IIB was conducted on May 25, 1976. The attendance at DSARC IIB is provided in Figure N-7. The project manager at DSARC IIB was Capt. J. Thomas who was

ODDR&E	ASD(I&L)	ASD(C)	ASD(PA&E)
R. Parker	J. Gansler	E. Eaton	E. Aldridge
W. Stoney	F. Trogden	C. Cardiff	A. Pennington
J. Cann	F. Myers		
W. O'Neil	H. Ellsworth		
R. Berry	J. Akridge		
G. Sutherland			
D. Henry			
Col. T. Dumont			
R. Chapman			

JCS	ASD(I)	DD(T&E)	CAIG
Capt. E. Woolridge	M. Goulder	Lt Gen W. Lotz	M. Margolis
		BGen C. Graves	H. Manetti
		Capt J. Rice	

NAVY

J. Bowers, ASN(I&L)
RAdm M. Cook, DCNM
RAdm R. Blount, OP-981
RAdm L. Baggett, OP-951
VAdm K. Lee, NAVAIR-00
VAdm J. Doyle, OP-03
Lt. Gen T. Miller, DCS (Aviation)
VAdm F. Peterson, OP-05
Capt R. Mason, OP96D

Presenters:

RAdm R. Morris, OP-32
Capt J. Thomas, PMA-266
Cdr J. McGill (Slides), PMA-266
Mrs. Rucker, PMA-266
Col Robsin, PMA-266

FIGURE N-7

Attendance
LAMPS DSARC IIB
May 25, 1976 - 1400 - 1E801 #7

assigned in January 1975. The purpose of this DSARC was: (1) to obtain approval to issue Request for Quotation to industry for prototype aircraft and to continue the LAMPS MK III extended mission program defined by the Navy, and (2) to adjust cost and performance targets and thresholds as stated in the revised DCP-85. Capt. Thomas confirmed positive response to each of Sec. Clements' guidance requirements from DSARC IIB. In addition, a Cost Effective Study by the Center for Naval Analysis for OP-96 showed that the MK III was competitive on a cost and effectiveness basis with non-LAMPS alternatives. The project schedule (see Figure N-8) was also revised to accommodate the use of UTTAS as a candidate airframe.

The program cost at DSARC IIB in comparison to DSARC IIA is shown in Figure N-9. The DSARC IIB Secretary of Defense Decision Memorandum (SDDM) was issued on June 10, 1976, by Sec. Clements and authorized continued development in accordance with the plans presented, including issuance of the RFP for a UTTAS-class helicopter airframe and engine. The guidance also required a DSARC IIC before award of the prototype aircraft contract.

Competitive RFQs were released to industry on June 23, 1976, for the airframe and August 5, 1976, for the engines. Sustaining engineering contracts were awarded to Sikorsky and General Electric on September 1, 1977, with the concurrence of both the Secretary of the Navy and the Secretary of Defense. (Note complete award of FSD contracts was delayed until DSARC IIC in February 1978.)

E. DSARC IIC

A "For Comment" DCP-85 was issued early in 1977. OSD responded with comments in February-March 1977 identifying issues to be addressed on or before DSARC IIC. These issues include the Design-to-Cost (DTC) goals, the Life Cycle Cost, the cost methodology, the operational availability, the software and the RAST systems. A series of questions posed by the SecDef (Director, Planning and Evaluation) in July 1977 started the planning for DSARC IIC. These questions were addressed in the LAMPS MK III Mission Requirement Study by PM-4. In addition, in July 1977, the Navy undertook a management review of the LAMPS program. As a result of this review, the Navy project office was reorganized. The Navy elevated the project manager from Captain to a Flag Officer, increased the responsibility and authority of the project office to both a PMA and a PMS and upgraded and increased the office staff. Additionally the H-3 and HXM programs previously assigned to the project office were transferred to another PMA.

During this period the DOD Product Engineering Services Office (PESO) was conducting a logistics review of the LAMPS MK III program. This review also raised the issue of Operational Availability (Ao), and a memorandum to OASD (MRA&L) dated September 12, 1977, provided recommendations. On December 16, 1977, the

LAMPS MK III SCHEDULE

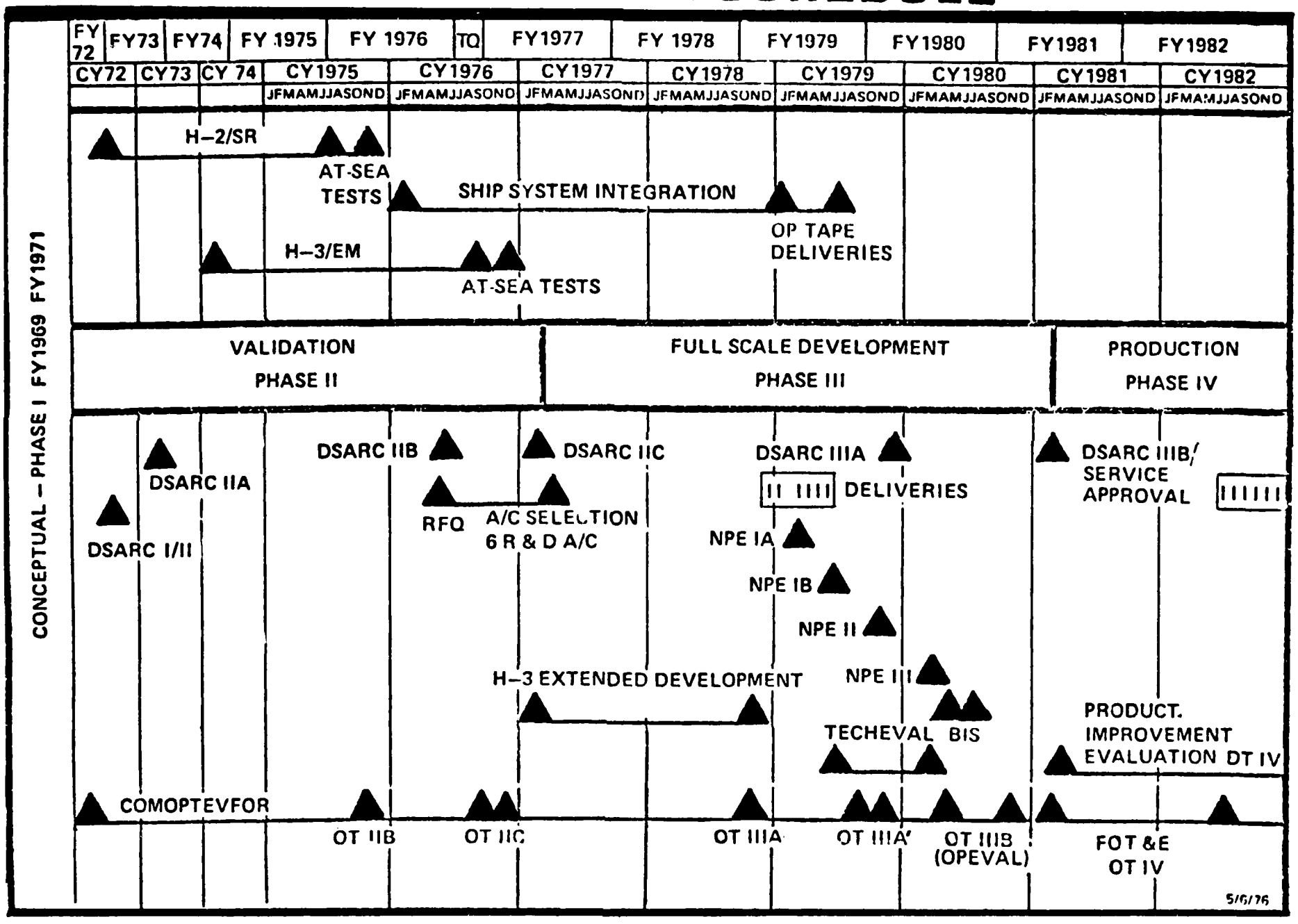


FIGURE N8

LAMPS MK III
PROGRAM COST COMPARISONS
SUMMARY DSARC IIA - DSARC IIB

($ in MILLIONS)

	DSARC IIA SR		DSARC IIB EM		▲		
	FY 72 CONST $	ESCAL $	FY 72 CONST $	ESCAL $	CONST $	ESCAL $	CHANGE FOR ESCAL ONLY
TOTAL RDT & EN	*189.4	*226.1	303.3	442.8	+113.9	+216.7	+102.8
AIRCRAFT PRODUCTION	680.5	1,060.1	797.8	1,557.6	+117.3	+497.5	+380.2
SHIP PRODUCTION	94.2	94.2	319.3	692.3	+225.1	+598.1	+373.0
TOTAL PROGRAM	964.1	1,380.4	1,420.4	2,692.7	+456.3	+1,312.3	+856.0

CONSTANT DOLLARS (ESCALATED WITH OSD INDICES OF 25 JUL 75)

Current estimates are in FY 76 $'s. For comparative purposes, estimates have been deflated to FY 72 $'s by the following factors:

RDT & EN = 36.8%
APN = 34.24%
OPN/O & MN = 46.9%
SCN = 42.9%

FIGURE N9

CNO Executive Board (CEB) review was held and on January 18, 1978, the DNSARC brief was conducted. On February 15, 1978, a revised Charter of the LAMPS Project Manager was issued. (Attached).

The LAMPS MK III DSARC IIC review was conducted on February 16, 1978. The purpose of the review was to obtain approval to assign the airframe and engine FSD contracts and to continue FSD of the LAMPS MK III system. The DSARC IIC attendance list is provided in Figure N-10. The PM (RADM. Baughman) provided a full program overview which included the changes from DSARC IIB in the development schedule (see Figure N-11) and program cost (see Figure N-12). The changes were attributed to the experience of planning, integrating, supporting and testing the extended mission system.

The Milestone IIC SDDM, issued on February 25, 1978, by Sec. Duncan, authorized continuance into FSD and the award of FSD contracts for the helicopter airframe and engine. Specific guidance directed additional attention to availability, reliability, maintainability and logistic support. An initial briefing on this subject was to be provided to OSD by September 1, 1978. This SDDM also required a DSARC Milestone IIIA prior to authorization for limited production. During April 1978, additional meetings were held with OASD to clarify the SDDM guidance concerning availability, reliability, maintainability and logistic support.

In May 1978, RADM Baughman established a LAMPS DSARC Action Team in order to comply with the directives of the DSARC IIC SDDM. The tasks were considered beyond the normal capabilities of the program office and thus the Ad Hoc team was set up to assure concentrated attention to meet the deadline imposed. The program office organization was expanded to include an Integratd Logistics Support (ILS) division and Cdr. Funck was established as ILS manager.

During this period, Capt. Winkel was assigned as Project Manager and he reported the progress on DSARC IIC guidance in December 1978. Figure N-13 documents the actions taken by this team up to March 1981.

F. Program Review (DSARC IIIA)

Planning for a DSARC IIIA commenced in February 1981 (7 1/2 months prior to the actual review). In February 1981, Captain J.M. Purtell was assigned as Project Manager and promulgated the DSARC IIIA Major Planning Milestones (see Figure N-14).

During July 1981, an LRG assessment of the LAMPS MK III ILS program was conducted. In August 1981 and September 1981 follow-on LRG reviews were conducted to evaluate the operational availability, and the logistics support methodology used to support

USDR&E

Dr. Dinneen
Mr. Moore
Mr. O'Neil
Mr. Trogdon
BGen Graves
Dr. Anderson
Mr. Baldwin
Mr. Bushman
Mr. Williams III
Miss Weddle

ASD(C)

Mr. Quetsch
Mr. Eaton
Mr. Van Hoosen

ASD(MRA&L)

Dr. White
Dr. Nelson
Mr. McGrath

ASD(ISA)

Col Larsen
Cdr Bitoff

ASD(PA&E)

Mr. Porter
Mr. Christie
Mr. Gibson
Capt. Livingston

Adv for NATO

LGen Cooper
Mr. Nicolas

JCS(J-5)

RAdm Frudden
Capt Jones

DIA

Capt Hamer

CAIG

Mr. Margolis
Mr. Manetti
Cdr Balut
Maj Yourtee

DSMC

Dr. Hurta

U.S. Army

Col Zugschwert

U.S. Navy

Mr. Mann
Mr. Cann
RAdm Baughman (Presentor)
VAdm Doyle
Capt Braun
Cdr Johnson (Projection Booth)
Adm Michaelis
Vadm Peterson
Mr. Seward
VAdm Turner
VAdm Waller
RAdm Ward
Mr. Whitfield (Projection Booth)
Mrs. Rucker (Projection Booth)
Capt Walsh
Capt Ward
Cdr Kraft
Mr. Kupelican

FIGURE N-10

Actual Attendance
LAMPS DSARC IIC
February 16, 1978

LAMPS MK III

DEVELOPMENT SCHEDULE

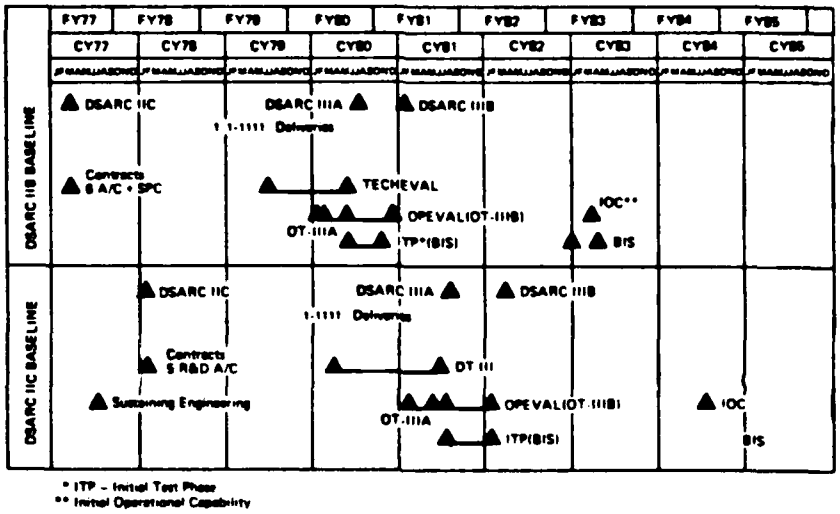


FIGURE N11

DSARC IIC

LAMPS MK III
Program Cost Comparison Summary
($ in Millions)

Appropriation	DSARC IIC Constant FY 76 $	DSARC IIC *Escalated $	DSARC IIB Constant FY 76 $	DSARC IIB * Escalated $
RDT&E	580	722	395	443
Aircraft Production	1,483	2,568	1,071	1,558
Ship Production	508	914	466	692
MILCON	9	15	–	–
Program Totals	2,580	4,219	1,932	2,693

FY 76 $ = 31 December 1975
*Escalated with OSD indices of 3 August 1977

FIGURE N12

ACTIONS TAKEN TO DATE

• TASK FORCE ESTABLISED BY PMA/PMS-266	MAY 1978
• FIRST REPORT PRESENTED TO:	
CHNAVMAT	MARCH 1979
LAMPS STEERING COMMITTEE	MARCH 1979
VCNO	APRIL 1979
ASN (MRA&L)	MAY 1979
OASD (MRA&L)	JUNE 1979
• STUDY PROJECT INITIATED	APRIL 1979
• SECOND REPORT TO VCNO	NOVEMBER 1979
• VCNO TASKING MEMO	DECEMBER 1979
• OP-05/OP-03 RECOMMENDATIONS	APRIL 1980
• VCNO TASKING MEMO TO OP-03	MAY 1980
• OP-03 TASKING TO CHNAVMAT	JULY 1980
• CNM PASSES OP-03 TASKING TO PMA-266	AUGUST 1980
• THIRD REPORT PRESENTATION SCHEDULE	
CNM	FEBRUARY 1981
LAMPS STEERING COMMITTEE	MARCH 1981
VCNO	MARCH 1981
ASN	TBD
ASD	TBD

FIGURE N13

LAMPS MK III DSARC IIIA
MAJOR PLANNING MILESTONES

EVENT	DATES (All 1981)	AUTHORITY
1. Coordination of Navy review process: OP-03 coordinates arrangements with OP-090X for review process for CEB through Pre-DSARC.	20 Feb	2/
2. Milestone Planning Meeting: DSARC Executive Secretary chairs planning meeting.	25 Feb	1/
3. Independent Cost Analysis: OP-03 requests OP-960 to prepare parametric cost analysis.	2 Mar	2/
4. Review of ILS Program Documentation: OP-04 initiates review of ILS documentation provided by OP-03 in coordination with OP-03 and CNM.	2 Mar	2/
5. DCP/IPS Draft: Distributed by OP-03 for comment.	1 Apr	2/
6. Staff comments on DCP/IPS Draft: Comments delivered to OP-03.	1 May	2/
7. Incorporation of changes in DCP/IPS: OP-03 incorporates changes, obtains appropriate concurrences, and delivers to OP-987 for forwarding to ASN (RE&S).	20 May	2/
8. Final Cost Estimates: PMA/PMS-266 provides final detailed program cost estimates and supporting rationale to OP-96D.	20 May	2/
9. "For Comment" DCP and IPS transmitted to DAE, and MRF established.	27 May	1/
10. DCP Resources Annex B: OP-03 provides up-to-date Annex B to OP-090.	27 May	2/
11. Scheduling of DSARC Review: ASN (RE&S) requests scheduling of review.	27 May	2/
12. Program Cost Assessment: OP-96D provides preliminary assessment of cost estimates for pre-CEB review.	26 Jun	2/

FIGURE N-14

13.	DAE comments on DCP and IPS.	29 Jun	1/
14.	ARB Review: Presentation of DCP/IPS draft by PMA/PMS-266.	29 Jun	3/
15.	Pre-CEB presentation of DCP/IPS draft: By OP-03, PMA/PMS-266 and COMOPTEVFOR.	9 Jul	2/
16.	Logistics Support Plan Summary: OP-03 provides ILS Plan Summary to OP-04.	16 Jul	2/
17.	Final Report on Logistics Program Readiness: OP-04 provides final report.	16 Jul	2/
18.	CEB Review of DCP/IPS Draft: Presented by OP-03, PMA/PMS-266 and COMOPTEVFOR.	17 Jul	2/
19.	Cost Estimates: PMA/PMS-266 provides cost estimates to OP-96D.	23 Jul	2/
20.	Provisional Approval for Service Use (PASU): OP-03 obtains PASU for the LAMPS MK III Weapon System.	24 Jul	2/
21.	DNSARC Review: Presentation of DCP/IPS draft by OP-03, PMS/PMA-266 and COMOPTEVFOR.	24 Jul	2/
22.	"For Comment: draft DCP/IPS reviewed and forwarded: OP-03 distributes "For Comment" drafts for concurrence, then forwards to OP-987 for subsequent transmittal by OP-098 to ASN (RE&S).	30 Jul	2/
23.	Final DCP and Update for IPS - ASN (RE&S) forwards final documents to DAE.	6 Aug	1/
24.	OSD Cost Analysis Improvement Group (CAIG) Briefing: OP-960 presents an independent parametric cost analysis.	6 Aug	1/
25.	OSD Test and Evaluation (T&E) Briefing: OP-03 PMA/PMS-266 and COMOPTEVFOR brief Deputy Director (Test and Evaluation).	6 Aug	1/
26.	OSD Manpower and Logistics Analysis (M&LA) Briefing: OP-03 and PMA/PMS-266 brief the Assistant Secretary of Defense (Manpower, Reserve Affairs & Logistics).	6 Aug	1/

FIGURE N-14 (Continued)

27.	DIA Report to DSARC Chair	13 Aug	1/
28.	Pre-DSARC Review: OP-03 and PMA/PMS-266 brief presentation to SECNAV and CNO.	17 Aug	2/
29.	DSARC Chair's Pre-Brief Meeting (OSD Staff Only).	20 Aug	1/
30.	CAIG report, T&E Report, and M&LA Report: OSD reports to DAE.	24 Aug	1/
31.	DSARC Review: OP-03 and PMA/PMS-266 make presentation.	22 Sep	1/
32.	SDDM Issued.	17 Sep	1/

Notes: 1/ DODI 5000.2
2/ OPNAVINST 5000.46
3/ NAVMATINST 5000.19C

FIGURE N-14 (Continued)

the required readiness level. In September 1981 ASD (MRA&L) conducted a separate ILS review.

Operational Availability continued to be an issue. In addition, the issues of affordability, production readiness, and cost avoidance were raised. During July and August 1981 the following briefings occured: NAVMAT ARB; PRE-CEB; CEB; OSD-T&E; OSD-CAIG; OSD-M&LA; DNSARC; and SECNAV/CNO. During this period, OSD established initiatives to streamline the acquisition process in order to reduce costs and shorten the acquisition time.

This new direction impacted the LAMPS MK III Program in that OSD wanted to reduce the number of DSARCs and was not ready to make a decision on full production in September 1981. Therefore, DSARC IIIA was changed to a Program Review. This was basically a change in name only.

The purpose of the LAMPS MK III Program Review on September 22, 1981, was to obtain: (1) authority to proceed with limited production of LAMPS MK III; (2) release of FY82 production funds; and (3) release of FY82 APN advance procurement funds required to support the FY83 Lot II buy of 48 aircraft.

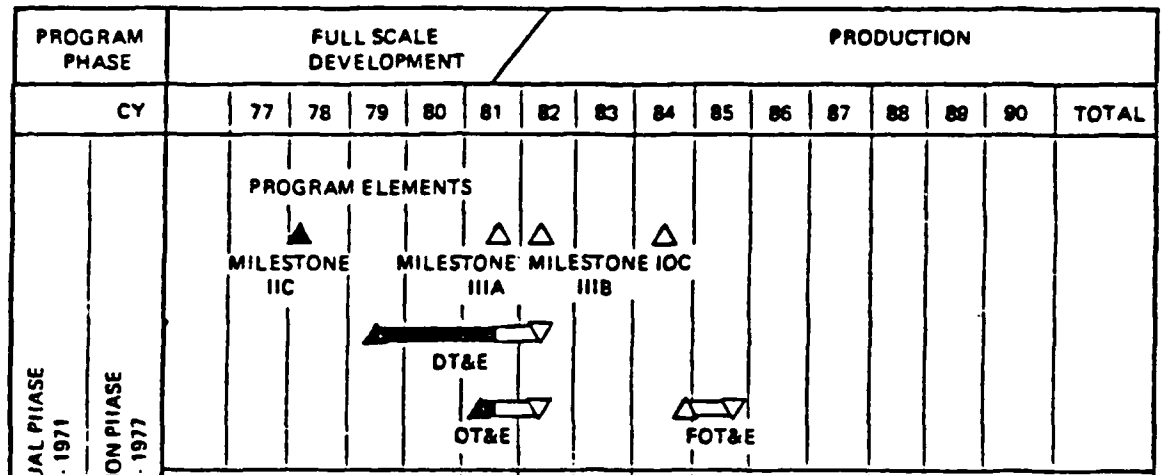
The key issues discussed at the Program Review were:

- Affordability (Navy funding requirements).
- Cost Avoidance (measures taken by the Navy and Contractors).
- Production Readiness (Production Readiness Reviews findings).
- Procurement Strategy (Transition to Production)
  - 95% Progress Payments
  - Fixed Price Incentive Contracts
  - Economical Production Rates
  - Selective Multi-Year Procurement

The program schedule (Figure N-15) remained as planned at DSARC IIC. The funding requirements shown in Figure N-16 reflect a marked increase over those presented at DSARC IIC. This increase was due to (1) no cost control of in-service GFE; (2) altered business bases at Sikorsky and GE; and (3) the decrease of the Blackhawk procurement plan. (On November 12, 1981, CNM certified the ILS program as ready for production.)

The OSD Decision Memorandum was issued by DepSecDef Carlucci on November 24, 1981, two months after the Program Review. The

DEVELOPMENT/PRODUCTION DELIVERY SCHEDULES



	77	78	79	80	81	82	83	84	85	86	87	88	89	90	TOTAL
SH-60B SEAHAWK															
RDT&E				5											5
Production							2	27	52	60	60	3			204
SHIP SUBSYSTEM															
RDT&E															
– Electronics				3											3
– RAST				3											3
Production															
– Electronics							4	18	12	20	18	10	20	3	105
– RAST							5	19	11	20	18	10	20	2	105

FIGURE N15

LAMPS MK III FUNDING OVERVIEW BY APPROPRIATION

	RDT&E,N	PROCUREMENT				MILCON	TOTAL
		AP,N	OP,N	SC,N	O&M,N(FMP)		
DSARC IIC	721.8	2,568.3	363.3	311.8	238.8	15.4	4,219.4
CHANGES	21.1	541.6	65.0	32.6	356.8	3.5	1,020.8
ESCALATION	25.7	1,215.1	142.5	61.4	481.1	4.1	1,929.9
DSARC IIIA	768.6	4,325.0	570.8	405.8	1,076.7	23.0	7,169.9

FIGURE N16

Navy was authorized to proceed with limited production and tasked with 8 additional actions:

1. Develop a plan to correct deficiencies discovered during technical and operational testing to date, including a schedule for testing the corrections and incorporating them into production designs. Include this in a revised LAMPS MK III Test and Evaluation Master Plan, which is to be submitted for approval to the Director, Defense Test and Evaluation.

2. Develop a plan for conducting sufficient additional opeational testing of the RAST subsystem to provide an adequate data base for the asessment of its operational suitability prior to DSARC III. Include this in a revised RAST Test and Evaluation Master Plan, which is to be submitted for approval to the Director, Defense Test and Evaluation.

3. Submit the complete cost effectiveness analysis that was accomplished prior to the 22 September Program Review.

4. Submit with the DCP for Milestone III a detailed analysis of the false contact rate of the AN/SQR-19 Tactical Towed Array Sonar. Examine the potential impact of the false contact rate on LAMPS MK III availability and combat effectiveness over a period of several weeks in the context of the planned wartime utilization rate.

5. Provide revised goals and thresholds for helicopter mean time to repair and maintenance manhours per flight hour to include all organizational level maintenance and support workload.

6. Program and fund an effort to improve the diagnostic and other maintainabiltiy features of the LAMPS MK III system. In planning for data collection and analysis in the next phase of development and operational testing, give higher priority to evaluating maintenance and diagnostic capabilities and iden--tifying needed improvements.

7. In finalizing production contracts, provide incentives for the contractors to address reliability and maintainability improvements in production. Additionally, the Navy should plan to continue reliability improvement and flight test efforts on the engineering models in the event that results of Operational Evaluation demonstrate the need.

8. Prior to DSARC III, investigate options for extension of the employment of contractors for intermediate and depot repair of LAMPS MK III peculiar items over the lifetime of the system. This should include an assessment of the potential for reduction in the requirements for skilled Navy technicians.

As requested in the SDDM, an investigation of options for the extension of the employment of contractors for intermediate and

depot repair of LAMPS MK III peculiar items over the lifetime of the system was conducted (Task 8). The study included an assessment of the potential for a reduction in the reuqirements for skilled Navy technicians. The study confirmed that currently planned transition dates are feasible and cost effective. A copy of this study has been provided to OSD (MRA&L).

G. DSARC III (IIIB)

The organization of the Project Office at DSARC III was similar to that at the September 1981 Program Review. Captain Purtell, the Program Manager, had approximately 16 months of experience with the program and was familiar with the DSARC process since he had gone through the Program Review (essentially DSARC IIIA) in September 1981. The heads of each major division in the program office were similarly, if not more, experienced with the project.

In February 1982, CNO requested that a Project Office and project manager be identified for the POM-83 new start - SH-60 (CV), a carrier-based variant of the LAMPS MK III. Because of the commonality with the SH-60B, this management responsibility was assigned to a senior officer under the SH-60B program office (PMA-266). This is reflected in the organization chart in Figure N-17.

The purpose of the DSARC III review was to obtain authority to proceed with full production of LAMPS MK III. Preparation for this review began in January 1982 with the update and revision of the DCP and IPS. Figure N-18 provides the major planning milestones promulgated by CNO on January 21, 1982. Prior to the DSARC, the Program Office supported approximately 46 briefings/meetings. These included various NAVAIR, OPNAV, SECNAV Prebriefs, LRG, ARB, Pre-CEB, CEB, DNSARC, CAIG, T&E Brief, M&LA Brief, and an ASN (R,E&S) Brief.

Before the DSARC, OSD notified the Program Office (OUSD Memo to ASN (R,E&S) dated June 23, 1982) that specific issues of concern would be addressed prior to or instead of the usual overall briefing. The issues to be covered were: (1) Production Readiness (particularly addressing the ALQ-142 ESM and MAD systems), (2) Procurement Objective, and (3) Production Rate.

DSARC III took place on June 29, 1982. The attendance list is provided in Figure N-19. Only the specific issues mentioned above were discussed in any detail. The funding requirements at DSARC III are given in Figure N-20. The schedule for transition to the production phase is shown in Figure N-21, and the DCP-85, alternatives are given in Figure N-22.

LAMPS MK III

PROGRAM OFFICE ORGANIZATION

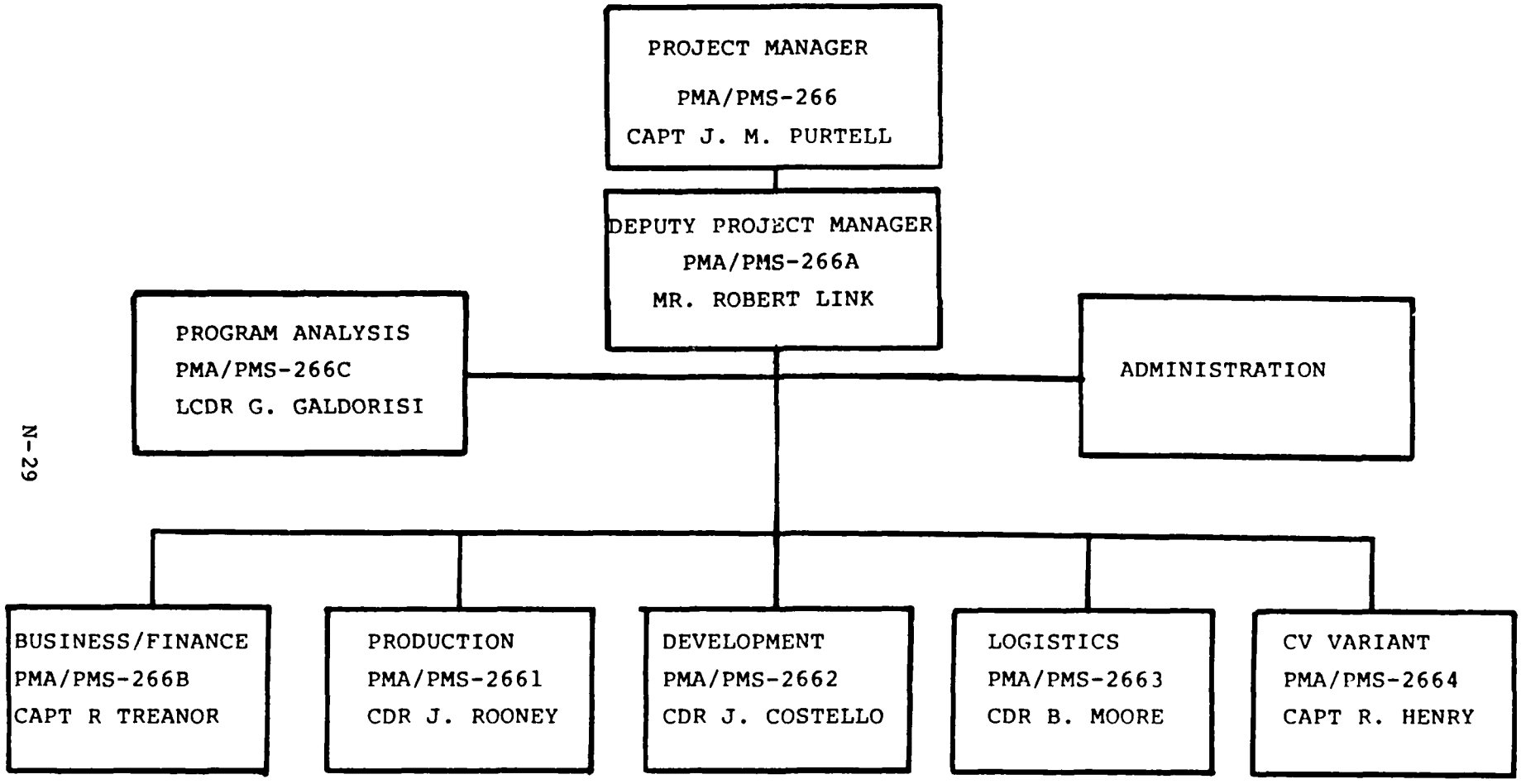


FIGURE N17

LAMPS MK III DSARC III
MAJOR PLANNING MILESTONES

EVENT	DATES (All 1982)	AUTHORITY
1. Coordination of Navy review process: OP-03 coordinates arrangements with OP-090X for review process for review process for CEB through Pre-DSARC.	15 Jan	2/
2. Independent Cost Analysis: OP-03 requests OP-960 to prepare parametric cost analysis.	15 Jan	2/
3. DCP/IPS Draft: Distributed by OP-03 for comment.	3 Mar	2/
4. Staff comments on DCP/IPS Draft: Comments delivered to OP-03.	1 Apr	2/
5. Final Cost Estimates: PMA/PMS-266 provides final detailed program cost estimates and supporting rationale to OP-96D.	15 Apr	2/
6. Incorporation of changes in DCP/IPS: OP-03 incorporates changes, obtains appropriate concurrences, and delivers to OP-987 for forwarding to ASN (RE&S).	15 Apr	2/
7. Approval for Service Use (ASU): OP-03 obtain ASU for the LAMPS MK III Weapon System.	19 Apr	2/
8. LRG Review: Presentation by PMA/PMS-266.	20 Apr	2/
9. ARB Review: Presentation of DCP/IPS draft by PMA/PMS-266.	21 Apr	3/
10. Program Cost Assessment: OP-96D provides preliminary assessment of cost estimates for pre-CEB review.	22 Apr	2/
11. OP-987 forwards DCP/IPS to ASN (RE&S).	22 Apr	2/
12. Pre-CEB presentation of DCP/IPS draft: by OP-03, PMA/PMS-266 and COMOPTEVFOR.	30 Apr	2/

FIGURE N-18

13.	"For Comment" DCP and IPS transmitted to DAE by ASN.	6 May	2/
14.	CEB Review of DCP/IPS Draft: Presented by OP-03, PMA/PMS-266 and COMOPTEVFOR.	14 May	2/
15.	Cost Estimates: PMA/PMS-266 provides cost estimates to OP-96D.	19 May	2/
16.	DNSARC Review: Presentation of DCP/IPS draft by OP-03, PMS/PMA-266 and COMOPTEVFOR.	25 May	2/
17.	OSD Cost Analysis Improvement Group (CAIG) Briefing: OP-960 presents an independent parametric cost analysis.	31 May	1/
18.	OSD Test and Evaluation (T&E) Briefing: OP-03, PMA/PMS-266 and COMOPTEVFOR brief Deputy Director (Test and Evaluation).	1 Jun	1/
19.	OSD Manpower and Logistics Analysis (M&LA) Briefing: OP-03 and PMA/PMS-266 brief the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics).	2 Jun	1/
20.	DIA Report to DSARC Chair.	10 Jun	1/
21.	DSARC Chair's Pre-Brief Meeting (OSD Staff Only).	17 Jun	1/
22.	DSARC Review: OP-03 and PMA/PMS-266 make presentation.	24 Jun	1/
23.	SDDM Issued.	?	1/

Notes: 1/ DODI 5000.2
2/ OPNAVINST 5000.46
3/ NAVMATINST 5000.19C

FIGURE N-18 (Continued)

OUSDRE

Dr. Wade (Chairman)
DUSD(AM - Mr. Wm. Long
DUSD (Sponsor) - Dr. Mac Adams
Action Officer - Mr. Bob DeLaney
Mr. Will O'Neil
Mr. Tim Divincenzo

D,DT&E

Admiral Sam Linder
Mr. Gene Thompson

DIA

Dr. Dave Katz

ASD(C)

Bob Leach

ASD(MRA&L)

Mr. Mike McGrath

DIR(PA&E)

Mr. David Chu
Mr. Tom Gibson

SERVICE

(1) - Mr. G.A. Cann, PDASN(RES)
(2) - VAdm R.R. Monroe, CNO(OP-098)
(3) - VAdm E.R. Travers, VCNM
(4) - VAdm R.L. Walters, CNO(OP-03)
(5) - Mr. F.W. Swofford, ASN(S&L)
(6) - RAdm S.J. Hostettler, CNO(OP-35)
(7) - RAdm L.C. Chambers, NAVAIR(AIR-
(8) - RAdm G.W. Davis, NAVSEA(SEA-91)
(9) - Capt. J.M. Purtell, NAVIAR (PMS-
(10) - RAdm C.J. Kempf, CNO(OP-05B)

USD(Policy)

Dr. Dov Zakheim

OJCS

BG R. D. Peat
Capt. C. H. Crigler

CAIG

Mr. Milt Margolis
Major Jim Wilson

DSMC

Cdr. Tab Justis
Cdr. David Timmons
LtC. Stan Souvenir
Mr. Jess Sweely
Cdr. Ben Sellers
LtC. Tony Perino
Mr. Greg Wierzbicki
Dr. Jay Billings

FIGURE N-19

LAMPS DSARC III
AUTHORIZED ATTENDEES

LAMPS MK III

FUNDING REQUIREMENTS
ALTERNATIVE 1 (TY $ M)

FISCAL YEAR	PRIOR YEARS	FY 83	FY 84	FY 85	FY 86	FY 87	FY 88	FY 89	FY 90	TOTALS
QUANTITY										
AIR SUBSYSTEMS										
SH-60B	18	48	36	36	36	30	-	-	-	204
SHIP SUBSYSTEMS										
SC,N	22	5	5	7	8	7	6	-	-	60
OP,N	4	9	7	14	11	7	-	-	-	52
APPROPRIATIONS										
RDT&E	758.0	9.0	4.5	-	-	-	-	-	-	771.5
AP,N	832.3	1231.6	936.5	835.6	749.1	586.5	116.0	103.8	-	5391.4
SC,N	297.4	56.1	60.0	90.1	105.8	99.7	71.9	-	-	781.0
OP,N	43.3	87.4	82.2	123.1	102.3	75.5	-	-	-	513.8
OBM,N (FMP)	-	-	14.0	116.9	76.4	223.4	208.3	121.8	63.6	824.4
MILCON	12.5	9.0	-	-	-	-	-	-	-	21.5
TOTAL	1943.5	1393.1	1097.2	1165.7	1033.6	985.1	396.2	225.6	63.6	8303.6

CURRENT REQUIREMENTS VS. CONTROLS
ALTERNATIVE 1 (TOTALS) (TY $ M)

POM	1943.5	1393.1	1135.0	1219.9	1088.4	1154.7	367.2	121.8	81.8	8505.4
RDMT	1943.5	1393.1	1097.2	1165.7	1033.6	985.1	396.2	225.6	63.6	8303.6
Δ±	-	-	-37.8	-54.2	-54.8	-169.6	+29.0	+103.8	-18.2	-201.8

FIGURE N20

LAMPS MK III TRANSITION TO PRODUCTION

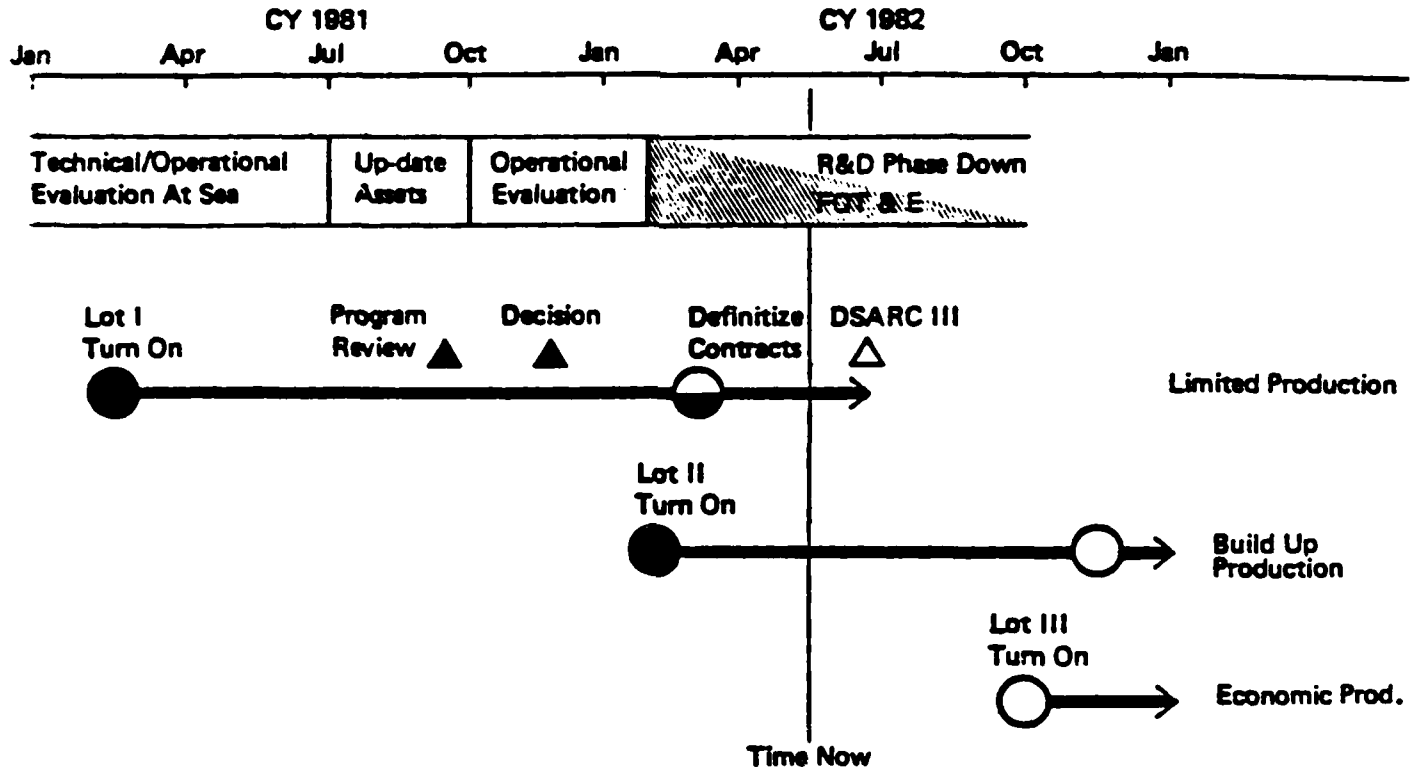


FIGURE N21

LAMPS MK III ALTERNATIVES

ALTERNATIVE 1 - POM-84
204 SH-60B (18-48-36-36-36-30)
112 SHIP SYSTEMS (60 SC,N 52 OP,N)

ALTERNATIVE 2 - FYDP
204 SH-60B (18-48-64-74)
106 SHIP SYSTEMS (54 SC,N 52 OP,N)

ALTERNATIVE 3 - TERMINATE PROGRAM

FIGURE N22

The DSARC III SDDM was signed by DepSecDef Carlucci on December 8, 1982. A DSARC I/II is scheduled for June 30, 1983, for the CV variant, now designated SH-60F.

IV. PROGRAM STATUS

The LAMPS MK III Full Scale Development completed in December 1982. The November 24, 1981, SDDM specifically authorized the Navy to contract for the production of eighteen helicopter systems and ten ship systems, to proceed with FY-82 military construction and support efforts, and to initiate advance procurement for forty-eight helicopter systems.

The significant events in the programs' history are shown in Figure N-23.

Table N-1 provides a comparison of the funding profiles and major milestone schedules at each DSARC. In general, preparation for each DSARC was a lengthy process starting anywhere from 6-8 months prior to the DSARC. In most cases, the resulting SDDM also provided detailed guidance to the project office which required extensive tasking with short deadlines.

Also notable is the attendance at the DSARCs: while the reviewers are numerous, the expertise from within the program office (other than the PM) is not represented at all.

The new administrations efforts to decentralize the DSARC process resulted in elimination of DSARC IIIA. However the Program Review which took its place required the identical effort. "A DSARC by any other name ..." (is still a DSARC). Although the DSARC III SDDM was not signed until December 1982, almost six months after the review, the project continued on schedule.

EVENTS	DATE
LAMPS MK III DSARC I/II	Jun '72
LAMPS MK III DSARC IIA	Jul '73
IBM SELECTED AS SPC	Apr '74
CONCEPT VALIDATION	
P-3C(ASW)	May '74
SH-2(OHT)	Jun '74
DEMONSTRATED H-2, SHORT RANGE	Nov '75
DSARC IIB	May '76
ISSUED RFQ FOR PROTOTYPE AIRCRAFT	Jun '76
COMPLETED DT/OT IC* TESTING (DEMONSTRATED H-3, EXTENDED MISSION)	Dec '76
AIR VEHICLE AND ENGINE CONTRACTORS SELECTED	Aug '77
DSARC IIC - FULL SCALE DEVELOPMENT CONTRACTS AWARDED	Feb '78
AIR VEHICLE MOCK-UP	Feb '78
AVIONICS INSTALLATION MOCK-UP	Jun '78
SHIP COMPATIBILITY TRIALS (FFG-7/DD-963)	Jul/Aug '78
R&M ANALYSIS COMPLETED	Jul '79
DELIVERY OF FIRST RAST SYSTEM TO NAEC	Jul '79
FIRST YT ENGINE DELIVERY	Aug '79
RAST DEMONSTRATION	Sep '79
FIRST FLIGHT FOR (FSD) AIRCRAFT	Dec '79
FIRST PROTOTYPE SH-60B HELICOPTER DELIVERED	Jan '80
LAND-BASED TEST SITE OPERATIONAL	Feb '80
WEAPON SYSTEM DEMONSTRATION	May '80
FIRST DELIVERY OF SH-60B SEAHAWK	Jun '80
NPE-IA COMPLETED	Jul '80
NAEC RAST SYSTEM FUNCTIONAL TESTING COMPLETED	Jul '80
NPE-IN COMPLETED	Aug '80
NPE-IB COMPLETED	Aug '80
NAVY WEAPON SYSTEM DEMONSTRATION STARTED	Oct '80
FFG-8 PSA COMPLETED	Nov '80
FFG-8 FIRST DATA LINKED WITH SH-60B	Nov '80
NAVY WEAPON SYSTEM DEMO COMPLETED	Jan '81
FIRST SH-60B SEAHAWK LANDING ABOARD FFG-8	Jan '81
SHIP ENVELOPE DEVELOPMENT AND RAST TECHNICAL COMPLETED	Feb '81
ADVANCE ACQUISITION CONTRACTS AWARDED -- LOT I/BUY 1	Mar '81
NPE-IC COMPLETED	Mar '81
NPE-II COMPLETED	Apr '81
OT-IIA* AND RAST OPEVAL COMPLETED	Jun '81
OSD PROGRAM REVIEW - LIMITED PRODUCTION	Sept '81
ADVANCE ACQUISITION CONTRACTS AWARDED -- LOT II/BUY II	Mar '82
OT-IIB* OPEVAL COMPLETED	Feb '82
BIS ITP COMPLETED	Jun '82
MILESTONE III - FULL PRODUCTION	Jun '82
FIRST PRODUCTION AIRCRAFT DELIVERY	Oct '83
BIS COMPLETED	Jul '84
IOC	1984

FIGURE-N23: LAMPS MK III Significant Events

TABLE N-1

LAMPS MK III
DSARC SUMMARY COMPARISON

	DSARC I/II	DSARC IIA	DSARC IIB	DSARC IIC	PROGRAM REVIEW	DSARC III
DSARC DATE	6/29/72	7/19/73	5/25/76	2/16/78	9/22/81	6/29/82
SDDM DATE	7/11/72	8/14/73	6/10/76	2/25/78	11/24/81	12/8/82
PMA	CAPT Lonnquest	CAPT Boh	CAPT Thomas	RADM Baughman	CAPT Purtell	CAPT Purtell
PLANNED IOC		7/80	3/83	7/84	7/84	7/84
SCHEDULE						
IIB		10/74				
IIB		10/75	3/77			
PROGRAM REVIEW III			12/79	8/81		
III		(1/79)	2/81	3/82	4/82	
COST (THEN YR $)						
RDT&E		226	443	722	769	722
APN		1060	1558	2568	4325	5391
SCN				312	406	781
OPN		94	692	363	571	514
O&MN(FMP)				239	1077	824
MILCON		-	-	15	23	22
TOTAL		1380	2693	4219	7171	8304

APPENDIX O

TRIDENT
PROGRAM STUDY REPORT

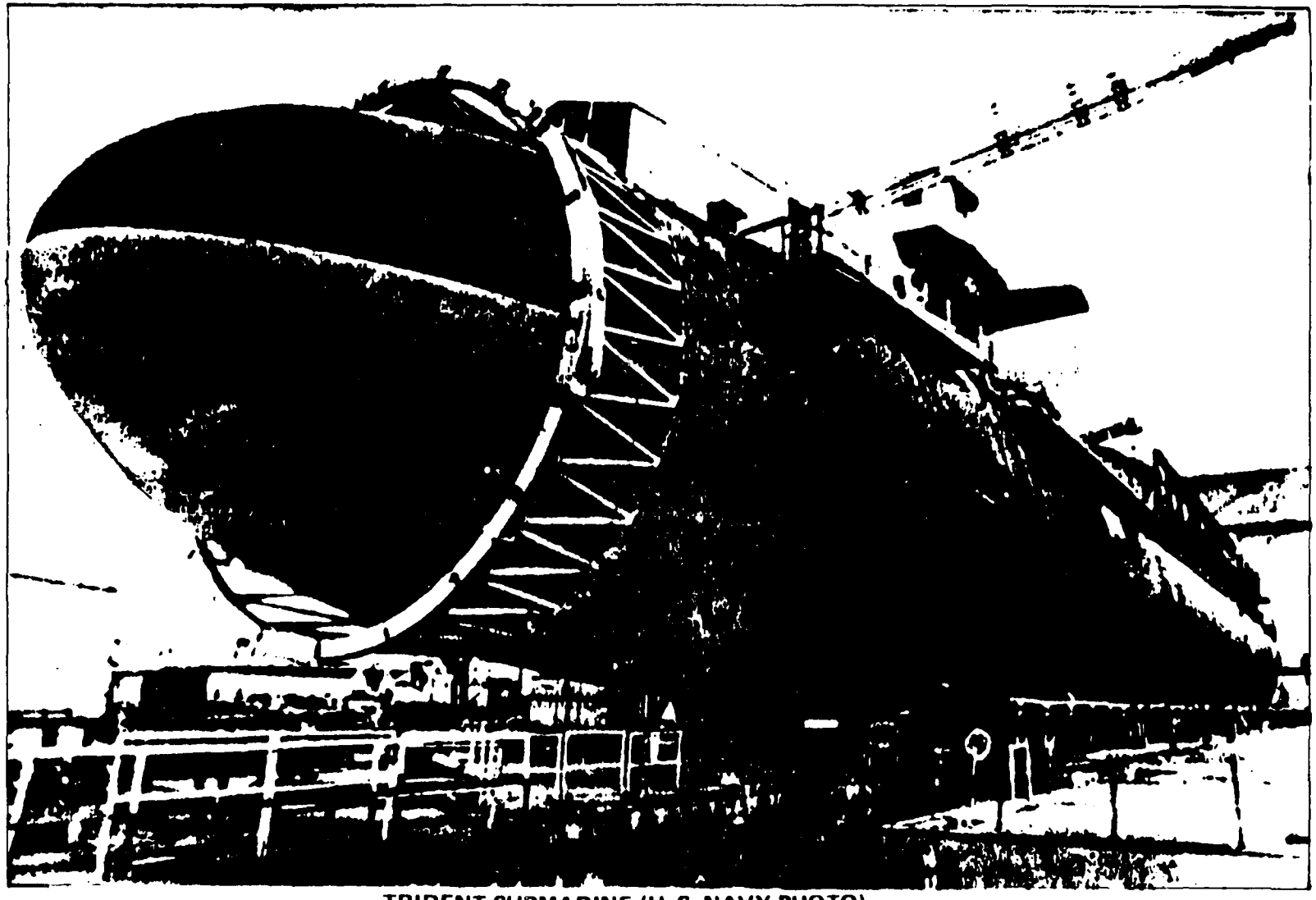
I. SYSTEM DESCRIPTION

The TRIDENT System Project is a long-term program for the modernization and orderly replacement of presently deployed ballistic missile submarine systems (POLARIS and POSEIDON). The project incorporates three elements: the TRIDENT submarine; the TRIDENT missile; and TRIDENT logistic support.

The TRIDENT submarine is a new third generation nuclear powered submarine, shown in Figure 01. The TRIDENT submarine runs quieter and is able to stay at sea longer than the previous SSBN submarines. It has greater firepower, is less detectable, has greater survivability, and is not dependent on bases in foreign countries. Significant specifications are presented in Table 01.

There are two TRIDENT missiles. The TRIDENT I missile is a new long range missile with a payload made up of multiple, independently targetable reentry vehicles (MIRV). The range of the TRIDENT I missile is about 4,350 nmi. TRIDENT II missile, larger than TRIDENT I and with a range of about 6,000 nmi, is planned for development and installation in TRIDENT submarines as a successor to the TRIDENT I missile. The TRIDENT I, shown in Figure 02, is 34.1 feet in length, 74 inches in diameter, and weighs about 73,000 pounds. The TRIDENT II is 44.5 feet in length, 83 inches in diameter, and weighs about 120,000 pounds.

The operational and maintenance requirements of the TRIDENT submarine are more stringent than those of current Fleet Ballistic Missile (FBM) submarines and have required recognition of TRIDENT logistic support as a major element of the TRIDENT system project. These requirements, in the form of extended patrols, shorter refit turnaround time, more years between overhauls, and shorter overhauls, have led to the development of new logistic design parameters, training and maintenance concepts to satisfy those requirements in a cost effective manner. Direct logistic support of the operational TRIDENT system will be concentrated at Naval Submarine Base, Bangor, Washington, and at Naval Submarine Base, Kings Bay, Georgia. These submarine bases and the allocated TRIDENT-related activities will provide support in the form of submarine refit, replenishment, crew training, missile processing, and site operations and personnel support for military personnel and dependents.



TRIDENT SUBMARINE (U. S. NAVY PHOTO)

Figure - 01:

Table O1

TRIDENT SUBMARINE SPECIFICATIONS

Displacement, tons:	Surfaced	16,600
	Submerged	18,700
Dimensions, feet:	Length	560
	Beam	42
	Draft	35.5
Missiles:	24 tubes for TRIDENT missile	
Torpedo tubes:	4-21 inch diameter	
Propulsion power:	Nuclear (S8G reactor)	
Operational cycle, days:	At sea -	70
	Alongside -	25

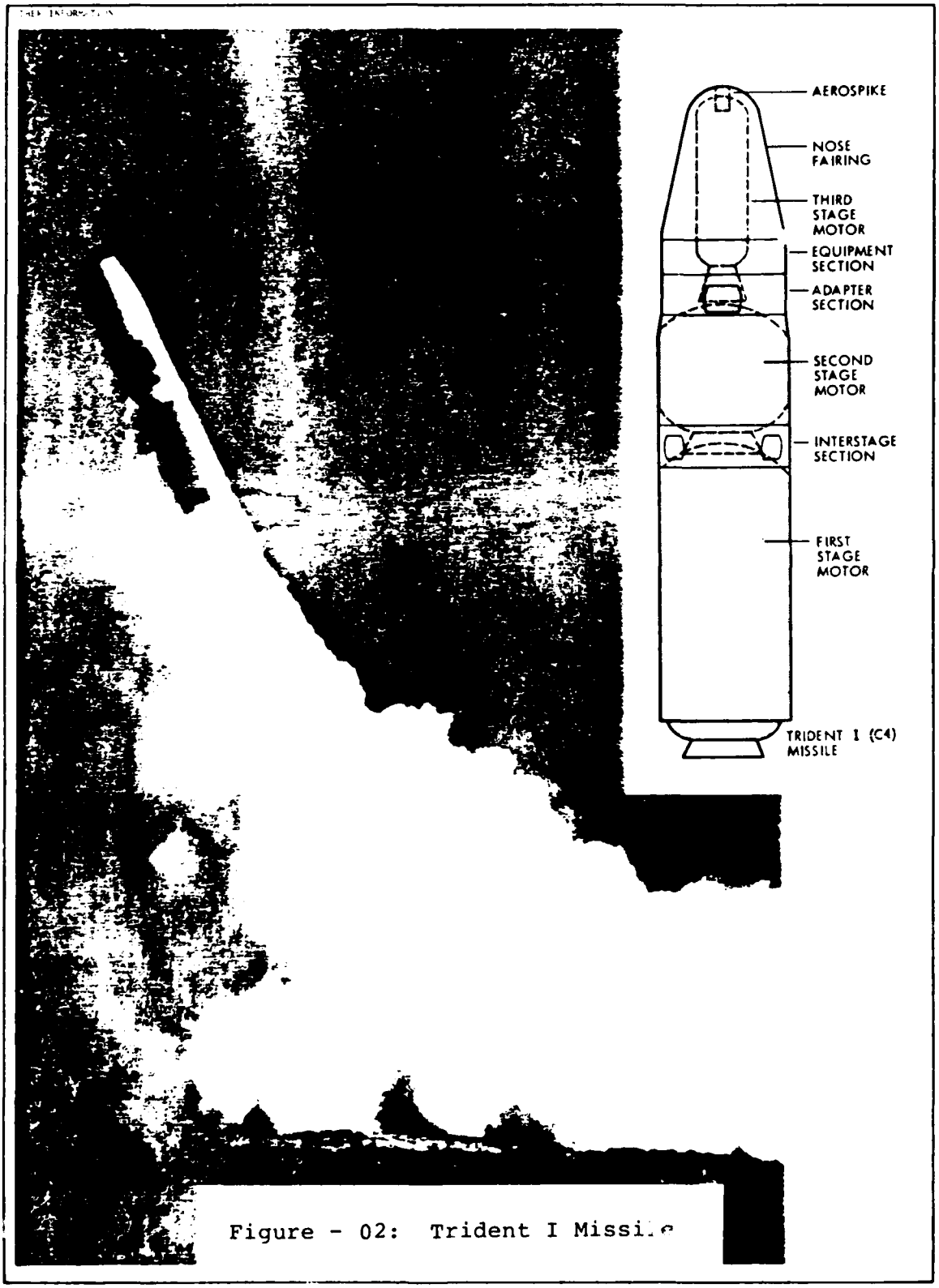


Figure - 02: Trident I Missile

II. INITIAL PROGRAM SUMMARY

The TRIDENT System Project can trace its origins to the STRAT-X study of 1966. Further Navy studies led to a conceptual TRIDENT in 1968. In May 1969, DDR&E requested ASN (R&D) to conduct additional concept studies. In the Fall of 1970, preliminary studies of a refit facility were initiated.

On January 19, 1971, the Chief of Naval Operations requested that the Chief of Naval Material (CNM) take immediate steps to establish an Undersea Long-Range Missile System (ULMS) (later renamed TRIDENT System on May 15, 1972) Project Manager under CNM. The ULMS Project (PM2) was created and a Project Manager designated on March 30, 1971.

PM2 was charged with planning, direction, control and integration of all effort within the Naval Material Command for the total ULMS System and all research and development efforts which supported ULMS development and successful deployment. The ULMS System was defined to include the submarine, the missile system, the nuclear propulsion plant, supporting R&D, and supporting shore facilities. Performance of the acquisition process for these elements of ULMS was specifically assigned as follows:

- Strategic Weapon System (missile, warheads and ship installed subsystems) - Director, Strategic System Project (PM1) under the guidance of PM2.

- Submarine - Project Manager, ULMS Submarine Ship Acquisition Project (PMS 396), under the guidance of PM2.

- Naval nuclear propulsion plant - Director, Division of Naval Reactors/Deputy Commander, Naval Ship Systems Command, for Nuclear Propulsion (SHIPS 08). PM2 to consult with and obtain concurrence in all matters relating to or affecting nuclear propulsion plants.

- ULMS R&D List - Managers of each project, subject to PM2 approval of funding changes and adequacy of work efforts.

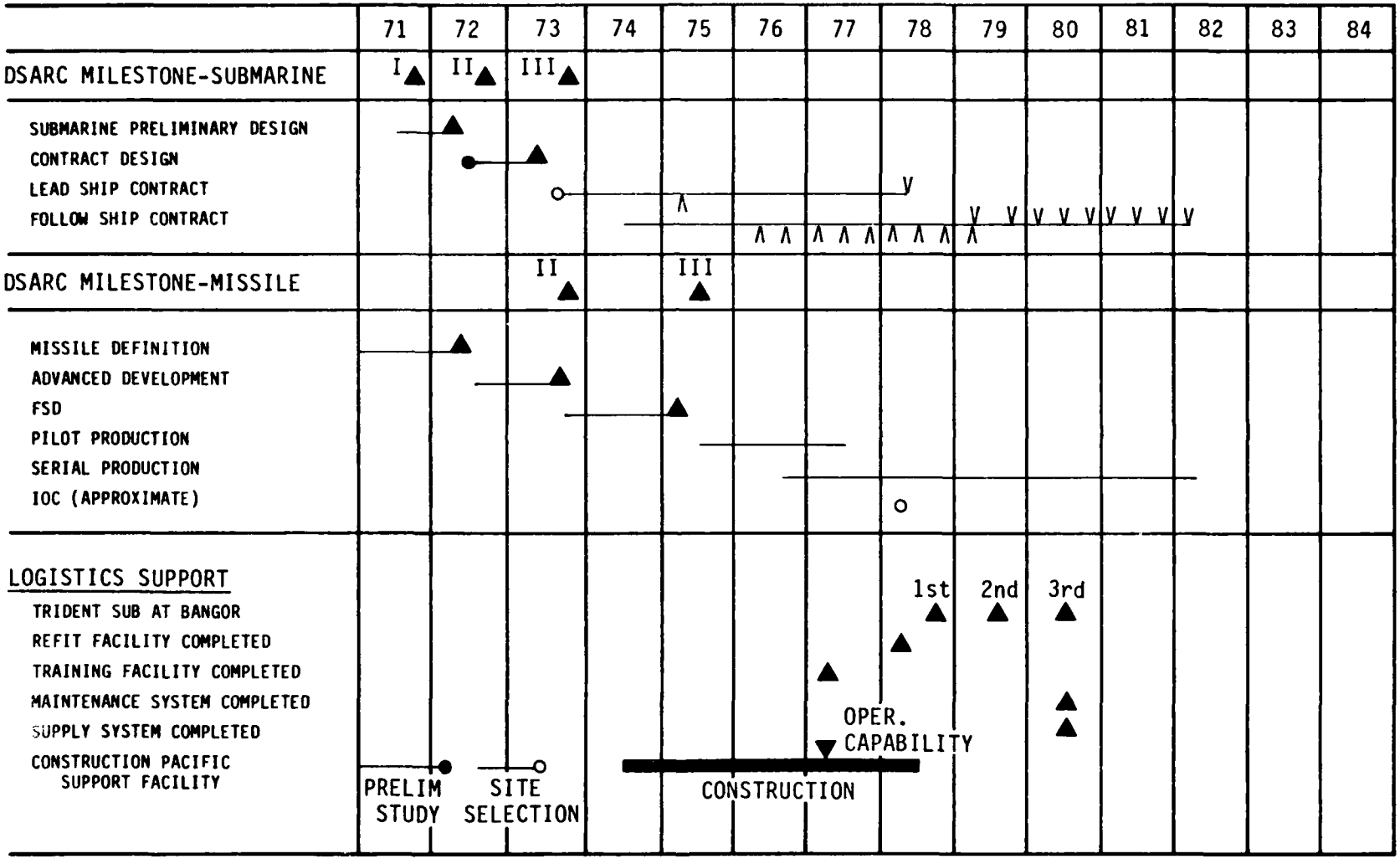
PM2 also was charged specifically with developing, maintaining and justifying the ULMS Project budget and with overall control and responsibility for funds designated in the Navy's budget for the ULMS Project.

PM2's responsibilities were to continue until deployment of the ULMS at which time it was intended that ULMS, would be turned over to the proper support elements of the Naval Material Command (PM1 and Systems Commands) for support and maintenance.

The Navy completed the additional concept studies and selected a system configuration in June 1971. The results of

these studies were incorporated into the ULMS Project DCP-67 and into briefings for a DSARC Milestone I review. DCP 67 was drafted in ODDR&E.

The initial Navy recommended development program for the ULMS (TRIDENT) has been reconstructed from various unclassified sources and is depicted in Figure O3. Dates indicated are approximate. The initial plans included construction of the lead ship with FY74 funding and a program of three submarines a year with FY75, 76, and 77 funds, for a total of ten ULMS submarines. The missile (now TRIDENT I) would have a 4,000 nmi range and be sized to permit retrofit in some of the POSEIDON-armed Fleet Ballistic Missile (FBM) submarines.



Λ - KEEL LAID

V - SUB LAUNCHED

Note: Dates approximate reconstructed from unclassified sources

Figure -03 TRIDENT SYSTEM PROJECT INITIAL PLANNED MILESTONES

III. PROGRAM EVOLUTION

A. DSARC Milestone I Review - September 1971

No records were available covering pre-DSARC activities and the DSARC meeting. The Undersea Long-Range Missile System (ULMS) Development Concept Paper (DCP 67) was signed on September 14, 1971, by DDR&E for the DepSecDef.

The primary requirement for ULMS, as cited in DCP 67, was to maintain and improve the national strategic deterrent. The FBM submarines then in service would reach their 20th year of active service between 1983 and 1987, resulting in block obsolescence and a decrease in strategic deterrent capability.

Four issues were addressed in the DCP. These were:

- Increasing threat;
- Obsolescence of current force;
- Technical advances that presented the opportunity for improvements in capability; and
- The opportunity to upgrade the capability of the existing force afforded by a new missile.

Five options were discussed that ranged from "do nothing" to various combinations of submarines/missiles and IOC dates.

Two categories of risks, technical and cost, were identified. The cost risk was identified as being a gross estimate.

The DepSecDef Decision of September 14, signed by DDR&E, approved the development of a new missile that could be used to upgrade the current force and would be used in a new submarine force in the early 1980s. The decision directed the Navy to hold back on final ship design until the missile design was firm and went on to approve the Navy recommended option.

Future DSARC reviews were scheduled approximately as follows:

DSARC II	(Submarine)	October 1972
DSARC II	(Missile)	October 1973
DSARC III	(Submarine)	October 1973
DSARC III	(Missile)	May 1975

B. DSARC Milestone II (Submarine)/Program Review (Missile) - December 14, 1972

After DCP 67 was signed in September 1971, a number of follow-on decisions were issued in DepSecDef and UNDERSECNAV memoranda, PDMs and PBDs. A list of these decisions and other events between 9/71 and 11/72 follows:

Date	Decisions and Events
12/71	Program Review
12/23/71	PBD 313, "ULMS"
12/71	PBD 317, OSD Program Decision to Proceed
1/4/72	PBD 324, "FY72 Program Supplement"
1/8/72	UNDERSECNAV Memo, "ULMS Submarine Characteristics"
2/72	Preliminary Refit Facility Studies Completed
3/72	Submarine Preliminary Design Completed
5/72	Missile Systems Definition Completed
5/15/72	ULMS Project renamed TRIDENT System
7/72	Contract Design Commenced
8/30/72	DepSecDef Memo, "PDM for DON"
9/21/72	DepSecDef Memo, "Amended PDM for DON"
10/72	Congressional Approval
11/72	PDM

On October 11, 1972, in a memorandum to the DSARC Principals, DDR&E called for a Program Review of the TRIDENT program. The review would cover the TRIDENT I missile and its weapon system in the first phase and the TRIDENT submarine in the second phase. The date of the meeting was to be December 9, 1972. Three enclosures were provided, described as follows:

- o General guidance for DSARC II reviews;
- o Specific items to be addressed for the TRIDENT I missile (as listed in Table O2); and,

TABLE O2

SPECIFIC DISCUSSION ITEMS FOR TRIDENT I MISSILE DSARC REVIEW

1. Review proposed baseline for major weapon characteristics:

   a. Range/payload options including risk and acquisition cost for various range extension options.

   b. CEP

   c. Navigation/guidance including options for improved CEP.

   d. Other weapon system characteristics including differences for 640 and TRIDENT submarines.

   e. Tradeoffs completed and decisions taken on baseline definition.

   f. Tradeoffs remaining, description of efforts to be completed in support of the decision-making process, and expected time scale for completion of remaining major decisions.

2. Review MK 400 warheard phase II studies and recommended options, including implications of the options on weapon system characteristics, system effectiveness, and DOD costs.

3. Review MK 400 warhead phase II impact and capabilities studies.

4. Discuss Navy and AEC recommendations for phase III warhead development.

5. MaRV/penaid options including plans for maintaining interface capability for potential future MaRV deployment.

6. Discuss overall program and flight test schedule, including plans for at sea launch platform.

- o Specific items to be addressed for the TRIDENT submarine (as listed in Table O3).

It was intended by DDR&E that this review serve as a DSARC II for the submarine, with a DSARC II for the missile to be scheduled in October 1973.

An addendum Cover Sheet Number 1 change to DCP 67, which incorporated the changes in the program since the initial DCP of September 1971, was circulated "For Coordination" by DDR&E on November 17, 1972. This addendum noted that the submarine building program proposed was very ambitious since it was planned for construction of up to three TRIDENT submarines a year. The importance of the concept of a TRIDENT support complex to achieve availability goals was emphasized. Program changes that were incorporated in the addendum included the following:

- o Delay TRIDENT I missile to be consistent with the IOC of the TRIDENT submarine.
- o Provide the option of putting the TRIDENT I missile into POSEIDON equipped FBMs.
- o Provide for development of a TRIDENT II missile with a later IOC date.

On November 28, 1972, ASN(R&D) responded to the DDR&E memorandum of October 11, 1972 that had scheduled the TRIDENT Program Review. ASN(R&D) stated that the Navy would cover the topics specified in the enclosures to the DDR&E memo "... to the extent that available information will permit." He noted that the information requested was not available since the requisite work had not been completed and would not be completed until late Summer 1973. He specifically identified the following items that would not be available until then.

a. A DCP which covers and summarizes the results of the current Concept Formulation/Validation effort.

b. Test and Evaluation Plan.

c. Advance Procurement Plan.

d. Risk Assessment Manual.

e. Integrated Logistics Plan including a Navy Training Plan and a Support Facility Development Plan.

f. Cost Effectiveness Study.

g. Submarine Detailed Characteristics.

TABLE O3

SPECIFIC DISCUSSION ITEMS FOR TRIDENT SUBMARINE DSARC REVIEW

1. Review proposed baseline for major characteristics:

   a. Number and size of missile tubes including rationale for limiting tube size to 87" diameter, and decision to limit length by a single hull penetration.

   b. Power plant including impact on submarine hull size.

   c. Size, displacement, speed including speed vs. generated noise and impact on patrol area available from CONUS and overseas bases.

2. Growth potential for TRIDENT II missile based on proposed tube size, including advantages/disadvantages associated with larger tube sizes up to 100 inches.

3. Options for less than 24 missile tubes, including effect on operational characteristics, overall system costs and specific Navy recommendations.

4. Support facilities for submarine and weapon systems, including consideration of operational advantages/disadvantages associated with single major base on either West Coast or East Coast.

5. Describe baseline personnel and manning, and plans for minimizing personnel and training requirements.

6. Quieting program including special machinery design, propulsion system design, and hovering/pressurization system design to minimize radiated noise.

7. Defensive system design including sonar system, defensive weapons and countermeasures.

8. Design of integrated communication system.

9. Major tradeoffs remaining, description of efforts to be completed in support of the decision making process and expected time-scale for completion of remaining major decisions. Include specific discussion of:

   a. Missile/submarine tradeoffs associated with deletion of hovering system.

   b. Missile/submarine tradeoffs associated with deletion of gas generator from submarine portion of missile launching systems.

10. Overall program plans and schedules.

The ASN(R&D) went on to request that the December meeting be considered only a TRIDENT Progam Review and that a DSARC II review not be considered until late in the Summer of 1973.

On December 1, 1972, DDR&E postponed the meeting until December 14, 1972, and noted that the purpose of the meeting would be limited to an overall Program Review of the TRIDENT Program. The agenda was recast to highlight four topics as listed below:

- o Mission requirements and operational considerations.
- o Program overview.
- o Technical report on missile.
- o Technical report on submarine.

The TRIDENT Program Review was conducted on December 14, 1972. The DSARC considered five issues as follows:

- o Design.
- o Crew size should be reduced.
- o Is submarine T&E schedule satisfactory?
- o When should the DSARC III be scheduled?
- o Is funding consistent with the planned IOC date?

A list of expected attendees for this meeting is provided in Figure O4.

A revised charter for the Project Manager, PM2, was issued on January 5, 1973. This revision reflects the change of the name of the project from ULMS to TRIDENT and changes in name of other associated organizations. TRIDENT Project relationships with other organizations are depicted in Figure O5. The TRIDENT System Project now consisted of all efforts within the Naval Material Command relating to:

- o The TRIDENT System funded under PE 1.1228N.
- o Research and Development efforts funded under PE 6.4360N, P.E. 6.4363N, and P.E. 6.4560N.
- o The TRIDENT Refit Complex planning and design efforts funded under P.E. 9.1211N.

In January 1973, CNO approved the characteristics for the TRIDENT submarine and, in February, the Navy selected Bangor, Washington, as the TRIDENT support site.

ODDR&E

Dr. J. Foster, Jr. (Chair.)
J. Walsh
Lt Gen R. Coffin
J. Brett
G. Sutherland
Capt Fagan
Cdr Miller

ASD(I)

ASD(T)

Navy

J. Warner, SecNav
F. Sanders, U/SecNav]

Navy

R. Frosch, ASN(R&D)
R. Nesen, ASN(FM)
C. Ill ASN(I&L)
Adm I. Kidd, CNM
VAdm E. Wilkensen, OPO2]
RAdm J. Metzel, OPO981]
RAdm L. Smith, SPOO]
Capt E. Avallone, OASN(I&L)
Capt P. Gilcrist, OPOOKI
Mr. P. Waterman, OASN(R&D)
J. Probus, OASN(R&D)
Capt A. Thompson, PM2
Mr. Hanessian, NAVSHIPS
RAdm R. Kaufman, OP21]
RAdm H. Lyon, PM2]
Capt R. Wertheim, SP20
Capt H. Hoffmann, PMS-396
Lt. J. Webb, PM-2
Capt R. Williams, OP211
Mr. R.L. Swartz, PM-2

OASD(I&L)

B. Shillito
VAdm E. Reich
J.M. Malloy

OASD(C)

R. Moot
J. Sherick
F. Van Hoosen

ODDR&E (T&E)

Lt Gen A. Starbird
RAdm F. Petersen
Capt R. Frost

DIA

Capt R. Fox, USN

CAIG

JCS

RAdm S. Cooley

OASD (SA)

Dr. J. Christie
A. Wood
T. King

Exec. Secretary

E. Nucci

FIGURE 04

EXPECTED ATTENDANCE
TRIDENT PROGRAM REVIEW
December 14, 1972

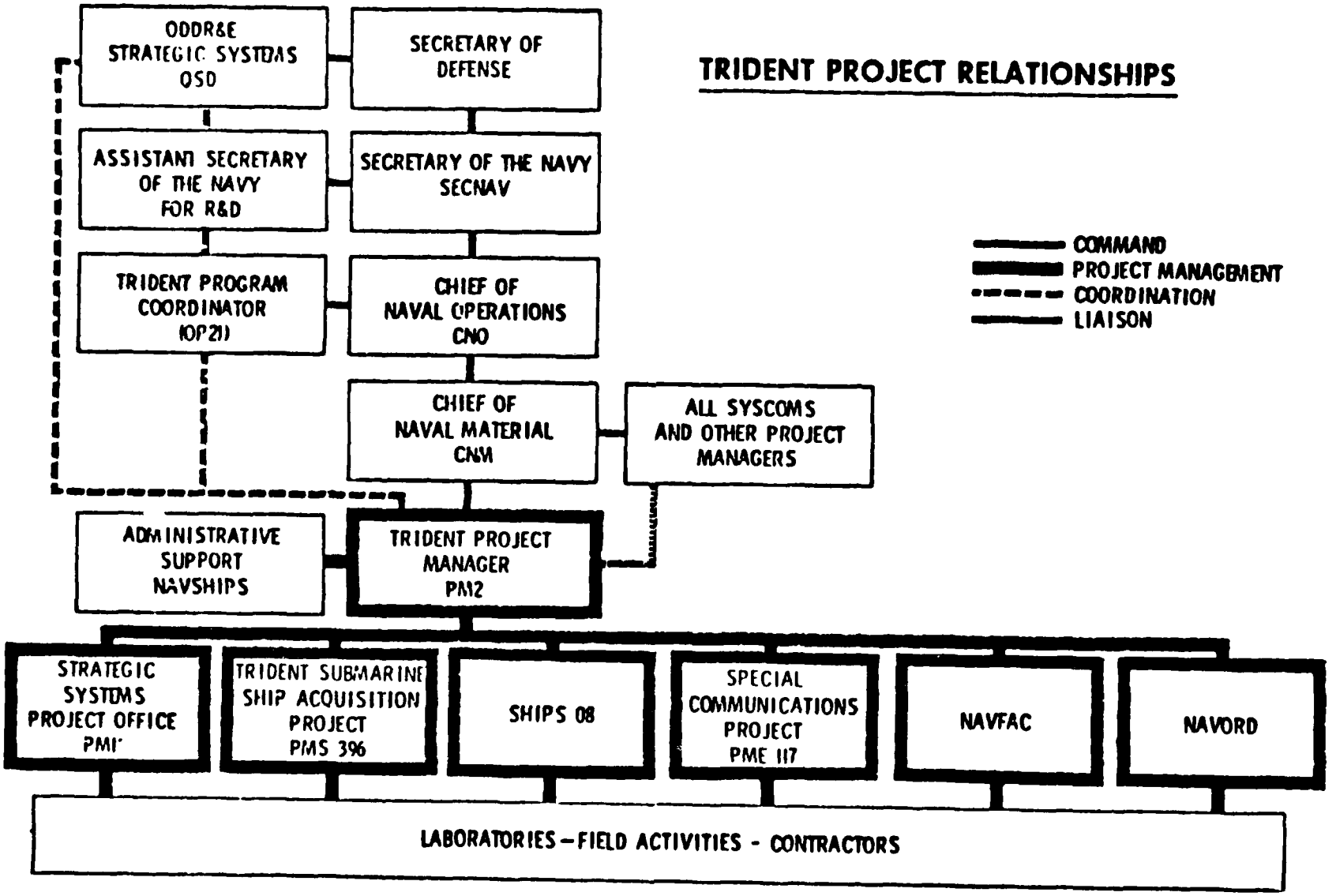


Figure - 05: Trident Project Relationships

On February 9, 1973, a Secretary of Defense Decision Memorandum (SDDM) was issued, based on the TRIDENT Program Review of December 14, 1972. The main points of this SDDM were as follows:

- The DSARC Review of December 14, 1972, was considered to be the DSARC II for the TRIDENT submarine and a Program Review for the missile.
- The Navy was authorized to do a detailed design of the TRIDENT submarine.
- The Navy was directed to adjust the TRIDENT I (C-4) missile development schedule into alignment with that of the submarine construction schedule so as to achieve Initial Operational Capability (IOC) for both at the same time.
- Minimize concurrency.
- Vigorously pursue cost reduction.

Available records from the TRIDENT Program Office indicate that the impact of the SDDM was to require the Navy to restructure the overall program, particularly the missile development.

There is some apparent confusion, based on the limited information available. First, the SDDM authorized the Navy to do detailed design, a decision that would normally come after a DSARC II review. Yet, in the exchange of memorandum between DDR&E and ASN (R&E), it had been agreed that the December DSARC meeting would be a Program Review. The Navy had begun Contract Design in July 1972, an effort that would not be completed until later in 1973. ASN (R&D) had specifically addressed this point in his memorandum of November 28, 1972.

Secondly, the directions given the Navy to align the missile schedule with that of the submarine appears to conflict with the DepSecDef Decision of September 14, 1971, that had directed the Navy to hold back on final ship design until the missile design was firm. The SDDM guidance does, however, appear to follow that of the "For Coordination" DCP addendum circulated by DDR&E on November 17, 1972, which directed the Navy to delay TRIDENT I missile development to be consistent with the IOC of the TRIDENT submarine.

The TRIDENT Program History now lists the December 1972 DSARC as a Milestone II (Submarine).

C. DSARC Milestone II (C-4 Missile) - October 1973

The Navy continued preliminary design and other studies. The Contract Design for the TRIDENT submarine was completed in May 1973 and the specifications were approved. In August, the military characteristics for the missile warheads were approved.

A September 21, 1973, DDR&E memorandum scheduled a DSARC Review on October 9 for the TRIDENT I Missile Program for Milestone II to consider the readiness of the missile for Full Scale Development. The proposed agenda included the following items:

- o Brief overview - total TRIDENT program and status.
- o Readiness of TRIDENT I Missile to enter full-scale development, including:
  - Results of testing.
  - Schedule of testing prior to DSARC III.
  - Expected range/payload/accuracy of baseline C-4 missile.
  - Expected missile configuration.
  - Expected targeting effectiveness.
  - Range extension options dropped from the C-4 baseline design, rationale, and impact on cost, risk, schedule and targeting effectiveness.
- o Alternative plans for follow-on to C-4 missile.

A subsequent memorandum on October 4, 1973, postponed the DSARC until October 18, 1973.

The Navy presentation at the DSARC Review emphasized that the TRIDENT missile program was on schedule, within funding limits, had not breached DCP goals, and was ready for Full Scale Development (FSD). The Navy requested approval for FSD.

In the DSARC review on October 18, three issues were considered, as follows:

- o Is the TRIDENT I (C-4) Missile ready for Full Scale Development (FSD)?
  - Validity of program objectives
  - Ability to meet objectives

- Are the performance goals valid?
- Should the reliability goals be increased?

An attendance list for this DSARC meeting is provided in Figure O6.

PBD 302RC2 in January 1974 caused a restructuring of the TRIDENT program by changing the projected construction rate of 1-3-3-3 submarines per year to 1-2-2-2-2-1 submarines per year.

The SDDM for the DSARC Milestone II (Missile) Review was issued on March 14, 1974. The SDDM authorized the Navy to proceed with the TRIDENT I (C-4) Missile into Full Scale Development (FSD), with the following caveats:

- To minimize total program cost consistent with performance goals.
- To submit a plan for an option to improve the system's accuracy.
- To apply POSEIDON lessons learned for improved reliability.
- To submit within 60 days a draft DCP with information on alternative plans for development and procurement of a TRIDENT II follow-on missile system.
- To establish a DTC goal for the TRIDENT I (C-4) Missile and implement Contractor Cost Data Reporting.

D. DSARC Milestone III (Submarine) - October 17, 1974

A revised charter for PM2 was issued on July 19, 1974. In this revision, PM2 was assigned advance development responsibility for an SSBN(X), a proposed new submarine described in a classified Chief of Naval Material letter of February 1974.

The issuance of this charter came soon after a major change in the organization of the Naval Material Command through consolidation of the Naval Ordnance Systems Command functions into the Naval Air Systems Command and the new Naval Sea Systems Command (formerly Naval Ship Systems Command). The new TRIDENT Project relationships are depicted in Figure O7.

PM2 was now charged with responsibility for "the successful deployment of the total TRIDENT system", a somewhat broader definition than before.

Office Dep Sec Def

RAdm Carr

ODDR(R&E)	OASD(I&L)	OASD(C)	O/DPA&E
Dr. M. Currie (Chairman)	A. Mendolia	T. McClary	L. Sullivan
R. Parker	VAdm E. Reich	D. Hessler	A. Wood
J. Walsh	J. Malloy	J. Hempstead	T. King
J. Brett	BGen F. Trogden	C. McFadden	S. Rubins
G. Sutherland	Capt R. McLain		
Capt J. Fagan	H. Bading	OASD(I)	
	W. Henderson	Dr. H. Sauerwein	

JCS	ODDR&E(T&E)	CAIG	DIA
BGen B. Lewis	LGen A. Starbird	D. Srull	Capt L. Montague
Capt D.Taylor	RAdm Peterson	T. Edsen	
	Capt Frost		

DSMC

LCdr C. Gertner

NAVY

J. Warner, SecNav - Part time
J. Probus, OSN (R&D)
R. Nesen, ASN(FM)
Adm J. Holloway, VCNO
Adm I. Kidd, CNM
RAdm L. Smith, PM-1
VAdm D. Wilkinsen, OPO2
VAdm W. Moran, OP98
VAdm G. Talley, OPO6
RAdm H. Train, OP96

Capt W. Williams, III OPO2
Capt B. Balderston, OPO2
Mr. J. Kammerer, OP96
RAdm H. Lyon, PM2
RAdm R. Wertheim, PM1
Capt J. Brownley, OPO2
Cdr R. Miller, OPO2
R. Swart, PM2
A. Loposer, PM2
Capt L. Theil, NAVCOMPT

Executive Secretary

E. J. Nucci

FIGURE O6

ATTENDANCE
TRIDENT II MISSILE
DSARC---
October 18, 1973

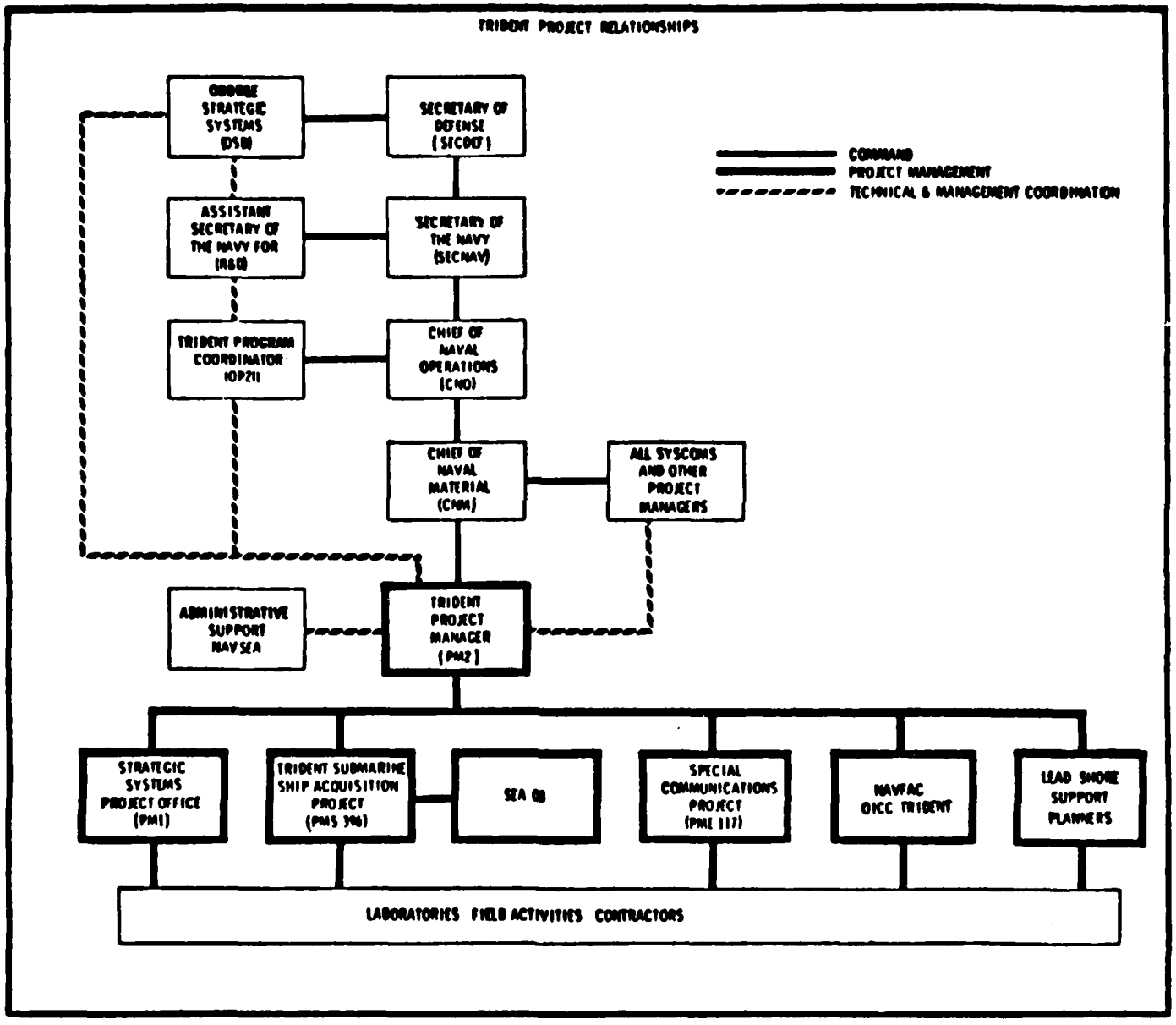


Figure - 07: Trident Project Relationships, Revised

New responsibilities for performance of the acquisition process for associated organizations include:

- o TRIDENT Command Control Communications - Project Manager, Special Communications Project (PME 117) under the guidance of PM2.

- o TRIDENT Support Site and other supporting shore facilities - Officer in charge of Construction (OICC), TRIDENT, acting for the Commander, Naval Facilities Engineering Command.

The scope of the TRIDENT System Project now included:

- o The TRIDENT system funded under P.E. 1.1228N

- o Research and Development efforts funded under P.E. 6.3314N, P.E. 6.4363N, and P.E. 6.4560N.

- o TRIDENT support site planning and design efforts funded under P.E. 9.1211N.

- o SSBN(X) advance development efforts funded under P.E. 6.3588N.

On July 25, 1974, the lead submarine contract was awarded. In August 1974, a PDM was issued that again required a restructuring of the TRIDENT Program. This PDM addressed a construction rate for the follow ship program of 2-1-2-1-2-1.

The DSARC Milestone III (Submarine) Review was held on October 17, 1974, under the chairmanship of the ASD (I&L). Little information is available. An attendance list is provided in Figure O8. OSD raised the following issues at the DSARC meeting:

- o The Navy had not established DTC goals as directed.

- o Was manpower available (in the shipyard) to meet the construction schedule?

- o The Navy had not required CCDR as directed.

- o "Do the T&E results to date support authorization of the following ship programs of 2-1-2-1-2-1...commencing FY75 given the high degree of concurrency permitted?"

In November 1974, the TRIDENT missile program was restructured. A PBD was issued in December 1974 based on a follow ship production rate of 2-1-2-1-2-1.

DDR&E

Hon. M. R. Currie
Mr. J. B. Walsh
Mr. G. R. Barse
Mr. J. F. Fagan

ASD(PA&E)

Hon. L. Sullivan
Mr. E. C. Aldridge
Mr. E. Pyatt
Mr. T. J. King

ASD(C)

Mr. F. P. Wacker
Mr. R. M. Cargill
Mr. R. A. Davidson
Mr. J. P. Welsch
Mr. R.A. Harshman

ASD(I&L)

Hon. A. I. Mendolia
Mr. J. S. Gansler
RAdm D. A. Webster
Mr. F. W. Myers
Mr. H. M. Bading
Mr. D. Babione

T&E

Lt Gen A. D. Starbird (Acting)
RAdm E. E. Uissot
Capt R. A. Frost

JCS

RAdm P. J. Hannifin
Capt J. D. Taylor

DIA

Mr. E. E. Speaker

CAIG

Mr. M. A. Margolis
Cdr T. M. Edsor

Exec. Secretary

Mr. E. J. Nucci

Department of the Navy

Hon. D. S. Potter DSECNAV
Hon. J. L. Bowers ASN(I&L)
Adm W. H. Bagley VCNO
VAdm R. L. J. Long OP-02
RAdm R. L. Baughan NMAT-09
RAdm J. H. Nicholson (OP-211) Presentor
RAdm L. Smith PM-1
RAdm R. H. Wertheim PM-1 Presentor
RAdm A. J. Whittle OP-90
RAdm H. E. Lyons PM-2 Presentor
Mr. Marcy
Mr. Hanessian

FIGURE 08

TRIDENT SUBMARINE
DSARC III
October 17, 1974

The SDDM for the DSARC Milestone III was issued on December 13, 1974, together with a Cover Sheet Number 2 Change to DCP 67. The key decision made was to approve the Navy request for production of the TRIDENT submarine. Caveats to the SDDM included the following:

- o Report within 60 days on the feasibility of starting OPEVAL earlier than then planned.
- o Submit within 90 days acceptance and reliability test plans for Sonar (AN/BQQ-6) and Defensive Weapon System MK-118 and plans for integration testing of Communications and Control Systems.
- o Submit within 30 days DTC goals for the submarine and the missile.
- o Work with ASD(C) on ways to implement CCDR.

The follow ship contract was awarded in February 1975.

E. <u>DSARC Milestone III (Missile) - 23 December 1976</u>

A new Project Manager for the TRIDENT Project was appointed on May 30, 1975. A revision to the TRIDENT Project Manager's charter was issued on December 23, 1975, the fourth version. Significant changes from the preceding version included:

- o New responsibilities for Research and Development efforts in support of "Linear Chair" Project and 6" Acoustic Countermeasure Project.
- o Elimination of the SSBN(X).
- o Designation of tenant activities on SUBBASE BANGOR including:
  - o TRIDENT Refit Facility (TRF).
  - o TRIDENT Training Facility (TTF).
  - o Strategic Weapons Facility (SWFPAC).
  - o Naval Ordnance Evaluation Facility (NOEF).

The scope of the TRIDENT System Project now included:

- o The TRIDENT System funded under P.E. 1.1228N.

- Research and Development efforts funded under P.E. 6.3314N, P.E. 6.3360N, P.E. 6.4307N, P.E. 64363N, and P.E. 6.4560N.

- SUBBASE BANGOR, TRIDENT-related tenant activities, and other TRIDENT-supporting shore facilities funded under P.E. 9.1211N.

- Linear Chair Project effort funded under P.E. 1.1221N and P.E. 6.3588N.

- 6" Acoustic Countermeasure Device funded under P.E. 1.1221N.

The follow ship procurement rate was changed to 2-1-1-2-1-2 by PBD 207R on December 6, 1975. The President's Budget for FY77, submitted to Congress in January 1976, added an 11th submarine. The SecDef's Posture Statement in early 1976 announced for planning purposes that additional submarines beyond the 10-ship plan would be acquired at a rate of three submarines every two years.

The keel for the lead TRIDENT submarine, OHIO, was laid in April 1976.

The DSARC Milestone III for the TRIDENT I Missile was originally scheduled for February 1976. It was subsequently postponed to August and then to December. The DSARC met on December 23, 1976. A list of expected attendees is provided in Figure 09.

The Navy requested approval for production of the TRIDENT I (C-4) Missile under one of two alternatives, as follows:

- Alternative 1 - Approve Full Scale Production of the TRIDENT I (C-4) Missile in accordance with previously approved IOC dates. Release remaining FY77 Weapons Procurement-Navy (WPN) funds by February 1, 1977.

- Alternative 2 - Limited approval for Full Scale Production. Release sufficient funds by February 1, 1977, for production through May 1977. Release the rest in June 1977 after a Program Review in May-June 1977 of early flight test results.

The DSARC raised two issues:

- Is the TRIDENT I ready for production?

- Will there be sufficient testing by the June 1977 follow-on Program Review to provide meaningful data?

ASD(I&L)

D. Babione - Chairman
J. Gansler
BGen. Trogdon
P. Sullivan
R. Yamnicky
R. Thomas

ASD(Comptroller)

F. Wacker
B. Beckner
R. Dominguez

DDR&E(T&E)

Lt Gen Lotz
RAdm Kollmorgen
Capt Small

JCS

RAdm Hannifin
Capt Jones

ODDR&E

Dr. Currie
J. Walsh
R. Berry
H. Lin
Capt Brownley

D(P&E)

E. Aldridge
T. King
R. Bott

CAIG

M. Margolis
J. Arena

NAVY

Dr. Bennett
T. Marcey
Adm Michaels
VAdm Long
RAdm Smith
RAdm Wertheim
RAdm Metzel
RAdm Kelln
Capt Delaney
Capt Wadsworth
Cdr Harner
S. Scureman

FIGURE 09

EXPECTED ATTENDANCE
TRIDENT I MISSILE DSARC III
December 23, 1976

The SDDM based on this TRIDENT I (C-4) Missile Program DSARC III Review was issued on January 17, 1977. The SDDM approved this Navy Alternative 2 and the Cover Sheet Number 3 Change to DCP 67. This authorization included the following caveats:

- o $180M of FY77 funds released for production through May 1977.
- o Balance of funds deferred pending successful Program Review in May 1977 of early flight test results.
- o Navy directed to submit a revised Test and Evaluation Master Plan (TEMP) by March 1, 1977.
- o Navy directed to submit a detailed description of the Project Manager's cost estimate prior to May 1977.

F. TRIDENT II (D5) Missile

The concept of a TRIDENT II missile first appeared in available records in the SDDM of March 14, 1974, that authorized FSD for the TRIDENT I (C-4) missile. In this SDDM, the Navy was directed to submit a draft DCP covering development and procurement of a TRIDENT II.

In May 1976, DepSecDef directed the development of the TRIDENT II with an IOC in the '80s. Concept formulation began about October 1977 and Advance Development in October 1980. SecDef told Congress in March 1980 that a DSARC II review would be held in FY83 to select one of the options for Full Scale Development (FSD) leading to an IOC in the late 1980s. This was followed by a PDM on October 2, 1981, that directed the Navy to fund the development of the TRIDENT II (D5) Missile to meet a 1989 IOC date. THE DSARC II Review is scheduled for September 1983. A draft Cover Sheet Number 4 Change to DCP 67 is in preparation.

IV. PROGRAM STATUS AND FINDINGS

A brief summary of significant program events since the TRIDENT I (C-4) Missile DSARC III Review in December 1976 includes:

- January 1977 - First TRIDENT I (C-4) Missile Test Flight successful.
- February 1977 - Naval Submarine Base, Bangor, achieves limited operational capability.
- January 1978 - East Coast FBM support base established at Kings Bay, Georgia.
- March 1978 - SecDef reduced the follow ship building rate to 1-1-1-1-2-1-2, beginning with the FY80 budget. This was done to allow the building yard to catch up since delivery date schedules had slipped from 18 to 24 months.
- April 1979 - Lead submarine, OHIO, christened and launched.
- July 1979 - TRIDENT I (C-4) Missile deployed on backfitted POSEIDON SSBN.
- October 1980 - Kings Bay, Georgia, selected as the Atlantic Coast TRIDENT base.
- June 1981 - OHIO begins sea trials.
- July 1981 - TRIDENT Support Activities at Bangor transition to operational command control.
- June 1982 - SecDef announces restructuring of TRIDENT II (D-5) Missile Program.

Nine TRIDENT submarines had been authorized through FY81 and one per year planned from FY83 through FY87 for a program total of 14 (as of September 1982). Delivery of TRIDENTs would extend to December 1992 under this plan.

The SecDef decision in June 1982 to restructure the TRIDENT II missile program was intended to reduce total program costs by installing the D-5 system sooner into new construction submarines to avoid later backfitting of this capability, even though construction time would be longer for the first few submarines. The TRIDENT II (D-5) IOC date of 1989 would not be changed.

Since 1978, there have been three new Project Managers in PM2 and three revisions have been issued to the PM2 Charter. The

revision of July 19, 1978, added responsibility for all Research and Development efforts which support the Survivable SSBN Tender Project and program management functions for the acquisition of supporting facilities of the Naval Submarine Support Base, Kings Bay. The revision also specified that the TRIDENT Project Manager would be responsible for support and maintenance of the TRIDENT system until completion of overhaul of the first TRIDENT submarine.

The scope of the TRIDENT System Project has expanded to include:

- o TRIDENT System funded under P.E. 1.1228N.
- o TRIDENT I Missile System funded under P.E. 6.4363N and P.E. 1.1228N.
- o TRIDENT Submarine funded under P.E. 6.4560N and P.E. 1.1228N.
- o TRIDENT II Missile funded under P.E. 6.3371N.
- o SUBBASE Bangor and support activities funded under P.E. 1.1228N.
- o LINEAR CHAIR funded under P.E. 1.1221N.
- o 6" Acoustic Countermeasure Device funded under P.E. 1.1221N, P.E. 6.4560N, and P.E. 1.1228N.
- o SUBBASE, Kings Bay, funded under P.E., 1.1228N.
- o Survivable SSBN Tender funded under P.E. 6.3527N.

The Project Office was staffed by about 55 personnel.

On November 19, 1979, the Charter was revised with the appointment of a new Project Manager. There is no mention of the 6" Acoustic Countermeasure Device in this revision. Two new areas of responsibility are included:

- o Follow-on strategic submarine funded under SSBN-X P.E. 6.3554N.
- o TRIDENT Broad Based Jammer (MK-4) funded under P.E. 1.1228N.

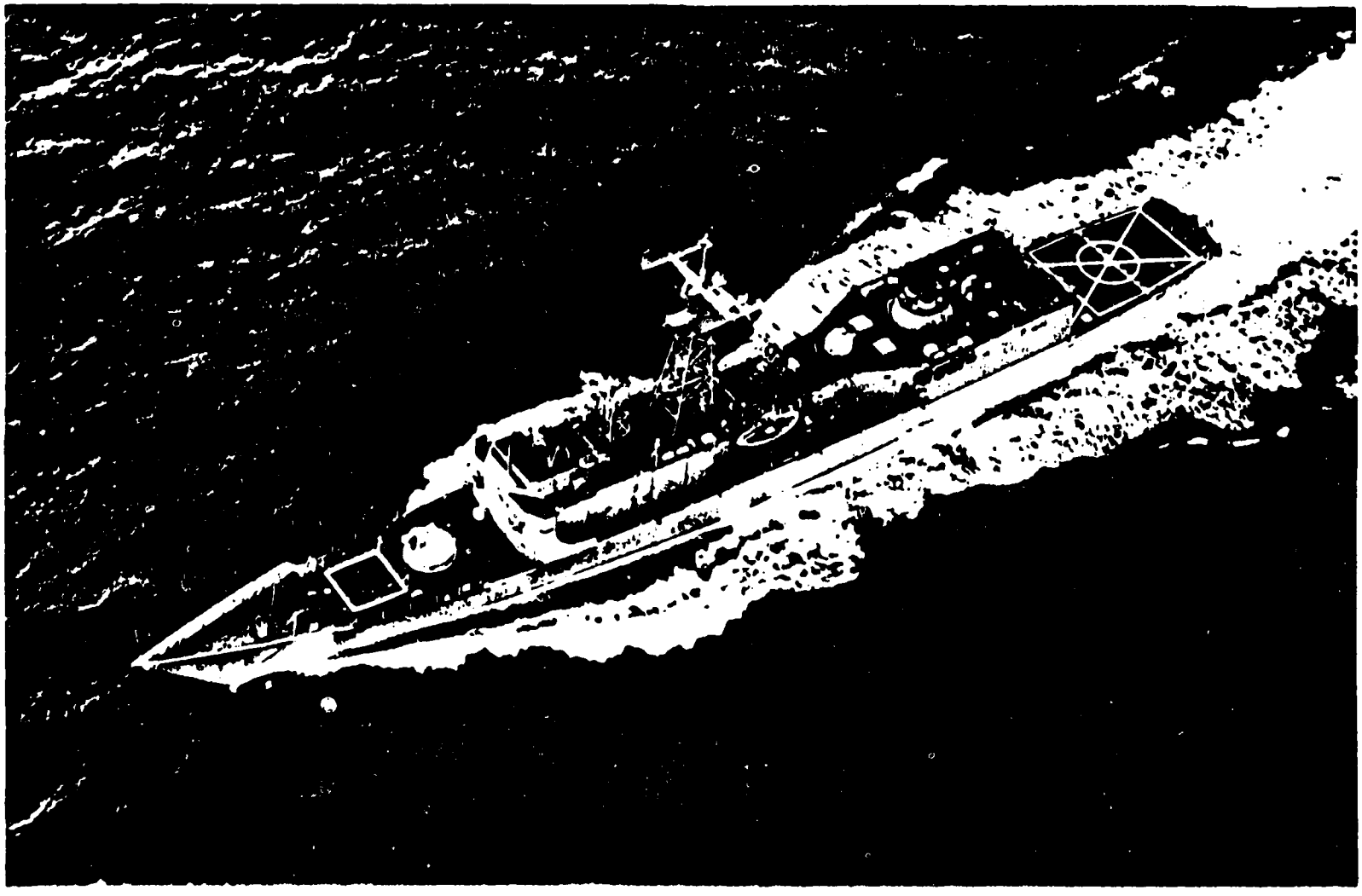
The size of the Project Office staff had now increased slightly to 59 billets.

The current TRIDENT System Project Manager's Charter was issued on February 16, 1982. The primary change in this revision

from previous Charters is the recognition that SUBASE Bangor had transitioned to the operational command of Commander, Submarine Force, U.S. Pacific Fleet on July 1, 1981. PM2's responsibilities to interact with the fleet for support of TRIDENT are defined. The Project Office staff included 67 billets.

APPENDIX P

FFG
PROGRAM STUDY REPORT

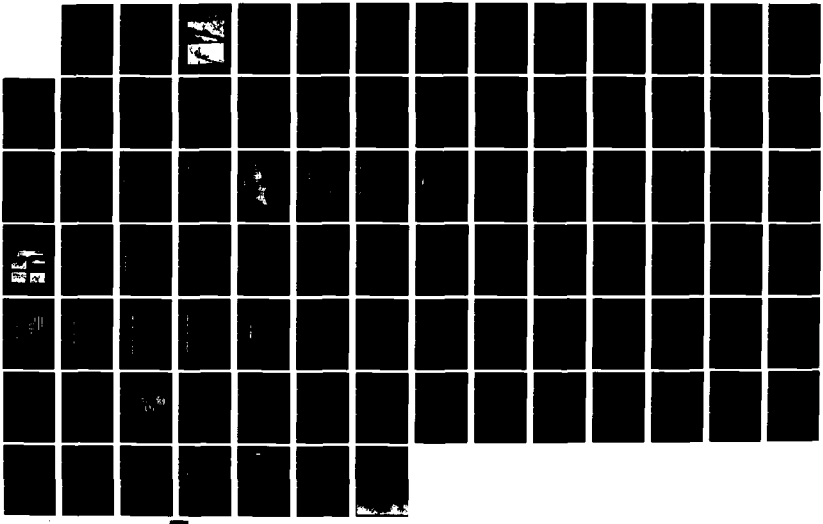


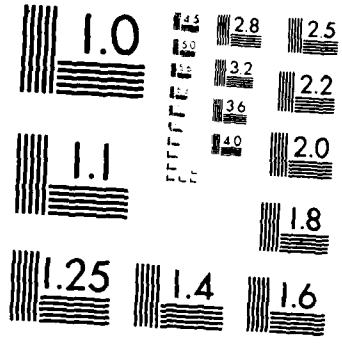
COURTESY OF U.S. NAVY

Figure - P1: FFG-7, OLIVER HAZARD PERRY

AD-A129 797 EVALUATION OF THE EFFECTIVENESS OF THE DEFENSE SYSTEMS ACQUISITION REVIEW..(U) INFORMATION SPECTRUM INC ARLINGTON VA D D ACKER 04 APR 83 3/3

UNCLASSIFIED ISI-V-3824-03-VOL-2-PT-2 MDA903-82-G-0055 F/G 5/1 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963 A

I. SYSTEM DESCRIPTION

The Navy's FFG-7 Class guided missile frigate is a new class of ocean escort ships designed to operate in areas of low enemy threat. The FFG-7 program is the "low" part of an overall Navy strategy referred to as the "high-low mix." Generally, this strategy refers to the need for: (1) highly capable and high-cost cruisers and destroyers to serve in areas of severe enemy threat; and, (2) less capable and less costly ships to operate in areas where the enemy threat is less intensive. Photographs of the FFG-7 Class ships are shown in Figures P1 and P2.

The idea for a relatively small and inexpensive escort type ship was first introduced by the CNO in September 1970 when he directed the conduct of a feasibility study "to examine a new class ship which would be optimized for essentially one mission of either ASW, AAW or surface warfare." The guidelines for that study were that "equipment should be kept relatively simple and the use of complex integrated hardware and software systems should be avoided." The initial direction was for a ship to be built in quantity for a unit cost of about $50 million. In May 1971, a Design-To-Cost (DTC) goal of $45 million was established for a 49 follow ship production run.

During the conceptual phase, the initial concept of a relatively simple, inexpensive and specialized ship was expanded with the definition of the FFG-7 mission, performance and payload.

Mission requirements for an ASW ocean escort, to be filled "in conjunction with other forces" permitted significant changes in normal design practice in order to reduce system costs. Some of the key changes included:

- Use of an economical medium range sonar;
- Sustained speed of 28 knots allowed use of only two engines -- 1/2 the SPRUANCE-class power plant;
- Specified endurance permitted the use of a small hull;
- Single shaft propulsion;
- Minimal missile launcher and guns; and,
- Minimal crew -- originally set at 185.

Although the initial ASW capability was minimal, space and weight were allowed for later inclusion of improved sonar, ASW helicopter and electronics systems. These improved systems, in particular the LAMPS MK III helicopter system, TACTAS, and the Helicopter Landing System (HLS), had not been developed when the FFG-7 design was frozen. As a result, the stern configuration of

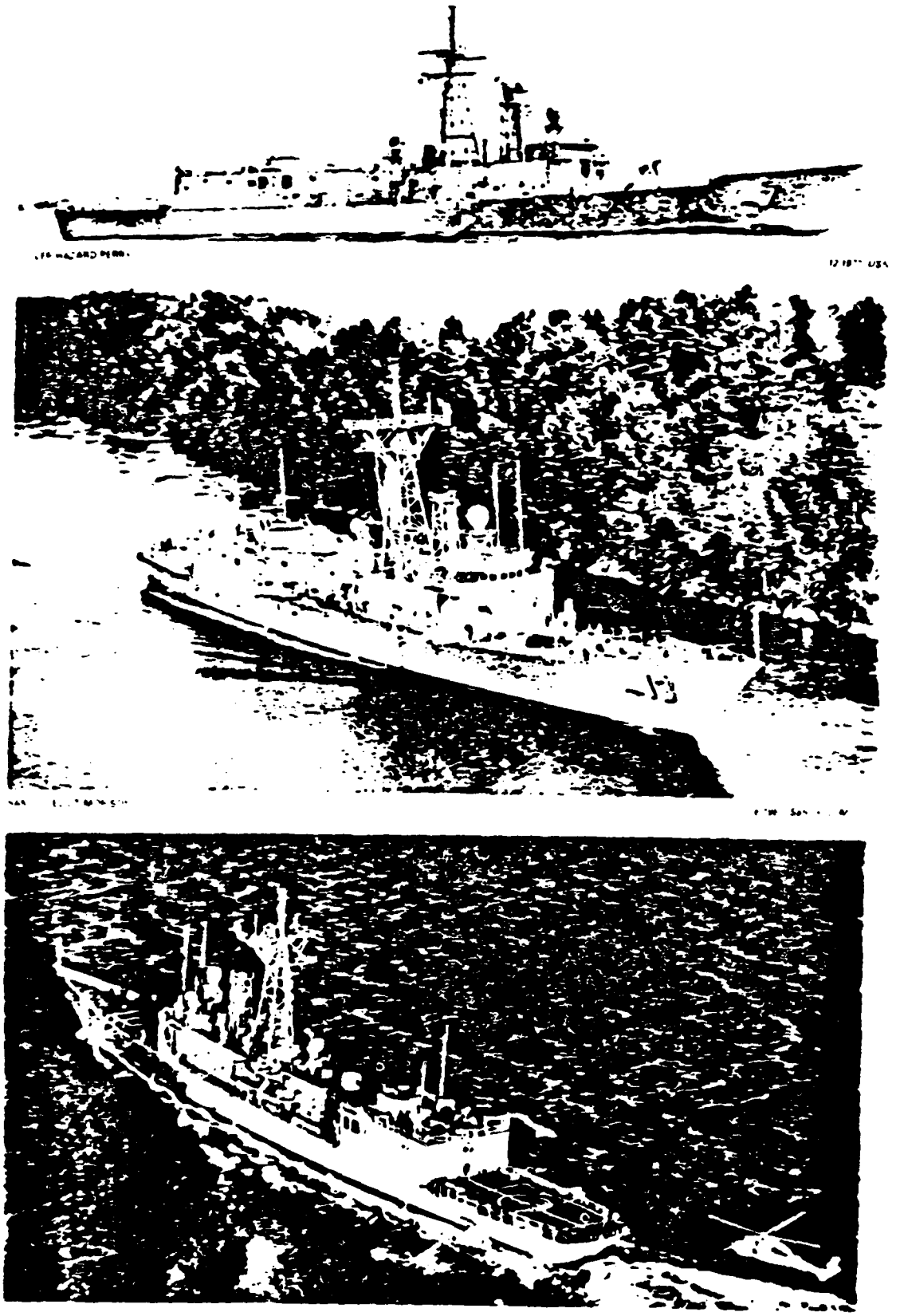


Figure - P2: Other Views, FFG-7 Class

the FFG-7 class had to be changed to accommodate these systems starting with FY79 program year ships. Those FY78 and prior year ships not being transferred to the Naval Reserve Force will be retrofitted with the modified sterns beginning in 1985.

Specifications for the FFG-7 are provided in Figure P3.

To achieve the goal of an economical ship, operational and maintenance costs must be kept down and operational availability kept high. Some of the key concepts or strategies adopted for the FFG-7 include:

- Progressive overhaul maintenance -- heavy reliance on shore-based maintenance and planned replacement of equipment to maintain a high level of material readiness and to reduce the need for frequent overhauls.

- Mission criticality oriented shipboard allowances -- establishing shipboard spares allowances in conjunction with the mission essential character of the equipment being maintained.

- Operational support inventory -- inventory levels designed to be more responsive to operational needs.

- Minimal manning -- reducing shipboard personnel requirements by improved ship and equipment design, the use of labor saving equipment, and changed maintenance techniques (i.e., greater dependence on shore-based maintenance).

- Upgraded shore maintenance facilities -- improved shore maintenance facilities to handle the larger workload that resulted from the change in maintenance techniques.

Displacement, Full Load (tons):		3,740
Length, overall (feet):	(FY78 and prior)	445
	(FY79 and later)	453
Beam, (feet):		45
Draft, (feet):	Keel	14.8
	Sonar	24.5
Aircraft:	(FY78 and prior)	2 SH-2F
	(FY79 and later)	2 SH-60B
Missiles:	SSM/SAM (1 single MK 13 launcher with 40 round magazine)	HARPOON/STANDARD
Guns:	Main Battery	1 76 mm MK 75 (OTO Melara)
	Close-in defense	1 CIWS MK 15 (20 mm PHALANX)
ASW:		2 triple torpedo tubes (MK 32)
Main Propulsion:		2 - LM 2500 Gas Turbines (40,000 shp) 1 shaft
Speed (knots):		28
Sonar:		SQS56 (Hull mounted) SQR19 TACTAS (to be added when available)
Accommodations:	(FY78 and prior)	185
	(FY79 and later)	215

FIGURE P3

FFG CLASS SPECIFICATIONS

II. INITIAL PROGRAM SUMMARY

A. Background

The design, development and production of combatant ships follows a procedure that differs in several significant ways from that followed in the acquisition of other major weapon systems. The size and complexity of combatants, the multistep acquisition process, and the length of time required for ship construction present a set of problems that have led to the current procedure.

The initial or conceptual phase includes definition of mission requirements and operational requirements, conduct of feasibility studies and preparation of preliminary designs. The development phase, known also as contract design, defines the derived ship in sufficient detail to permit ship builders to develop realistic proposals for detailed design and construction.

In the next phase, detail design and production, the project moves from R&D funding to the use of Shipbuilding and Conversion, Navy (SCN) funds. This phase would culminate with the delivery of the desired ship, the "lead ship" in the case of multi-ship construction.

If two or more ships are to be built, there are several different options possible. Two or more yards may contract for detail design and construction of one or more ships, one yard may receive a contract for all "follow" ships, or two or more yards may build follow ships to the identical detailed design of the lead ship. This latter option was selected for the FFG program.

In most R&D programs, serial production would not begin until the initial delivery item had been subjected to some form of OPEVAL. To follow such a procedure in shipbuilding, due to the extended periods of production, follow ship deliveries would not occur for several years. Instead, a degree of concurrency is planned to award follow ship contracts prior to lead ship delivery. The amount of concurrency depends upon the perceived risk.

B. Program Structure

As originally conceived, the FFG (then the PF) program called for the construction of 50 ships at an average follow ship unit cost of $45M based on a procurement of two blocks of 24 and 25 ships each. The acquisition strategy that was developed included two key concepts:

- Lead ship concept.
- Application of the design-to-cost concept.

Under the lead ship concept, a two year gap was planned between the lead ship and subsequent follow ship contracts until the

majority of the detailed design drawings for the lead ship had been issued and time for system/subsystem testing results was available. The design approach adopted for the FFG is called In-house Ship System Design with Shipbuilder Assistance. The lead shipbuilder completed detail design and constructed the lead ship. A second tentative follow yard had a contract to comment on producibility of the design in order to guard against bias in favor of the lead yard.

In contracting, the Navy used a cost-plus-incentive-fee type contract for lead ship construction and fixed price incentive fee type contracts for follow ships based on government warranted detail working drawings. The initial schedule for the FFG program is displayed in Figure P4.

The FFG was the first shipbuilding program conducted under the DTC concept. Under this concept, a cost goal is established early in the program with associated derivative goals. In the case of the FFG, there were three different cost goals established prior to DSARC I/II. These were:

- "About $50 million" -- PBD 507 of December 31, 1970.
- $45M each for 49 follow ships -- CNO decision of May 1971.
- $45.7M each for 49 follow ships -- revised CNO decision of August 1972.

Key derivative goals were ship displacement (in tons) and manning. Decision Coordinating Paper (DCP) thresholds were set at 3600 and 190, respectively.

Experience in the FFG program highlighted some interesting aspects of the application of DTC. During the conceptual phase, prior to the award of any contract, the flexibility to change an order to effect savings is maximized since the changes are on paper only. As development of the design continued, DTC changes became more difficult usually due to their impact on the design schedule. Finally, during production, flexibility is considerably reduced because of hardware impact on production contract. Figure P5 illustrates, in a simplistic way, the basic difficulty inherent in applying DTC to ship design. As cost information becomes more accurate over time, the flexibility to do something about emerging high cost areas is lessened. Thus, it is a truism in design that the better the cost information, the less you can do about it.

To achieve some of the subsidiary goals under the DTC concept, to reduce operating costs, and to increase ship availability, Integrated Logistics Support (ILS) planning was give high priority in structuring the FFG program. To achieve the objectives of minimal personnel manning and increased ship availability, several new approaches to logistics support were developed,

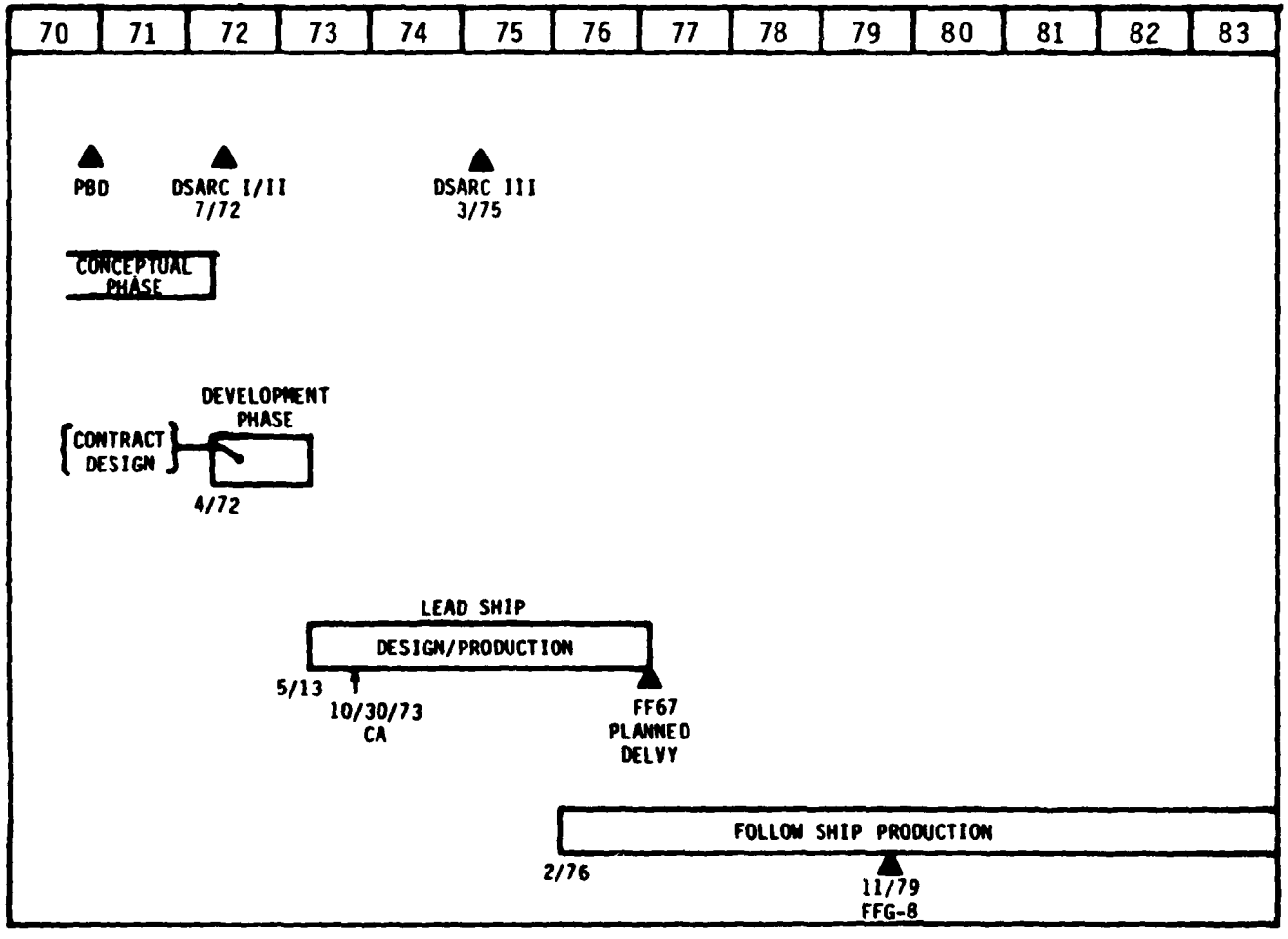


FIGURE P4 FFG INITIAL SCHEDULE

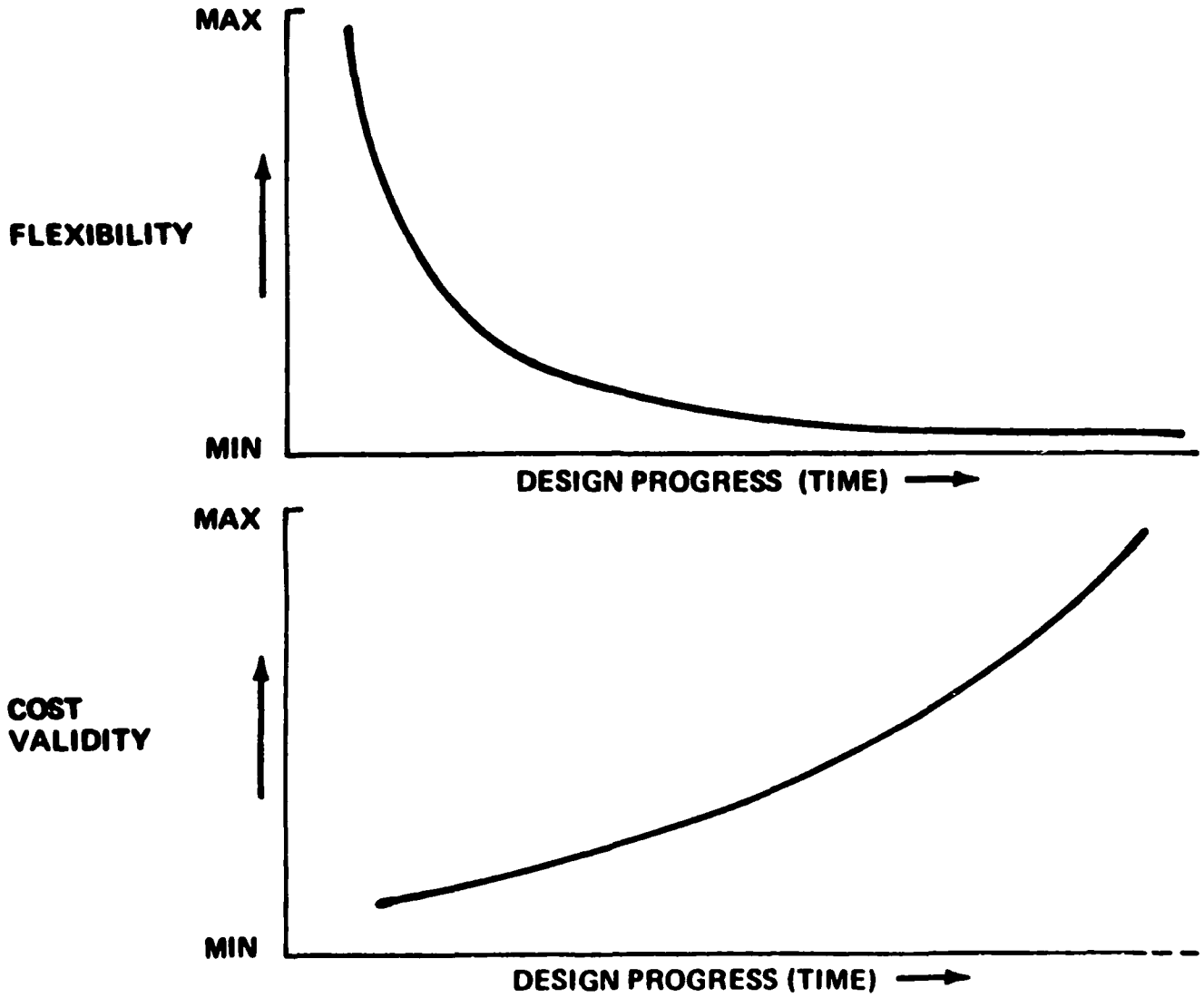


Figure - P5: **DTC APPLIED TO SHIPS**

which were previously untested in the surface Navy, as discussed in Section I. The major ILS milestones for the FFG-7 class are shown in Figure P6.

One of the more significant approaches involves the FFG maintenance plan. The FFG maintenance plan is a significant change from past maintenance practices in the surface Navy: it calls for the elimination of lengthy and costly overhauls in favor of short, well-planned, periodic maintenance availabilities. This strategy is called "progressive overhaul". A chart depicting the progressive overhaul maintenance cycle for FFG-7 class ships is shown in Figure P7.

Very briefly, the progressive overhaul is conducted in three phases:

1. IMAV - Intermediate Maintenance Availibilities. Scheduled at 6 month intervals for three week periods.

2. SRA - Selected Restricted Availability. Scheduled at two year intervals for four week periods.

3. Major Modernization - Scheduled at 10 year intervals for a period of about one year.

At each IMAV and SRA, planned maintenance will call for certain equipment or components to be removed and replaced, representing about 30% of the workload. The remainder is normal corrective action. At 10 years the ship will undergo a major modernization.

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
SHIP DELIVERIES														
• FIRST DELIVERY					●	○								
• FINAL DELIVERY														● ○
MAINTENANCE PLANNING AND MANAGEMENT														
• SHIP MAINTENANCE PLAN COMPLETED					●		○							
• MAINTENANCE MANAGEMENT SYSTEM OPERATIONAL									○ ●					
SUPPLY SUPPORT														
• EQUIPMENT LOGISTICS SUPPORT ANALYSIS COMPLETE						●			○					
• OPERATIONAL SUPPORT INVENTORY IN PLACE									○ ●					
PERSONNEL AND TRAINING														
• SHIPBOARD REQUIREMENTS VALIDATED						●		○						
• TRAINING STARTED		● ○												
FACILITIES UPGRADE														
• INTERMEDIATE LEVEL COMPLETED										●			○	
• DEPOT REWORK COMPLETED									●	○				
TECHNICAL DOCUMENTATION														
• INTERMEDIATE AND DEPOT LEVEL									●	○				
• SHIPBOARD					● □									

● PLANNED (ORIGINAL)
○ ACTUAL OR ANTICIPATED
□ PARTIAL DELIVERY

Figure - P6: **MAJOR INTEGRATED LOGISTICS SUPPORT MILESTONES - FFG-7 CLASS**

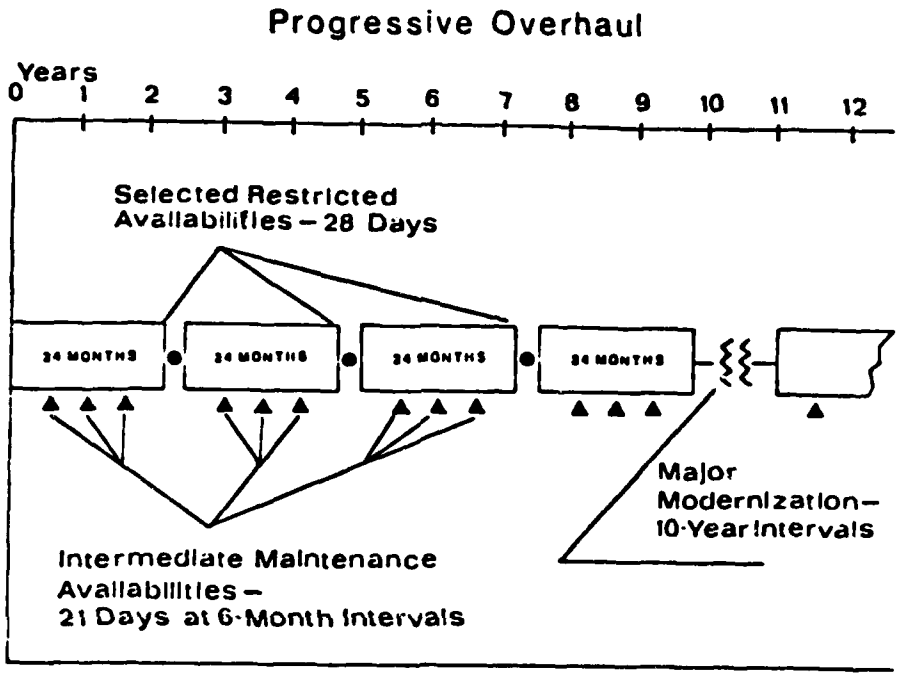


Figure - P7: FFG Class Operating Cycles

III. PROGRAM EVOLUTION

A. FFG Conceptual Phase

In the Spring of 1970, the "Long Range Objectives - 81" study determined that a need existed for additional escorts to perform required wartime missions. These escorts were to be relatively low in cost and small in size to complement the existing fleet and the DD963/DLGN38/DE1052 classes. The type was called a Light Destroyer (DP) in the early papers.

CNO directed that a cost and feasibility study of such a ship be conducted. Goals of cost and size were set as $35 to 45M and over 2000 tons, respectively.

In January 1971, the project was raised to CNO project status, and inserted into the FY73 budget as the Patrol Escort (PF). By June 15, 1971, DDR&E had been briefed, major decisions on sensors and weapons had been made, and a $45M design to cost goal was established.

On June 22, 1971, SECNAV asked SecDef for $51.6M for Long Lead Time (LLT) materials for the lead ship. The Senate Appropriations Committee was briefed in July with the objective of getting FFG funding in the FY72 budget by substitution. A budget amendment on July 30 requested $51.6M for LLT in FY72 vice two Salvage and Rescue Ships (ATF).

On August 24, 1971, the Patrol Escort Ship Acquisition Project (PMS399) was established (NAVSHIPSINST 5430.101 of August 24, 1971) with a designated Project Manager.

In September 1971, CNO approved the two block procurement of 49 follow PFs -- two blocks of 24 and 25 each -- and directed NAVSEASYSCOM to look for cost reduction alternatives. Congress did not authorize funds for advanced procurement using FY72 funds. A plan was developed to continue the design effort with reprogrammed funds. This delay in funding caused a slippage in the initial planned lead ship and follow ship deliveries.

An internal OPNAV memo in October 1971 indicates that OPNAV was trying to get to a DSARC review as soon as possible and then to Milestone III by late Spring or early Summer 1972 to insure full OSD support. By November 1971, a manning goal of under 185 officers and crew had been approved by CNO.

The prospect of Foreign Military Sales (FMS) had been recognized at an early date. The PF was proposed as a candidate for a NATO International Frigate on November 30, 1971. In December, initial discussions were being held with the Royal Netherlands Navy and the Canadians.

Funding for the PF Contract Design Phase was made available by reprogramming $10M. Final approval by Congress came on March 24, 1972. The Ship System Design Support Contracts were awarded on April 12, 1972.

B. DSARC Milestone I/II

Preparations for the DCP began on July 12, 1971, when the first draft outline was issued. Between September 15, 1971, and May 5, 1972, nine drafts of the DCP had been prepared. The "For Comment" draft was forwarded to DDR&E on May 5 and returned on May 30, 1972. After extensive revision, a "For Coordination" draft was forwarded to DDR&E on August 1, 1972. The "For Coordination" draft was returned to the Navy on August 28 and the DSARC Milestone I/II meeting held on August 31. The final revised DCP was returned to OSD in September 1972. The DCP was not signed until April 24, 1974, almost 20 months after the DSARC review.

Briefings and decisions associated with the DCP and the DSARC I/II meeting included:

o	March 4, 1971		UNDERSECNAV brief
o	April 30, 1971	-	CEB briefed by OP36. Decisions reached concerning sensors and weapons/fire control.
o	May 20, 1971	-	SECNAV briefed
o	June 15, 1971	-	DDR&E briefed
o	September 15, 1971	-	CNO briefed. Approved changes in fire control and procurement approach for two blocks of 24 and 25 ships each.
o	October 15, 1971	-	President's Scientific Advisory Committee (PSAC) briefed.
o	November 8, 1971	-	Industry briefing.
o	December 1-3, 1971	-	Discussion with Royal Netherland Navy
o	December 9, 1971	-	Discussions with Canadians
o	March 14, 1972	-	OSD Senior Staff briefed on AAW
o	March 16, 1972	-	SECNAV, UNDERSECNAV, ASN(I&L) and ASN(R&D) briefed.
o	March 24, 1972	-	PSAC briefed

- o April 7, 1972 - OSD Senior Staff briefed on ASW.
- o April 26, 1972 - CNO briefed. Decisions on 76mm OTO MELARA gun vice 35mm gun; numbers of UYK-7 computers; type of sonar, and study of LAMPS helicopter on board.
- o May 8, 1972 - CEB briefed on funding and manning study.
- o June 28, 1972 - CNO briefed on alternative of DCP
- o July 25, 1972 - CNO, ASN (R&D), and DD/T&E, OSD briefed on T&E plans since PF would be the first ship acquisition to go through DSARC since the new DoD requirements for T&E promulgated.
- o August 16, 1972 - DSARC pre-brief to CNO (CEB).
- o August 25, 1972 - DSARC pre-brief to UNDERSECNAV and ASN (L&L). DD/T&E, OSD, briefed on T&E.

The Request for Proposal (RFP) for ship design support was distributed on December 15, 1971. Industry proposals were received by February 18, 1972, and contracts were awarded on April 12, 1972.

In July 1972 a reorganization in the Naval Material Command placed the project office for the FFG, PMS 399, under a newly created major project office, PM 18. Creation of PM 18 was an attempt to bring ship acquisition under tighter control by the creation of a ship acquisition project "czar".

Management issues evolved during the preparation of the original DCP. In the second draft outline of the DCP, on August 13, 1971, the issues included the following:

- o Should the PF be a block of ships or a prototype with growth potential for future blocks?
- o Was the proposed characteristics adequate for the threat?
- o How would the ship's combat system be tested?
- o Were the estimated costs of the PF commensurate with the capabilities to be acquired?

- o If engineering development and production were authorized, how many ships should be procured and at what rate?

- o Should the procurement be a multi-year single source or a multi-year multi-source?

Two alternative programs were listed: (1) modify existing ships for prototype testing; or, (2) continue DE 1052/1076 construction program beyond 46 ships.

On April 18, 1972, OPNAV and ODDR&E discussions of the DCP issues addressed the following:

- o Sonar
- o 76 mm gun
- o CIWS
- o MK 92 FCS
- o Testing

On April 26, 1972, a DCP briefing to CNO and the CEB resulted in CNO making the following decisions:

- o To use the 76mm OTO Melara vice the 35mm gun.

- o Type of Sonar to use.

- o Number of UYK-7 computers to use.

- o Directed a study of the cost and feasibility of carrying a second LAMPS helicopter.

- o Approve the mission concept.

- o Agreed to the MK 92 FCS.

The Milestone I/II issues addressed in the DSARC meeting of August 13, 1972, included the following:

- o Should we proceed with development and implementation of the Patrol Frigate (PF) Program?

- o Is the PF class adequate for the threat?
  - Old sonar technology
  - Limited growth capability
  - Marginal for ASW missions

- o Are costs commensurate with expected capabilities?

- o What are alternatives?
  - Modification of existing ship type.

- o Has the required number of PFs been substantiated?

- Is T&E in accordance with DOD instructions?

- Has technical development proceeded to a point warranting detailed design and procurement?

A complete attendance list of the DSARC I/II meeting is provided in Figure P8.

The Deputy Secretary of Defense, on September 27, 1972, signed the SDDM reflecting decisions reached as a result of the August 31 DSARC. The decisions reached were the following:

The Deputy Secretary of Defense, on September 27, 1972, signed the SDDM reflecting decisions reached as a result of the August 31 DSARC. The decisions reached were the following:

- The Navy is authorized to proceed with the program for development and construction of the PF lead ship, land-based test sites, and advance procurement funding. Funds authorized were:

  - $191.5M FY73 for lead ship and land-based test sites.
  - $17.0M FY74 for advance procurement funding.

- Continue planning of block procurement on the schedule indicated in the DCP (24 followed by 25), with the first block to be awarded to at least three different ship builders.

- 120 days prior to DSARC III, review test results and contract plans.

- Approval of follow ship production contingent upon accomplishment of adequate T&E.

- Navy to plan and evaluate impact of assigning the lead PF to OPTEVFOR for a reasonable period.

- Periodic management and DSARC reviews should highlight Navy performance in meeting cost goals.

- A DCP threshold of $50M was established.

- DSARC III was scheduled for March 1975.

As a result of the DSARC decision, the first FY73 SCN funds were released to the project office on September 25, 1972.

Contract award for the lead ship detailed design and construction was made on October 30, 1973, to Bath Iron Works, Bath, Maine. The keel for the lead ship, the FFG-7, was laid on June 12, 1975.

ODDR&E	Dr. J. Foster (Chair) D. Heebner S. Peterson G. Sutherland CAPT R. Rowe G. Cann D. Anderson
OASD (I&L)	B. Shillito VADM E. Reich RADM S. Counts G. Croskery CAPT R. Pierce E. Trusella
OASD (C)	F. Wacker J. Cove W. Becker R. Hale
OASD (SA)	Dr. J. Christie Dr. G. Massel M. Leonard CDR J. Edson
JCS	COL Ritchie CAPT F. Watson
ODDR&E (T&E)	LTGEN A. Starbird (Ret) BGEN G. Sylvester CAPT F. Reichwein
Navy	J. Warner (Sec Nav) Dr. R. Frosch ASN(R&D) Mr. C. Ill ASN(I&L) RADM Christine, NAVORD ADM E. Zumwalt, CNO RADM S. H. Moore, OASN (FM) CAPT E. Otth, PMS-399 Mr. J. Albanese VADM F. Price OP-97 CDR J. Johnson Dr. C. DiBona VADM R. Adamson, OP-03 CAPT P. Gilcrist , OOK CAPT C. Cruse VADM R. Weymouth, OP098 RADM N. Sonneshein NAVMAT OOC RADM R. Baughan, PM-18 RADM K. Wilson, Dep. NavShips RADM R. Monroe, OP-96
Exec. Sec.	E.J. Nucci

FIGURE P8

FFG DSARC I/II Attendance
August 31, 1972

C. DSARC Milestone III

On August 2, 1974, CNM sent CNO a memo stating that it was unlikely that the Milestone III DSARC review could be held in March 1975 due to delays in completing IOT&E. A more realistic date was suggested as May 1975, which would still allow time to award the follow-ship contract by June 30, 1975. On August 12, 1974, an OPNAV memo noted that the most likely DSARC III date was considered to be about September 1975 due to continued IOT&E delays; however, the originator, OP-03, recommended taking no action to change the March 1975 date until about January 1975. CNO advised CNM that this question would be reviewed in January 1975.

Another OPNAV memo of February 11, 1975, "Critical Path to PF DSARC", noted that the DSARC III review was now scheduled in June and recommended slipping of the schedule goal to July and the threshold goal to September 1975. The primary cause of this slip was the delay that had been encountered in test and evaluation. The gist of the memo was that the T&E delay, plus the time required in preparation for DSARC (including the "wickets" of pre-CEB, CEB, SECNAV, DD/T&E, etc.), made September a more logical date.

Detailed planning in the program office, PMS 399, for the Milestone III DSARC review, began in the Fall of 1974. On December 6, 1974, the Project Manager issued a "Memorandum for the Management Council" which addressed the workload facing the staff. Two main efforts were before them:

- o Request for proposals and source selection process.
- o Test and evaluation; update of the DCP; and DSARC III.

To handle the workload for the DCP/DSARC, the Project Manager established a Special Task Force (STF) headed by the Deputy Project Manager and manned by specified staff members. In order to permit the Deputy PM to devote his undivided attention to the DCP/DSARC problem, all of the functions that the Deputy normally handled were assigned to specified Division Heads, effective from January 1 until completion of the DSARC.

On February 14, 1975, the Project Manager instituted a 6-day week, to continue until DSARC. Overtime was authorized for those eligible civil servants.

Some appreciation for the workload involved in preparing for a DSARC can be gained from the list of DSARC associated briefings provided in Table P1. Of the 23 meetings listed, the Project Manager briefed 21. This listing was prepared after the fact. In the following discussion, key briefings will be discussed in chronological order as they were scheduled.

By mid-April 1975, ASN(I&L) had requested ASD (I&L) to change the date of the DSARC III to July 1975. On April 11, 1975,

Table P1

LIST OF DSARC III ASSOCIATED BRIEFINGS

Date	Briefer	Given to	Subject
March 18	PMS399	OP 37	Pre-brief of LTGEN Starbird pitch
March 25	PMS399	OP 37	Pre-brief of FFG IOT&E
March 27	PMS399B	DDR&E and ASD (I&L) staffs	Pre-brief DCP (Decision Coordinating Paper)
March 27	PMS399	Gen Starbird	FFG IOT&E brief
August 11	PMS399	OP 37	Review of DCP revision
August 12	PMS399	OP 03	DCP review
August 29	PMS399/399.3	RADM Smedberg OP 01C	Manpower Determination and Requirements Preparation
September 3	PMS399/399.3	RADM Byran OP 43	Manpower and Maintenance Requirements
September 25	PMS399	OP 37	Discussion re CEB (CNO Executive Board)
October 2	PMS399	OP 03	Pre-brief of Pre-CEB
October 8	PMS399	OP 090	Pre-CEB
October 15	PMS399	VCNO	CEB
October 17	PMS399	OSD(I&L)	DTC briefing
October 17	PMS399	Sec. Potter	Briefing of Sec Potter re sonar
October 17	PMS399	VCNO	Mini (Post) CEB

Table P1 (Continued)

Date	Briefer	Given to	Subject
October 21	PMS399	DDT&E Staff	T&E Pre-briefing of staff of DDT&E
October 22	PMS399	CAIG	Cost Estimating Procedures/Assumptions
October 24	OP 37 PMS399	OP 03	Pre-brief of Pre-DSARC (Defense Systems Acquisition Review Council)
October 28	PMS399	OP 37	Pre-brief of DDT&E pitch
October 29	PMS399.3, 399B 399X	ASD (I&L) staff, DDR&E, CAIG	Cost estimates
October 31	PMS399	DDT&E	Briefing on FFG T&E
October 31	PMS399	OP 03	Pre-DSARC & CNO/SECNAV review
November 4	PMS399	OP 37	Pre-DSARC review

COMNAVSEASYSCOM formally notified CNO of the following DCP threshold breaches:

- o Overall costs, due to the impact of inflation.
- o Change in production decision date and slip in DSARC III date.
- o Additions to armament suite.

On May 5, 1975, ASD (I&L) agreed to change the Milestone III DSARC to September 1975 and to other changes in the DCP thresholds. He further set the requirement to notify OSD of the exact date desired for a DSARC III meeting at least 90 days prior to that date.

By August 4, a draft DCP was in preparation and was due to be circulated for Navy coordination on August 6. The status of specific IOT&E items was being discussed and a date for DSARC III had been set for September 25, but a slip to October seemed possible.

An internal OPNAV memo of August 12, 1975, established a schedule of events leading to the DSARC III and the need to slip the date of the DSARC. The schedule set forth was as follows:

August 22	-	Pre-CEB
August 29	-	CEB
September 10	-	CNO/SECNAV Review
September 16	-	Pre-DSARC
September 18	-	DD/T&E brief on IOT&E
September 25	-	DSARC III

This memo noted that the DCP was ready to be forwarded to ASD (I&L) via ASN (I&L) and that contract negotiations for the follow ship production had begun. It discussed the need to slip all scheduled dates due to a funding shortfall. Congress had authorized three ships in FY75 and nine in FY76. However, cost escalation would prevent the building of all nine of the FY76 lot.

In this memo, OP-03 proposed to plan for pre-CEB and CEB in early September, to advise the appropriate Congressional committees, and to delay DSARC III until mid-October.

A revised schedule had been prepared as noted in an OPNAV memo of August 21, 1975. The schedule was as follows:

September 23	-	Pre-CEB
September 30	-	CEB
October 9	-	CNO/SECNAV Review
October 28	-	DSARC III

This memo also noted collateral briefings as follows:

OP-01 - ILS
OP-04 - ILS
OSD(I&L)- DTC requirements in week of October 6
DD/T&E - Remainder of IOT&E in week of October 13

On October 14, 1975, the FFG Project Manager briefed the per-CEB review. Key points covered in his briefing included:

- o DSARC III scheduled now for November 6
- o Reviewed DSARC II FFG objectives
- o Navy issues to be resolved at CEB
  - oo 3 OPEVAL issues
    - -- Sonar
    - -- Combat System Integration
    - -- Weight and space (TACTAS, LAMPS)
  - oo Series production
    - -- Proposals exceed cost estimates
    - -- Three shipyards vs. two
  - oo Manning
    - -- Minimum crew size

The FFG DSARC III CEB briefing was held on October 15, 1975, with the VCNO as chairman. An October 28, 1975, VCNO memo referred to the October 15 presentation and an October 17 CEB meeting at which the following decisions were reached:

- o Plan to undertake a sonar improvement program.
- o Provided two alternatives for sonar procurement.
- o TACTAS will be retrofit; reserve space and weight; funding to be provided in FY79.
- o Approved proposed changes in combat systems integration.
- o Regarding ship production, the Navy position would be deferred until after receipt of final bids due by the end of October 1975.

During this period, the DCP 97 was going through a series of drafts. Records indicate that several drafts dated, as given in the following list, were prepared:

- o June 1, 1975 - "Strawman"
- o July 3, 1975 - "Strawman"
- o August 6, 1975 - Navy review

- o September 19, 1975 - Pre-CEB
- o October 30, 1975 - CEB decisions incorporated
- o November 3, 1975 - Pre-DSARC "For Coordination"
- o November 24, 1975 - "For Coordination"
- o December 11, 1975 - Final, signed DCP

As an aside, it is apparent that the OSD staff had expressed concern about perceived delays in receiving DSARC documentation, particularly DCPs, from the Navy. An internal OPNAV memo of August 4 noted the need to try to speed up the DCP/DSARC process internally in the Navy. These concerns were strongly expressed in a memo from OP98 to the senior OPNAV staff on October 20, 1975. In this memo, the Under Secretary of the Navy was reportedly unhappy that an excessive number of Navy DCPs and PMs had not been submitted in time to meet OSD deadline and were late. He directed improvement of the procedures for processing DCPs/PMs and noted that a follow-up system existed and should be used.

The November 3, 1975, "For Coordination" draft DCP 97 addressed four key management issues. These were:

- o Are estimated costs commensurate with expected capabilities?
- o Is the T&E program sufficient?
- o Is the detailed design sufficiently advanced to warrant procurement?
- o Does requisite shipbuilding capacity exist for the full FFG follow ship production program?

This draft also requested approval of an FFG follow ship program in accordance with one of the following alternatives:

ALTERNATIVE 1	FY	75	76	77	78	79	80	81	Comment
USN		3	6	11	12	11	13	13	Three shipyard plan
RAN*			2						
ALTERNATIVE 2									
USN		3	6	7	7	7	8	9	Two shipyard plan
RAN			2						

ALTERNATIVE 3

Do not procure follow ships. Develop alternative to meet DTC goals.

* RAN - Royal Australian Navy.

The average unit cost of the Alternative I follow ship construction program, a total of 69 ships, was represented as follows:

Initial 1972 DTC Goal (FY73$)	45.7M
Cost Growth	+ 8.1M
49 ship DTC Estimate (FY73$)	53.8M
Market Place Effects	+ 9.9M
	63.7M
Production Plan Changes and Other	+ 1.4M
	65.1M
Inflation	+62.0M
	127.1M
Contract Escalation	+23.1M
Alternative 1, Estimated Unit Cost 69 Ship buy (Then-year $)	150.2M

The recommended alternative was Alternative 1.

Two pre-DSARC briefs were apparently held, one on October 31, and one on November 3. Several recommendations for changes to the DCP were received by the Navy at each session according to internal OPNAV memoranda.

An unsigned OPNAV memo of November 4, 1975, stated that the FFG Milestone III DSARC briefing had been cancelled and that the SecDef decision would be made on the basis of a review of a revised DCP. An OSD memo directing specific changes was expected by November 10, 1975. An ASD (I&L) memo of November 5 provided formal confirmation of the cancellation and established a 30-day period to provide formal DCP approval.

In preparation for the scheduled DSARC III meeting, the list of issues proposed by the OSD staff to be covered at the meeting included the following major items:

- Is unit cost breach acceptable? (was $50M; now 53.8M)
- Can the Navy account for the DCP cost increase from $45.7M (FY73) to $130M (FY76)?
- Has the Navy complied with SecDef instructions to develop a plan for full operational appraisal of the FFG lead ship?
- Will the Navy modify the sonar and add TACTAS to provide ASW capability?

It should be noted that out year cost estimates differ between those listed in the OSD issues and those provided in the DCP. This difference became a major issue after the DSARC III decision and led to a CEB in October 1976, which will be discussed later.

On November 14, 1975, ASD (I&L) sent a memo to ASN (I&L) dealing with DCP 97 and DSARC III. Key points of this memo included:

- o Return of the November 3 draft DCP 97 with comments.
- o Request for a revised DCP within 30 days.
- o Hope to avoid DSARC review. If DSARC principals agree, the revised draft DCP would be submitted to SecDef for approval and signature.

An internal OPNAV memo of November 18, 1975, directed the submission of comments to the latest ASD (I&L) memo by November 24 and noted the urgency of getting a production decision by December 1, 1975, in order to get on contract. The memo noted specific OSD requirements to:

- o Provide funding data for planned updates and add-ons.
- o Provide funding estimates to agree with cost estimates in the current budget.
- o Provide an updated DCP within 60 days after award of the first follow ship contract with revised DTC goals.

A revised "For Coordination" draft DCP was forwarded from OPNAV on November 24. The management issues and alternatives were the same as those in the November 3 draft. A review of the Cover Sheet in the final signed DCP indicates that the DSARC principals signed this draft of the DCP between December 1 and 4, 1975.

During this period there were continuing discussions between the Navy and the OSD staff and within the Navy. For example, there was concern in the Navy over the manpower considerations of the DCP (Memo from OP-01 to OP-03 on December 10, 1975). Several minor changes in the DCP were made before December 9.

On December 9, 1975, the ASD(I&L) sent a memo to DepSecDef, "Guided Missile Frigate (FFG) DCP No. 97 - Action Memorandum". In this memo, the DCP was forwarded for approval and signature, recommending Alternative 1 for construction. ASD (I&L) went on to say:

> "This Navy program is well organized and managed and it was the Navy's first attempt to design and construct a ship within the Design-to-Cost concept. The DSARC principals recommended that this program be used to demonstrate that OSD can make timely procurement decisions by more effectively using the DCP process, thereby decreasing the number of DSARC reviews and their

numerous hours of administrative effort. I feel that we successfully accomplished our goal on this program".

The DEPSECDEF signed the DCP on December 11, 1975, approving Alternative 1. The following caveats were included:

- o Procure and install TACTAS and LAMPS III in accordance with the DCP.
- o Directed that DTC goal and threshold information be submitted in accordance with the guidance in the DCP.
- o Directed that test and evaluation reports of equipment specifically addressed in the DCP be reported to DD/T&E as soon as possible for evaluation.
- o Viewed the cost growth in GFE with concern. Stated that the Navy should give the FFG Project Manager authority such that the managers of GFE equipment would be responsible to the FFG program for cost as well as configuration and performance.
- o Directed that the DTC goal to be submitted include a discussion of management actions to be taken to control and reverse unit cost growth.

Responding to the DepSecDef's direction, the project office set a January 15, 1976, date to submit the required information. The OPNAV FFG Program Coordinator requested other elements of OPNAV to include the FFG program in future distribution of DCPs for other systems in development that would be part of the weapons suite for the FFG.

The contracts for the first eleven production FFG (9 U.S. and 2 RAN) were awarded on February 27, 1976.

The approval of FFG production and a concurrent commitment to the Australian government for the construction of three FFGs had a major impact on the project office. On March 11, 1976, the Project Manager, in a memo to COMNAVSEASYSCOM, subject: "FFG Program Staffing", requested eight additional civilian billets for the USN Program and two additional billets to manage the Australian case (to be funded by the Australian Government). The staff of PMS 399 had grown from about 5 military and 20 civilians in April 1972 to 7 military and 31 civilians for the USN program and 5 Australian billets as of March 1976. The proposed staff for the Production Phase included 7 military and 38 civilians for the USN program and 11 Australian billets. The rationale for the additional billets highlighted several points:

- o Management and tracking of billion dollar level multi-year SCN funds and the Australian funds.

- o Intense GAO/Congressional scrutiny.
- o Increased emphasis on GFE and GFE management - especially the DSARC III caveat that the PM be given authority so that GFE managers would be responsible to him for cost as well as configuration and performance.
- o Management of follow ship contracts - 11 follow ships at 3 shipyards with more coming.
- o Unique ILS requirements, including Australian.
- o Engineering system integration.

D. Post Milestone III Decisions

On May 12, 1976, ASN (I&L) sent a memo to DepSecDef, entitled "SECNAV Review of Post DSARC III Programs". Regarding the FFG program, ASN (I&L) noted the continuing work on sonar, status of the contracts, and the impact of a House Armed Services Committee-imposed budget reduction and estimated up to a six-month delay in completion of the lead ship.

A recommended FFG-7 DCP 97 Cover Sheet change was submitted to OSD on July 30, 1976, and was being reviewed in ODDR&E on August 27, 1976.

E. Design-to-Cost

As previously mentioned, the FFG program was the first ship acquisition project undertaken under the Design-to-Cost (DTC) concept. The Milestone I/II decision confirmed a unit DTC goal for the FFG of $45.7M with a $50M DCP threshold. As a result the Milestone III review, the Navy was directed to provide a revised DTC goal for the FFG.

The General Accounting Office reviewed the application of the DTC concept in 1975, GAO Report PSAD-75-81, "Application of Design-to-Cost Concept to Major Weapon Systems Acquisitions", June 23, 1975. This study examined in detail the application of DTC concepts in the A-10, XM-1 main battle tank and the FFG patrol frigate.

The GAO comments on the application of DTC by DoD were generally favorable. The need for further experience with DTC was noted. The report raised one warning directed at the FFG program, as follows:

> "In planning the configuration of the patrol frigate, the Navy decided to forego options for future characteristics changes that might be proposed because of changes in threat, new developments in weaponry, etc.

This approach has inherent dangers, also, because Navy ships normally have a 25-to-30 year life, and decisions of this nature could severely limit their useful life."[1]

On October 4, 1976, the Director of Navy Program Planning, in a memo to OP03, directed the preparation of a CEB presentation on the FFG DTC concept. This action was stimulated by the Navy submission of a revised DTC goal of $71M to OSD for the DCP 97. The presentation was to cover major trade-offs which were made to hold to original cost/displacement/crew size and subsequent changes in capability trade-offs and additions. Also, a subjective analysis should address DTC decisions that had been made in light of current experience. The CEB would be scheduled for late November 1976.

A pre-CEB briefing was given on December 6, 1976, a final draft presentation completed on December 30, 1976, and the CEB (chaired by VCNO) held on January 4, 1977.

The CEB DTC presentation included a summary of FFG DTC history, shown in Figure P9, key trade-offs such as those shown in Figure P10 for the development phase, a history of FFG-7 displacement shown in Figure P11, discussion of DTC estimating, and a detailed DTC variance analysis given in Figure P12.

Figure P13 indicates where future changes will impact the FFG cost estimates. Key points of the summary are provided in Figure P14.

A follow-on GAO FFG DTC study was undertaken early in 1977. (Only a "For Comment" draft was available.) The report was entitled "Application of Design-to-Cost Concept in Ship Acquisition."

This report included material very similar to that presented in the January 4, 1977 CEB. In the report, the Project Manager was cited as providing an estimate that the cost-performance trade-offs in the FFG program had saved from $8.9M to 12.2M in acquisition costs per follow ship. The Navy also estimated that the FFG would have displaced 1500 tons more (a 40% increase) without the constraints resulting from DTC.

Three major deficiencies were listed:

- Overly constrictive early design led to more expensive add-ons later.

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[1]GAO Report PSAD-75-9 June 23, 1975, p.9.

FFG DTC HISTORY

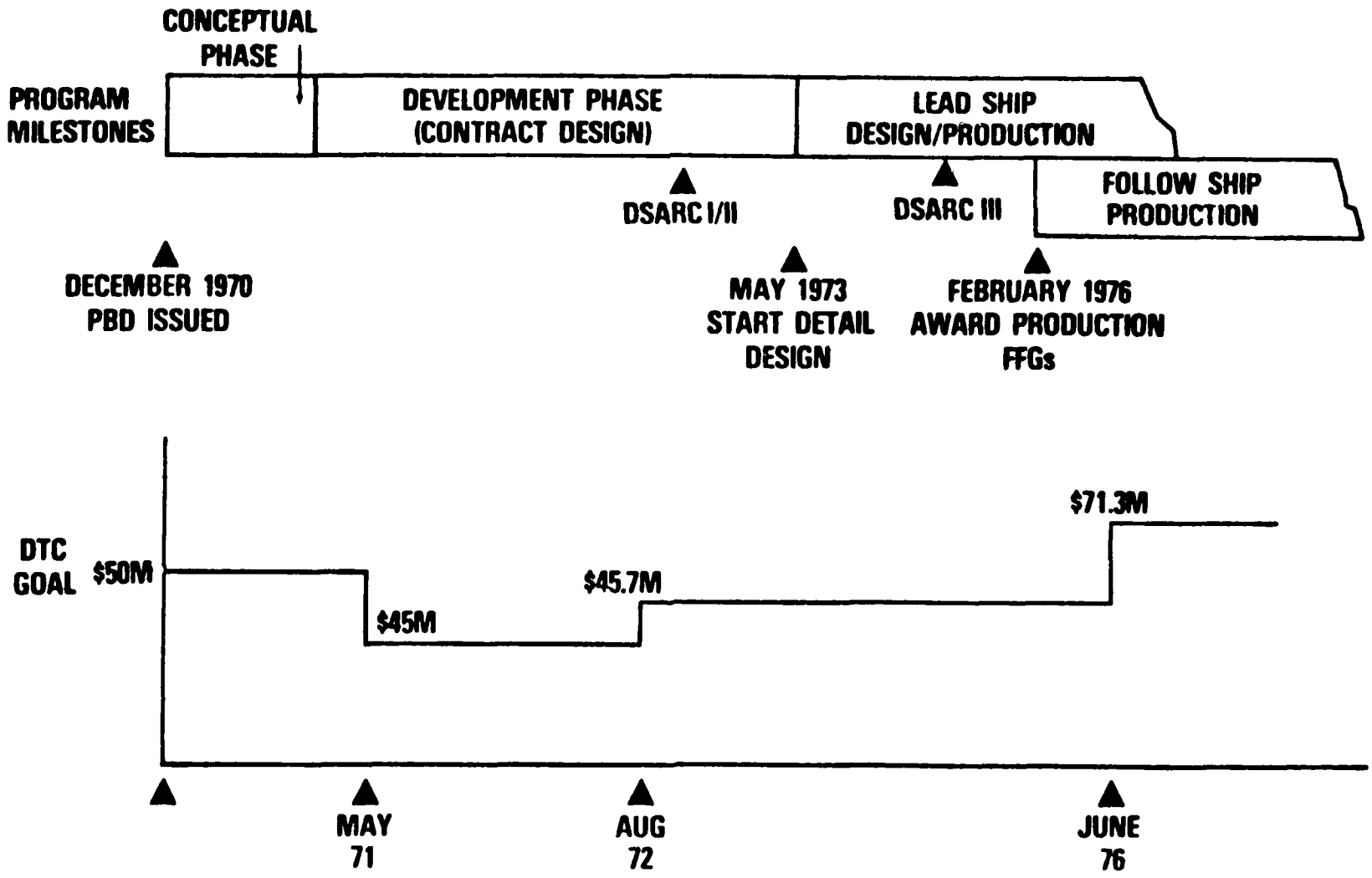


Figure - P9: FFG DTC History

DESIGN TO COST EXAMPLES - DEVELOPMENT PHASE

- CONSOLIDATED INTERIOR COMMUNICATIONS
  - NO DIAL TELEPHONE
  - GROUPED CIRCUITS
  - NO PNEUMATIC MESSENGER TUBES
  - MINIMIZED WATCH STATIONS
- ALL ELECTRIC SHIP
- USE OF WASTE HEAT VICE AUXILIARY BOILER
- BILGE KEELS WITHOUT ACTIVE STABILIZERS
- SINGLE ANCHOR, SINGLE CAPSTAN
- SINGLE BOAT

Figure - P10:

FFG-7 DISPLACEMENT (IN TONS)

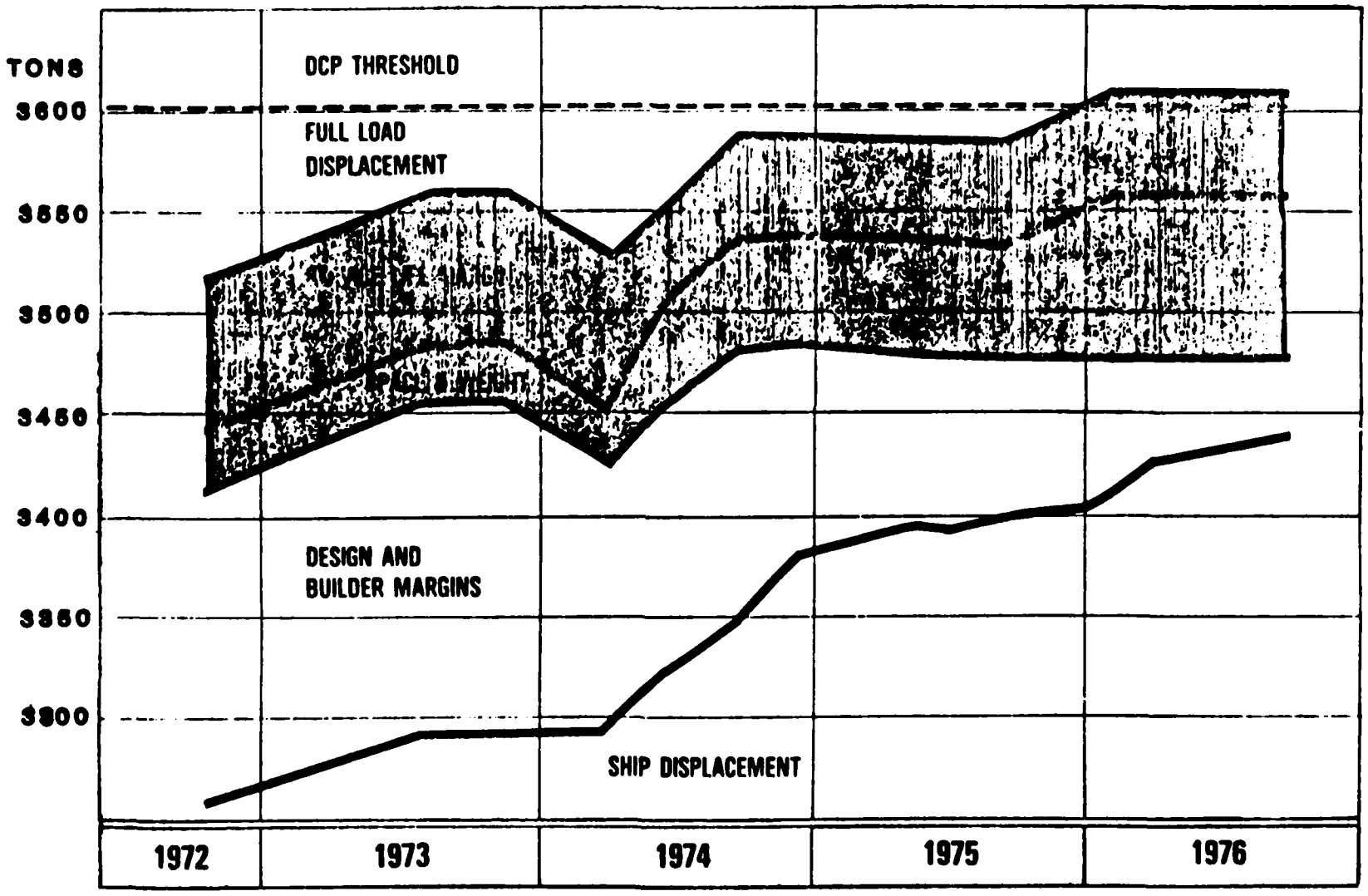


Figure - P11:

DESIGN TO COST VARIANCE ANALYSIS

		$M
PREVIOUS DTC GOAL, FY 73 $		45.7
ENGINEERING	+	1.8
ESTIMATING	+	5.9
CHARACTERISTICS/EXPANDED R/M/A	+	1.8
DETERIORATION OF COMPETITIVE SHIPBUILDING BASE	+	8.5
REVISED PROCUREMENT PLAN	+	2.0
EFFECT OF REVISED OUTLAY RATES ON FORWARD PRICING	+	3.0
DELETE COST RESERVATION FOR EW SUITE	−	.5
CURRENT DTC ESTIMATE, FY 73 $, BASED ON EACH OF 49		68.2
AVERAGE OF FIRST 9 VS AVERAGE OF 49	+	3.1
CURRENT DTC GOAL, FY 73 $		71.3

Figure - P12:

FUTURE CHANGES TO SHIP COST ESTIMATE

	APPROXIMATE[1/] FY 73$ COST ESTIMATE ($000)	FY 78	FY 79	FY 80	FY 81
PASSIVE ESM	1300	√	√	√	√
FIN STABILIZERS	900		√	√	√
CIWS	2900	√	√	√	√
HAUL DOWN SYSTEM	500				
LAMPS III ELECTRONICS	2000		√	√	√
LINK II (UHF)	650				
TACTAS	3550		√	√	√
MISC. ELECTRONICS IMPROVEMENTS	700				
TOTAL	12,500				

[1/] DCP RECURRING COST ESTIMATES FOR FY 75/76 FFG'S (CURRENTLY UNDER REVIEW BY DOD)

Figure - P13:

SUMMARY

- OPPORTUNITIES FOR DTC SAVINGS SHARPLY DECREASE AS DESIGN PROGRESS
- CONTRACT NOW CONTROLS PRODUCTION COST
  - VE PROVISIONS
  - FFPIF INCENTIVES
- DESIGN IS BALANCED TO REFLECT OWNERSHIP COST AS WELL AS ACQUISITION COST
- LACK OF FCC MARGIN MEANS VISIBLE COST GROWTH FOR ALL CHARACTERISTICS CHANGES
- DTC GOAL SERVED TO CONTROL COSTS DURING ALL STAGES OF DESIGN

Figure - P14:

- Did not get DTC concept into the contracts; the DTC work was primarily a part of the "in-house design effort."

- There were great difficulties in tracking lead ship costs to cost constraints and in early identification of cost growth problems and tracing them to their source.

Key conclusions drawn as a result of this study included the following:

- Organizational difficulties may limit DTC (for ships) to little more than a concept of greater awareness of cost factors.

- Application of the DTC concept may be limited to cases where the number of units is of primary importance and where performance trade-offs to stay within the design constraints are acceptable.

F. Continued GAO Interest

The GAO has reviewed the FFG ship acquisition process almost yearly. In 1978, primary interest was focused on the stern modification program to enable the FFG class to accommodate the LAMPS III, HIL, and TACTAS systems. Basically, the gist of the report was that the Navy had not adequately considered all relevant factors in their planning and had therefore incurred excessive costs and delayed full operational capability for the first 26 FFG-7 class frigates. (GAO letter December 29, 1978, to SecDef).

In April 1981, a GAO report, "Need to Extend the Period of Availability for Navy Shipbuilding Funds", MASAD-81-22 of April 1, 1981, was issued. The Navy had requested that the current 5-year time limit for obligation of shipbuilding and conversion funds be extended to 7 years. The schedule and funding of the FFG formed a significant part of the information used in the report.

In July 1981, another GAO report, "Logistics Concerns Over Navy's Guided Missile Frigate FFG-7 Class", PLRD-81-34 of July 7, 1981, addressed perceived obstacles that threatened the success of the Navy's logistics strategies for the FFG-7 class ships. The major obstacles identified in the GAO report were:

- Lack of skilled personnel to man and support the FFG-7 class.

- Inability to accurately forecast material requirements for planned maintenance actions.

- Need for a timely and accurate system for accomplishing and monitoring the maintenance plan.

The major recommendations given in this report included the following:

- Greater use of reliability centered maintenance if it can reduce maintenance costs at the intermediate and depot levels.
- Consider replacement frequency of equipment in determining FFG-7 class ship board spare parts allowance.
- Reassess stockage of some items in co-located geographic and corrective maintenance stocks to avoid unnecessary duplication.
- Revalidate crew requirements after new logistics support strategies are implemented.
- Reconsider previously rejected cost-benefit decisions for ship design and equipment alternatives to reduce crew requirements.

IV. PROGRAM STATUS

The original plans for the FFG program were based on a 50 ship program consisting of a lead ship followed by two blocks of 24 and 25 ships. The President's budgets for FY73, 74 and 75 presented the same planned program quantities:

FY	73	74	75	76	77	78	79	TOTAL
Quantity	1	-	7	11	10	10	11	50

From FY76 through FY83, the President's Budget projected total quantities ranging from 46 to 74 ships and building programs extending as long as FY87.

The actual program procurement profile is shown below:

FY	73	74	75	76	77	78	79	80	81	82	83	TOTAL
Quantity	1	-	3	6	8	8	8	5	6	3	2	50

Those FY78 and prior year ships not being transferred to the Naval Reserve Force will be retrofitted beginning about FY85 to support LAMPS III, HLS, and TACTAS. FY79 and later year ships are confirmed to accept these systems when available.

The Australian Navy is buying four FFG-7 class ships in addition to the U.S. Navy ships. Also, three FFG-7 class ships are being built by Spain in the El Ferrol yards under license.

The ultimate success of the FFG-7 class is closely coupled to the new logistics strategies adopted initially for this class of ship. This is a major experiment in minimal manning, modular repair, and nontraditional maintenance. It is highly dependent on shore and afloat facilities for intermediate maintenance support. Adequate numbers of trained personnel and other committed resources will be required over the life cycle of this class.

APPENDIX Q

HARPOON
PROGRAM STUDY REPORT

I. SYSTEM DESCRIPTION

The HARPOON is an intermediate range, high subsonic speed, all weather, radar homing anti-ship cruise missile. The HARPOON is effective against enemy destroyers, light cruisers, surfaced submarines, patrol craft and other (e.g., merchant, surveillance) enemy shipping.

The missile can be launched from aircraft, submarines, and ships and has been designed to be adaptable to existing launch and fire control systems. It can use TARTAR, ASROC, or canister launchers for surface launch. The main body of the missile is common to all applications. The aerodynamic surfaces are in several forms for various launchers and are designed for quick attachment. A solid propellant booster is used for all surface launches. The booster propels the missile on a ballistic trajectory until separation, then a turbojet provides propulsion. The missile cruises at low altitude using a radar altimeter. Terminal homing is provided by an active radar seeker. System characteristics are presented in Table Q1 and displayed in Figure Q1.

The HARPOON has been operational in the U.S. Navy since July 1977 and has been ordered by 12 allied nations. Over 3000 missiles have been built.

TABLE Q1
Harpoon Weapon System
Characteristics

	AIR	SHIP
Missile Weight:	1168 lbs.	1470 lbs
Missile Length:	12.6 ft.	15.0 ft.
Missile Diameter:	13.5 ft.	13.5 ft.
Fin Span (Extended):	3.0 ft.	3.0 ft.
Speed:	High	Subsonic
Warhead Weight:	570 lbs.	570 lbs.
Range:	Nominal 60 nmi	

Altitude: Various (ballistic initial, then sea skimming with final pop-up attack)

Airframe: Cylindrical body with 4 cruciform wings at mid-body

Populsion: Solid booster for sub and ship launch. J402-CA-400 turbojet for cruise

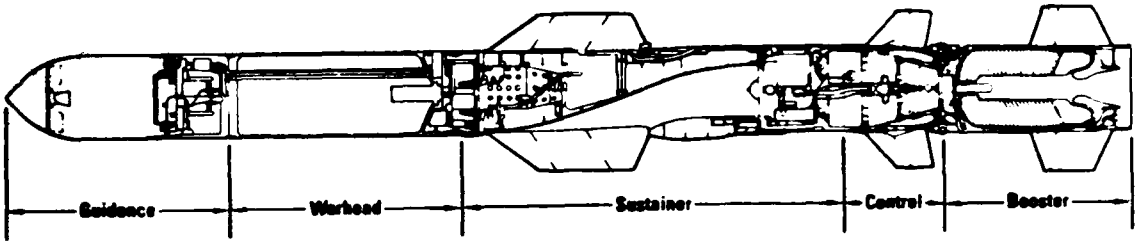
Guidance: Inertial during boost; inertial plus radar altimeter during cruise; active radar guidance terminal phase.

Fuzing: Contact with time delay fuze.

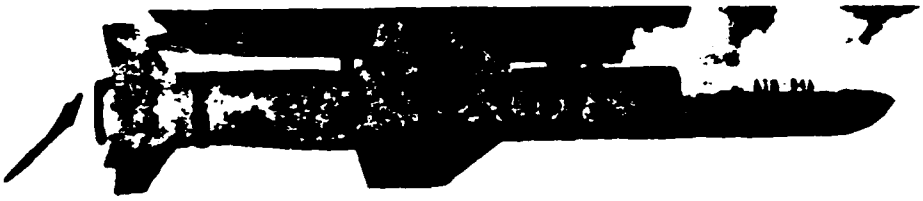
Warhead: High explosive, blast penetration.

IOC: 1977 - Ships
1979 - A/C, patrol
1981 - Attack A/C

OTHER INFORMATION



	Air Launch	Ship Launch
Missile Length	151.2 in.	182.2 in.
Missile Diameter	13.5 in.	13.5 in.
Missile Wingspan	36.0 in.	36.0 in.
Missile Weight	1168 lb.	
• ASROC		1470 lb.
• Canister, Encapsulated		1530 lb.
• TARTAR		1530 lb.



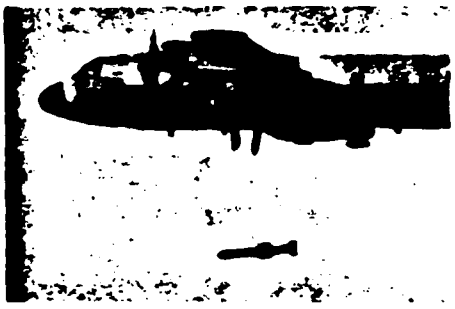


FIGURE Q1

II. INITIAL PROGRAM SUMMARY

The HARPOON Weapon System program is the second cruise missile program in the U.S. Navy. The first, the REGULUS, began in the late 1940s to provide a missile capability for submarines. The REGULUS program was terminated in the 1950s coincident with the development of the POLARIS system for FBMs. The REGULUS represented World War II missile technology while HARPOON incorporates the technology of the late 1960's.

The Navy promulgated a Specific Operational Requirement (SOR 11-74R1) for an anti-ship cruise missile on June 19, 1969. The Naval Air Systems Command was designated as the Principal Development Activity for HARPOON in July 1969 and the HARPOON Development Plan was approved by the Chief of Naval Operations in March 1970. Development Concept Paper (DCP 77) was approved by the Chief of Naval Operations on November 5, 1970. This initial DCP addressed two issues: (1) Is there a requirement?; and, (2) What is the best course of action? The alternative selected was the development of the HARPOON cruise missile system in a three phase program of Design Phase, Weapon System Development Phase (equivalent of FSD) and Pilot Line Phase. The transitions between phases were to be made through a sequenced set of key DSARC Milestones as shown in Figure Q2.

The Anti-Ship Weapons Systems Project (PMA-258) was formally chartered on December 11, 1970.

HARPOON PROGRAM SCHEDULE

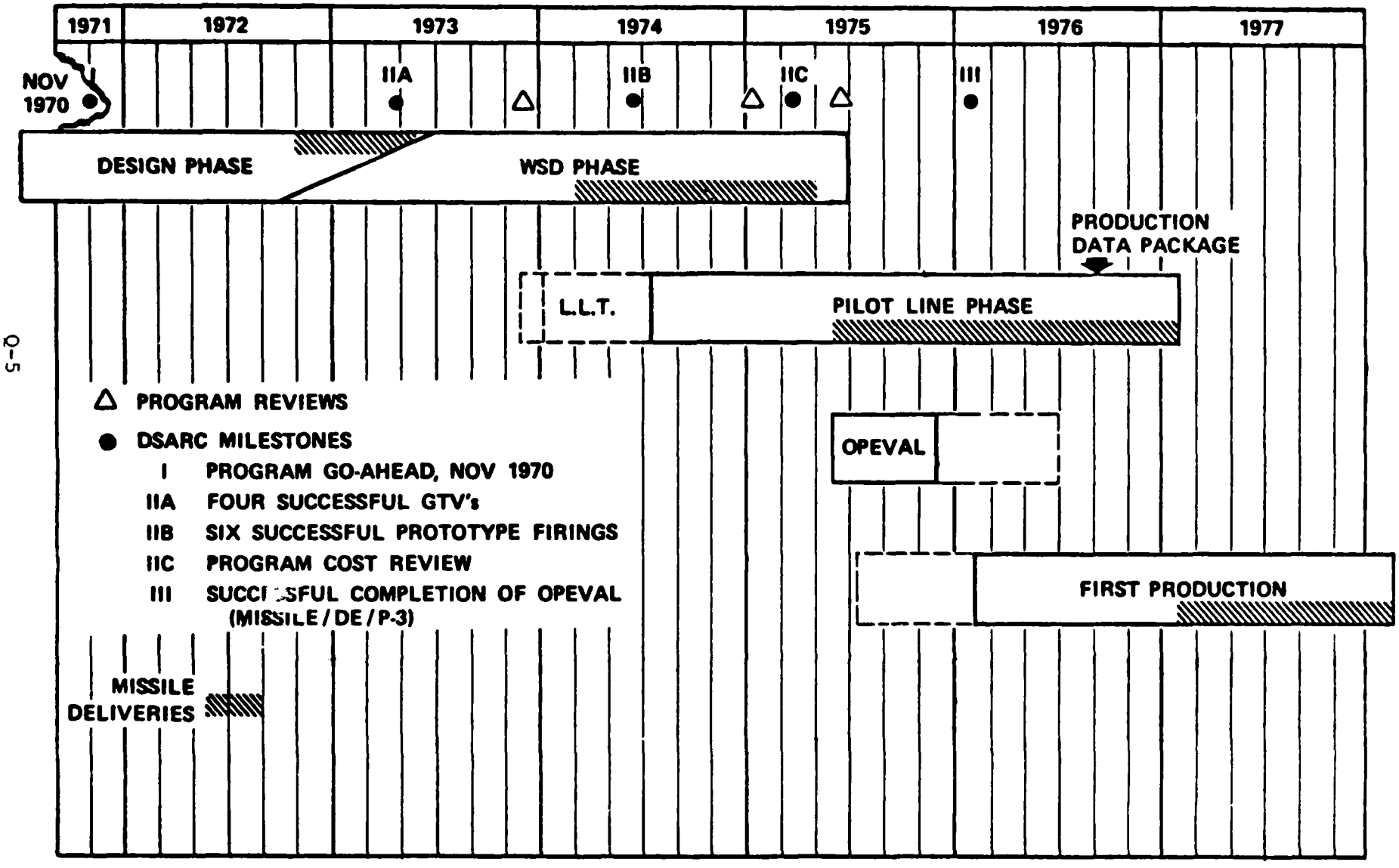


FIGURE Q2

III. PROGRAM EVOLUTION

A. Initiation

There are three dates that have been used as the initiation of the HARPOON project. The earliest is CNO message 132235Z in March 1970, approving the HARPOON Development Plan, which is cited in the HARPOON SARs. The second, shown in Figure Q2, is November 5, 1970, the date the Chief of Naval Operations approved DCP 77. The third, in the Acquisition Management Office (OSD) files, is July 13, 1971, called both the DSARC I or a DSARC Management Review depending on which memo is referenced. There were three other briefings of interest at the OSD level in the same time frame: (a) a DSARC Review of March 6, 1971, after which the DEPSECDEF approved DCP 77; (b) a DSARC briefing by the Navy on June 17, 1971; and, (c) a DEPSECDEF briefing by the Navy on June 25, 1971. In a memorandum of June 25, 1971, to the SECNAV, the DEPSECDEF confirmed his verbal authorization to proceed with the HARPOON program as briefed.

To keep this apparent confusion in context, it should be noted that the DoD Directives 5000.1 and 5000.2 had not been issued and that the DSARC system was evolving daily in OSD and the Services. An expected attendance list for the June 17, 1971, is shown in Table Q2.

Both the DEPSECDEF and DDR&E in August 1971 memos refer to the July 13, 1971, DSARC meeting as a "Management Review." A DEPSECDEF memo of August 9, to SECNAV is, however, effectively a Decision Memorandum based on the July 13, DSARC since it directs specific changes to the DCP 77.

The key issues raised at the July 13, DSARC include the following:

- Contract type
  - -- CPIF, performance and cost incentive contract may lead to cost overruns.
- Concurrency between prototype development (FSD) and pilot line phase.
- Identification of subcontractors and vendors.
- Degree of detail is out of proportion with early phase of program.

On August 25, 1971, DDR&E sent a memo to SECNAV and the other DSARC principals forwarding a Cover Sheet #1 change to DCP 77 with the changes as directed by DEPSECDEF. This memo appears to indicate that this first change to the DCP 77 was drafted in ODDR&E, a somewhat common practice at that time.

TABLE Q2

HARPOON DSARC I Expected Attendance
June 17, 1971

OSD	Honorable David Packard
ODDR&E	Honorable J. Foster, J. D. Heebner VAdm de Poix
OASD (I&L)	J. Malloy
OASD (C)	D. Brazier J. Sherick
OASD (SA)	Dr. J. Christie J. Lund
Navy	Honorable R. Frosch Dr. P. Waterman Capt. C. Ekas (Project Manager) Cmdr. P. Dudley R. R. Perko
Exec Sec	E. J. Nucci

A chronological listing of the initial HARPOON meetings and documentation is provided in Table Q3.

In summary, the Navy and the DSARC essentially held Milestone 0 - Program Initiation reviews followed very quickly by a DSARC Milestone I review and decision. The Project Manager, PMA 258, had 6.3 funding available from the date of his designation in December 1970.

DCP 77 set a schedule and criteria for subsequent Milestone reviews as follows:

DSARC MILESTONE	CRITERIA
IIA	Four successful GTV's.
IIB	Six successful prototype firings.
IIC	Program Cost Review.
III	Successful completion of OPEVAL.

B. Milestone IIA

The scheduled date for the Milestone IIA review was about June 1973, subject to the criteria of four successful GTVs. After program initiation in 1971, there were only a few changes

TABLE Q3
SUMMARY OF INITIAL HARPOON
PROGRAM MEETINGS AND DOCUMENTATION

DATE	MEETING AND DOCUMENTATION	COMMENT
June 19, 1969	SOR-11-74R1	Initial requirement
March 13, 1970	CNO approves HARPOON Development Plan	
November 5, 1970	CNO approves DCP 77	HARPOON Program Office refers to as DSARC I. More on the order of a Milestone 0 CEB.
March 6, 1971	DSARC Review and DEPSECDEF approval of DCP 77	Appears to be like Milestone 0.
June 17, 1971	DSARC Briefing	Called a Milestone I but no evidence of a decision.
June 25, 1971	DEPSECDEF briefing and DEPSECDEF approval to proceed with HARPOON program	
July 13, 1971	DSARC Management Review	Called a Milestone I by OSD and followed by a decision memorandum. Schedule of Milestone Reviews set.
August 9, 1971	DEPSECDEF Decision Memorandum based on 13 July 1971 DSARC	
August 25, 1971	Cover Sheet #1 change to DCP 77 forwarded by DDR&E	

in program documentation for the period from August 1971 to April 1973. A Cover Sheet #2 change to DCP 77 was approved on February 8, 1972, a revision was made to the Project Manager's Charter in June 1972, and an interim revision to SOR 11-74R was issued in August 1972.

A "For Coordination" draft DCP 77 for DSARC IIA appeared in April 1973 and DSARC IIA was held on May 3, 1973. The number of attendees increased to 48 as shown in Table Q4.

The purpose of the DSARC IIA was to seek approval to continue the project into Weapon System Development (equivalent to Full Scale Development). The criteria of 4 successful GTVs had been met. Three key issues were addressed. These were:

- How does HARPOON fit in with the mix of other Navy missiles (especially STANDARD ACTIVE and CONDOR)?

  -- Requirements of A-6 and A-7.

  -- Consistency with carrier ammunition handling capabilities.

- Should HARPOON be authorized to commence FSD?

  -- Inventory objectives have not been resolved!

- Should funding be authorized for pilot line production long lead time items?

  -- At planned or reduced quantities?

In addition, authorization for development was sought for two subsystems for HARPOON. One was Encapsulated HARPOON for launch from submarines. The capsule was required due to the launch environment. A separate Program Memorandum (PM) had been prepared for Encapsulated HARPOON. The second subsystem was a canister launcher to provide a HARPOON capability for PHM and PF (now FFG) class ships and other ships that did not have a missile or ASROC launcher.

The DEPSECDEF approved the recommendations of the DSARC on May 16, 1973, when he signed the SDDM, the DCP 77 (Rev. A) and the PM for Encapsulated HARPOON.

The SDDM of May 16, 1973, approved continuation of HARPOON into FSD including Encapsulated HARPOON and canister launch. It withheld release of long lead time funding pending a progress review in FY74. It also directed the Navy to keep the attack aircraft capability open. Pilot production planning should include options of 200, 150 and 100 missiles. The Navy was directed to resolve procurement objectives for HARPOON, CONDOR and STANDARD ACTIVE and to complete plans for installing HARPOON systems.

TABLE Q4
HARPOON DSARC IIA Attendance
May 3, 1973

OSD	R. Darman
ODDR&E	Dr. J. S. Foster, Jr. (Chair)
	Dr. N. Currie
	D. Heebner
	S. Peterson
	G. Sutherland
	Capt. R. Avrit
	Capt. A. Grosvenor
	Capt. J. R. Leives
OASD (I&L)	A. Mendolia
	H. McCullogh
	E. Trusella
	V/Adm E. Reich
	F. Randall
	B/Gen. F. Trogden
	M. Eyler
	R. Russell
OASD (C)	J. Hessler
	F. Van Hoosen
	N. Pingitore
OASD (SA)	Dr. J. Christie
	Cdr. R. Ailes
	Cdr. G. Strohsahl
JCS	Capt. T. Stewart
CAIG	M. Margolis
DIA	L. Bradley
Navy	Dr. P. Waterman, Act ASN (R&D)
	V. Ill, ASN(I&L)
	Adm. E. Zumwalt, CNO
	V/Adm W. Hauser, OPO5
	V/Adm W. Moran, OP98
	R/Adm W. Myers, OPO3C
	R/Adm H. Train, OP96
	R/Adm G. Synhorst, OPO2
	R/Adm T. McClellan, NAVAIR
	Capt. Oliver, OPOOK-1
	Capt. P. Engle, NAVCOMPT
	Cmdr. A. Smith, OASN (R&D)
OASD (I)	Cdr. D. Dennison
Presenters:	Capt. C. Ekas, PM
	Cmdr. P. Dudley, PMO
	Capt. P. Boyd, NAVAIR
	Cmdr. R. Albright, PMO
	Maj. Grimes, NAVAIR
	Cmdr. G. Phillip, OP9L
	Capt. K. Masterson, OP-96
Exec Sec	E. J. Nucci
ODDR&E(T&E)	R/Adm F. Peterson
	Capt. F. Reichwein

Although the documentation is very sketchy, some background for these decisions was found. The initial development program for HARPOON had proceeded very smoothly and had achieved its objectives to date. The surface Navy was strongly supportive of HARPOON; it provided a new capability in line with that of the Soviet Navy since HARPOON was a weapon with over-the-horizon capability. Naval aviators supported a HARPOON capability for P3 and S3 aircraft but were not very enthusiastic of an A6/A7 HARPOON capability, since that implied diversion of scarce attack aircraft to an anti-shipping role from their higher priority strike role. HARPOON was also viewed in some quarters as a threat to the air-to-surface CONDOR program.

Provision of a canister launch capability would permit HARPOON to be deployed to a variety of smaller ships that did not have anti-ship missile or ASROC capability. This development would then broaden the market in the U.S. Navy and in allied Navies as well.

As noted in the Milestone I reviews, the HARPOON program had been structured with considerable concurrency between FSD and pilot line production. This issue had not been resolved in the interim. In fact, due to Congressional pressure, concurrency had become a bad word in the defense establishment. It is, therefore, no surprise that long lead time funding was deferred.

As it turned out, the HARPOON IIA DSARC was not really over. A HARPOON Program Review scheduled for the fourth quarter of CY 1973 was combined with a DSARC Review of the STANDARD ACTIVE missile on August 29, 1973. Details of this meeting were not available; however, the SDDM on STANDARD ACTIVE, issued October 10, 1973, contained several decisions made relative to HARPOON. These included the following:

- The HARPOON was designated as the primary anti-ship missile.
- Limited the number of ships for the ARM program.
- Supported HARPOON for DDG/DEG.
- Directed Navy to plan for 150 missile pilot production but to keep the 100 missile option.
- Released a reduced amount of HARPOON LLT funds ($14.1M).

C. Milestone IIB (IIIA)

The HARPOON FSD proceeded satisfactorily for the next several months, the long lead time funding was committed, and the Navy began preparations for the Milestone IIB DSARC scheduled for June 1974. The key criterion for DSARC Milestone II was six successful prototype firings. That goal had been achieved by May 1974.

The one cloud on the horizon was the initial awareness of cost growths in the program.

The purpose of the MILESTONE IIB DSARC review was to gain approval for pilot production. The contract for pilot production was scheduled to be awarded in July 1974.

Key briefings in preparation for the DSARC IIB included:

Pre-CEB	May 8, 1974
CEB-Review	May 14, 1974
CNM Pre-brief	May 16, 1974
CEB	May 17, 1974
CNO/SECNAV Review	June 17, 1974
Pre-DSARC Brief	June 7, 1974
DSARC IIB	June 25, 1974

The Pre-CEB briefing of May 8, included the following points:

- o The proposedprogram was consistent with CNO Planning and Fiscal Guidance for POM-76.
- o The program had met the criteria for MILESTONE IIB of six successful prototype finings.
- o DSARC IIB was keyed to the issue of readiness for pilot production.
- o The pilot production contract was ready to be awarded in July 1974.
- o Reviewed key points of the DSARC IIA SDDM --
  - -- To retain A-6, A-7, DDG, DEG in development.
  - -- Deferred long lead time funds pending OSD review.
  - -- Plan for 200 missile pilot production with an option of 100 missiles.
  - -- Resolve procurement objective.
- o Reviewed key points of STANDARD ACTIVE DSARC II SDDM decisions relative to HARPOON--
  - -- Plan option of 150 missile pilot production
  - -- Reduced long lead time funding to $14.1M.
  - -- Retain option for 100 missiles.
  - -- Add 2T DDG, PG to HARPOON program.

- o Two pilot production options were offered --

  -- Option 1: 150 missiles.

  -- Option 2: 100 missiles (Delays 10C 5 months).

- o A deficency in FY75 funding was identified including $1.9M WPN and $3-to-5M RDT&E.

By the CEB Review on May 14, 1974, the identified shortfall had increased to a total of about $9.9M - $1.9M WPN as the result of a reprogramming action, another $3.0M WPN, and RDT&E of $5.0M.

The CNO decisions, as a result of the CEB, were:

- o Recommendthe 150 missile pilot production option.
- o Restore $1.9M WPN shortfall.
- o Go for FY75 supplemental budget request for remainder of shortfall.
- o Go for 2nd source ASAP.
- o Negotiate with OP98 for additional RDT&E funds.
- o Waive requirement for Approval for Service Use (ASU) in advance of procurement.
- o Defer A6 capability.

At the CNO/SECNAV review of June 7, 1974, it was further decided that the Navy issues for the DSARC II B would be:

- o Readiness for pilot production
- o Quantities of missiles for pilot production.

Two options would be presented:

- o Option 1 - 150 missiles
- o Option 2 - 100 missiles

A DSARC III was recommended for the first week of February 1976. At the Pre-DSARC II B brief on June 18, the Navy presentation identified a cost overrun of $19 M for the 150 missile pilot production. Cost reduction approaches were a key topic at this meeting.

The final presentation to the DSARC on June 25, was essentially the same as that of June 18, with the addition of a section on a Cost Reduction Plan.

In the records of the Acquisition Management Office in OSD, the DSARC meeting of June 25, is listed as DSARC IIIA. The rationale for this designation is based on the definition that Milestone III is for a production go-ahead and this meeting did indeed authorize pilot production for HARPOON. The records of this meeting indicate 3 issues for HARPOON:

- o Readiness for pilot production.
- o Number of missiles to be produced.
  - -- How does HARPOON fit in with other Navy missile?
- o Uncertainty regarding cost estimates

The Secretary of Defense decision based on the DSARC IIB/IIIA of June 25, was issued on July 25, 1974. This decision stated:

- o Approval of pilot production of 150 missiles.
- o Release of long lead time production funds prior to a DSARC IIIB was contingent upon satisfactory results in development prototype testing.
- o Navy was to provide rationale to drop the A6 capability
- o Projected cost growth was to be assessed.
- o Inventory requirements vis-a-vis CONDOR and STANDARD ACTIVE should be reviewed.

On July 11, 1974, the DEFSECDEF, in a memo to the Service Secretaries, directed the establishment of Design-to-Cost Goals for all DSARC programs by the time of the DSARC Milestone II review.

A Cover Sheet #1 change to DCP 77 (Rev. A) was issued reflecting the SDDM: no date is available. While a considerable amount of staff work took place in the next few months, no information was readily available. A new Project Manager took over the HARPOON project when the incumbent was promoted to flag rank.

D. <u>Program Review - March 1975</u>

On December 27, 1974, the ASD (I&L) in a memo to SECNAV scheduled a DSARC review for January 14, 1975, to review cost growth. The memo directed several specific actions that included:

- o Holdup contractual commitments.
- o Provide an updated resource annex, revised program milestones, and an independent cost estiamte by January 8, 1975.
- o Insure that the Congressional Data Sheets and the 12-31-74 SAR reflect this HARPOON review.
- o Plan to issue a revised DCP ASAP after the review.

The ASD (I&L) issued a formal call for the January 14, DSARC review on December 30, 1974, and postponed it on January 6, 1975. A new date of March 4, 1975, was set on February 5, 1975. The ASD (I&L) memo of February 5 to ASN (I&L) chided the Navy for delays in providing the information requested by the DSARC IIB (IIIA) SDDM of July 25, 1974. It directed the Navy to cover certain issues in the March 4 review as follows:

- o Total cost growth in the HARPOON program.
- o Pilot production funding.
- o Value engineering plan.
- o Overall plan for Foreign Military Sales (FMS).
- o Impact on inventory and readiness if HARPOON funding was constrained to the level shown in the January 1975 FYDP.

In addition, the Navy was directed to provide changes to the DCP by February 25. A follow-on review was proposed for June 1975 with an updated DCP.

Records of preparation for this review are very sketchy. The Navy presentation touched on the following list of points:

- o Program changesunder consideration include development of HARPOON capability for the A6 and dropping the A7.
- o Shortfall in funding now appears to be in excess of $21M.
- o A pilot production buy of only 100 missiles would reduce shortfall to 0.
- o Cost Control Activities being taken include:
  - -- Technical Review Team.
  - -- "Red Team" to study entire project.
  - -- Production Transition Team.

-- Addition of a Business Manager and a Project Budget Analyst to staff.

The HARPOON Project Offce called this review a DSARC IIC in their presentation. The Navy presentation noted 20 successful missile free flight successes out of 23 launches, including 3 successful warhead shots. Highlights of the Navy briefing are shown in Figures Q3 through Q7.

Issues covered in the DSARC Program Review included the following:

- o Cost growth and estimates.
- o Funding shortfalls - impact and resolution.
- o Actions to reduce costs.
- o FMS plans and impacts.
- o Impact of funding constraints.
- o Plans for A6 and A7.
- o Inventory requirements vs. CONDOR.

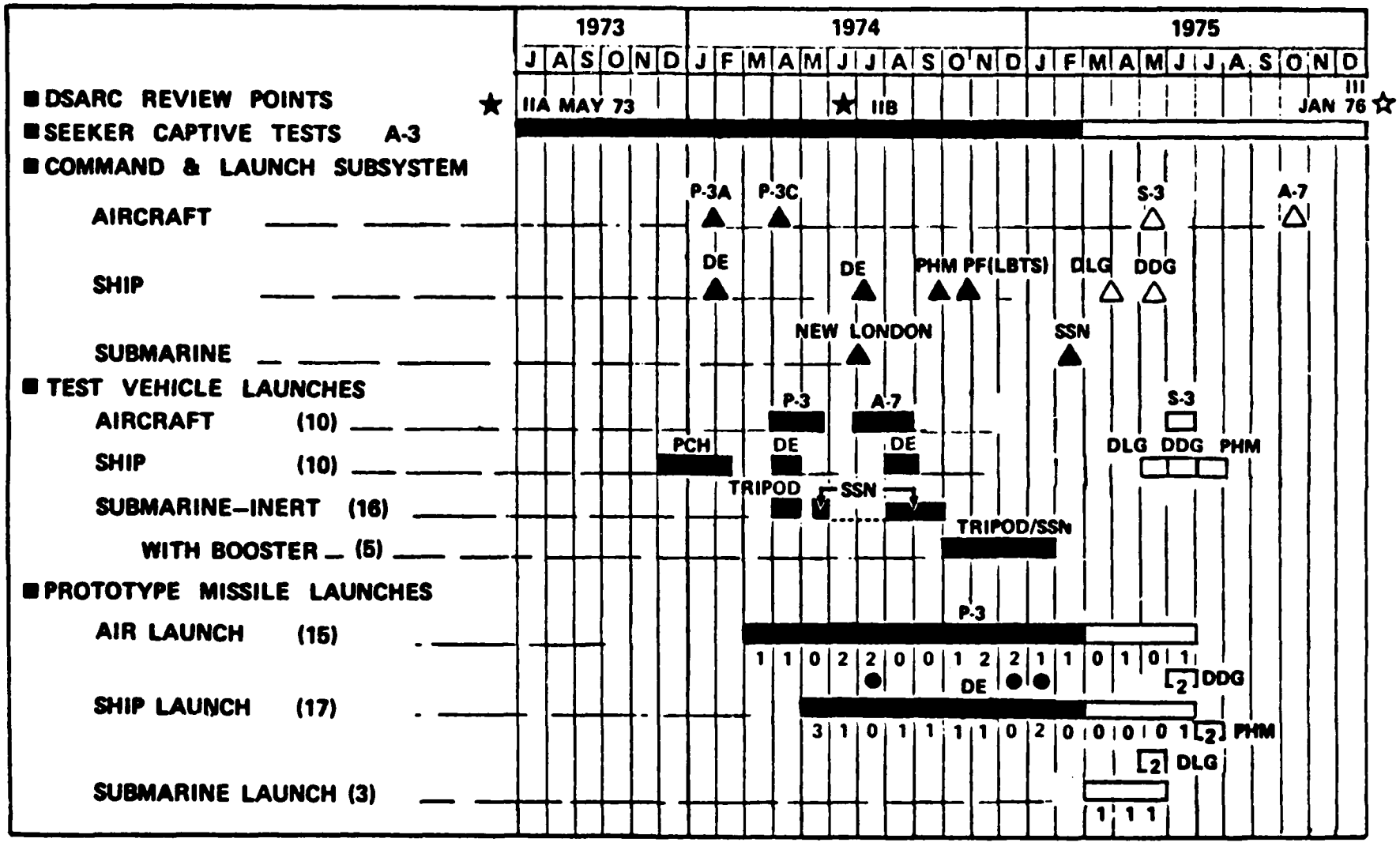
An SDDM based on the March 4, 1975, Program Review was issued April 29, 1975. The decisions, lengthy and detailed, are summarized in the following list:

- o Improve cost estimates.
- o Maximize cost reduction efforts.
- o Go to competitive procurement.
- o Hold up FMS commitments until next DSARC.
- o Scrutinize capsule costs.
- o Procure reasonable number of pilot production missiles with FY75 funds.
- o Develop HARPOON A6 capability.
- o Institute contractor cost reporting (CCDR).
- o Present VE and cost reduction results to CAIG at next DSARC.

E. <u>DSARC IIIA (IIIB)</u>

A call for a DSARC IIIA review on June 5, 1975, was issued by ASD (I&L) on May 14, 1975. The purpose of this review was to

WSD PHASE SCHEDULE



● WARHEAD SHOTS

FIGURE Q3

COST COMPARISON OF ALTERNATIVES

	ESTIMATED NAVY COST FY 74/75 $	ESTIMATED DEFICIT
CURRENT PROGRAM	$109.2 M	$ 11.4 M
FPIF – 150 MISSILES	$109.8 M	$ 12.0 M
FPIF – 100 MISSILES	$ 98.8 M	$ 1.0 M

FIGURE Q4

WPN PROGRAM COST ESTIMATE SUMMARY

PROGRAM	COST
2870 MISSILES 150 FY 1975	$1200 – 1500M
2870 MISSILES 100 FY 1975	$25 – 30M INCREASE

FIGURE Q5

HARPOON MISSILE PRODUCTION SUMMARY

CALENDAR YEAR	75	76	77	78	79	80	81	82	83	84
USN DELIVERY	45	93	253	396	516	550	550	467		
FIRM FMS*		8	91	76	22					
TOTAL	45	101	344	472	538	550	550	467		
TOOLING** MISSILES/YR.	120	120	360	540	540	540	540	540	540	540
FMS PROBABLE			73	144	102	80	80	81	80	65
FMS POSSIBLE				202	250	110				
USAF PROPOSED				57	100	63				
TOTAL ALL PROGRAMS	45	101	417	875	990	803	630	548	80	65

*FMS CONTRACTS CONTAIN SCHEDULE FLEXIBILITY
**ONE SHIFT – 5-DAY WEEK – RATE

FIGURE Q6

RECOMMENDATIONS

- REDUCE MISSILE PILOT PRODUCTION QUANTITY TO 100. GO–AHEAD REQUIRED 15 MARCH
- IMMEDIATE RELEASE OF HARPOON CONTRACTING CONSTRAINTS
- PROVIDE ADDITIONAL PROJECT COST DATA AND TECHNICAL REVIEW INFORMATION AT JUNE 1975 PROGRAM REVIEW

FIGURE Q7

determine if progress and requirements warranted release of long lead time funding for procurement. The ASD (I&L) memo identified 11 specific items to be covered. These are summarized below:

- o Cost growth and validity of contractor cost estimates.
- o Funding shortfalls - impact and resolution.
- o Actions to reduce procurement costs.
- o Competition.
- o Trade-offs between performance and cost.
- o Testing.
- o Production plan - quantity.
- o Missile redesign to be more affordable.
- o FMS plan.
- o Design to cost.
- o A6 issue.

A subsequent ASD (I&L) memo went into greater detail and stated "Cost growth is the most important issue."

The Navy had begun planning for a DSARC IIC by May 8, and was looking ahead to the scheduled DSARC III date of January 1976. (OP98 memo of May 12, 1975). It appeared that OPEVAL would not be completed before March 1976 and that a DSARC III before April 1976 would not be possible. The Navy referred to the June 5, DSARC as a Milestone IIC in line with the original Navy schedule since cost was the key issue to be considered. A draft cover sheet change to DCP 77 (Rev. A) was forwarded to the ASD (I&L) on May 21, acknowledging readiness for the DSARC. Other material requested by ASD(I&L) was also submitted in May. The Navy presentation for DSARC IIC/IIIA was briefed through the Navy in May with a pre-CEB on May 23. By late May, the Navy began referring to the scheduled June 5, DSARC as a Milestone III Review. The briefing prepared for this meeting emphasized the success of the program to date, with 24 successful firings out of 27 launches, and proposed a DSARC Milestone IIIB review in February 1976 contingent upon successful completion of OPEVAL.

On June 4, 1975, one day before the DSARC meeting, the ASD (I&L) sent a memo to the DDR&E regarding "HARPOON DSARC IIIA." This memo raised the issues of affordability and the requirement for HARPOON. It cited the Navy's lack of response to DSARC/ DEPSECDEF requests for information, the implication of very large cost growth, and the competition of HARPOON funding with other

Navy programs. The memo went on to say that the Navy did not understand Design-to-Cost principles and that the DCP cover sheet change procedure was not the proper vehicle for DSARC decisions.

The Navy presentation at the June 5, DSARC made the following points:

- o Program is technically sound.
- o The cost overruns noted previously (December 31, 1974, SAR) were now recognized as the impact of inflation.
- o Discussed the cost reduction program and the targeted cost reductions.
- o Discussed the procurement plan.
- o Discussed Design-to-Cost goals.
- o Requested release of LLT funds for initial production.

A record of the attendance is provided in Table Q5.

Undated notes from this DSARC meeting noted that some members felt that adequacy of need was not addressed and that the Navy had caused delays for OSD.

After the June 5, meeting, there was a hiatus of 2 months before an SDDM was issued. During this period, the Navy was requested to provide additional information that had not been requested prior to or during the DSARC and information for "post-DSARC deliberations". Two requests came from OASD (I&L) and one from ASD (C). The Navy forwarded information to OSD on June 9 and 18 according to memos in various files. There is an indication that other material was delivered personally. The Navy also replied to ASD (PA&E) concerns about cost growth and cost reduction through redesign on June 19. The Navy attributed the cost growth equally to inflation and true growth in costs. It considered that cost reduction through redesign was not a promising route.

On July 28, 1975, ASD (I&L) sent a memo to ASN (I&L) making three points:

- o The DSARC recommendations had been sent to DEPSECDEF but a decision would not be promulgated until early August.
- o The use of FY76 advance funding to protect HARPOON schedule and contract options was approved.
- o Noted release of $57M by ASD(C) on July 1, 1975.

That the Navy had received advance notice of the proposed DSARC decision is evidenced by an unattributed memo of July 31,

TABLE Q5
HARPOON DSARC IIIA Attendance
June 5, 1975

ASD (I&L)	Dr. Bennett
	Mr. Gansler
	Mr. Babione
	Capt. Barrincau
	Cdr. Sullivan
	Maj. Dillon
DDR&E	Mr. Parker
	Mr. Peterson
	Mr. Southerland
	Capt. Avrit
	Mr. Cann
	Mr. Nucci
OSD (C)	Mr. Wacker
	Mr. Pingitore
	Mr. Christie
	Mr. Sneed
OASD (PA&E)	Mr. Sullivan, Jr.
	Mr. Hall
	Mr. Porter
	LCDR Momm
DDT&E	LGen. Lotz
	B/Ben. Witloch
	Capt. Sherman
OSD (CAIG)	Mr. Margolis
	D. Pilling
	G. Asher
DSMS	B/Gen Albert
NAVY	Mr. J. Bowers
	Mr. G. Penisten
	Mr. H. Marcy
	Dr. P. Waterman
	Adm. F. Michaels
	VAdm. K.L. Lee
	VAdm. D.C. Davis
	VAdm. F.H. Price, Jr.
	RAdm. E.W. Carter III
	RAdm. J.S. Christiansen
	RAdm. W. Dedrick
	Mr. J. Kammerer
	Capt. W.T. Pilotti, Jr.
	Capt. G.R. Kelly
	Capt. R.K. Albright
	Capt. L. Skyes
	Capt. T.W. Martin
	Mr. Jerry Miller
	Cdr. John Leder
	LCdr. G. Auerback
	Capt. Peterson
JCS	BGen. Anson
	Capt. Woolridge
DSAA	Mr. Malakowski
OASD (Intel)	Mr. D. Hamilton
	Cdr. A. Roberton

1975, that discussed the impact and ramification of the proposed decision. These discussions concluded that:

- o A constraint on FY76 production could lead to increased out-year cost.
- o A delay in canister and capsule production pending redesign could have significant impact.

The memo directed additional effort to provide the data requested by OSD. The continuing OSD requests for data drew this comment: "This is micro-management at its worst." This paragraph went on to say that, in effect, a continuum of DSARCs had been created and the Program Manager's actions were hampered.

The HARPOON Project Manager was relieved during this time period.

The SDDM for the June 5, DSARC was promulgated on August 5, 1975. The main points of the SDDM are highlighted as follows:

- o The total HARPOON program and production was approved, subject to constraints and other directions.
- o FY76 production build-up was constrained to not more than 10/month for U.S. and 13/month for FMS.
- o Defer production of capsules and canisters pending redesign for lower cost.
- o Proceed with P&A on FMS requests subject to delivery constraints.
- o Forward cost reduction plan to ASD (I&L) by September 15, 1975.
- o Submit "Comprehensive Test Plan" to DD (T&E) prior to start of OPEVAL.
- o Revise DCP 60 days before DSARC IIIB.

The FMS issue immediately became a political one. The OSD staff was trying to hold HARPOON costs in check while cost reduction action was taken and a constraint on total production was an obvious way to achieve this end. However, the U.S. had made several key delivery commitments to allied nations for HARPOON that were now in conflict with the OSD-derived production rate. On August 18, 1975, DEPSECDEF permitted an increase in HARPOON production rates over those established in the SDDM of August 5, in order to accommodate Korea. The ASD (I&L) refused to concur or non-concur on an OASD/ILA memo of November 24, 1975; subject, "HARPOON Production Rate -- Action Memorandum". The Navy continued to provide information and plans to ASD (I&L) and OASD (SA)

in August, September, and October. A Navy plan of action of September 12, was approved by ASD (I&L) on November 6, 1975, noting that HARPOON production rates were tied up in FMS strategy.

F. Post Milestone III

Early in 1976 there was a significant change to the DSARC process, at least as it affected the HARPOON project. In April 1975, DEPSECDEF had chartered an Acquisition Advisory Group (AAG) to assess recommendations resulting from several recent studies of the acquisition process. The AAG reported its findings in September 1975. As a result of those findings, DEPSECDEF sent a memo to the Service Secretaries and the DSARC Principals on January 23, 1976. This memo delegated to the Service Secretaries the responsibility for the DSARC/DCP Surveillance of major programs past Milestone III and required submission of quarterly reports.

Shortly thereafter, on February 5, 1976, a memo was sent to DEPSECDEF, signed by all of the Assistant Secretaries for R&D. This memo recommended changes to DSARC policy and procedures with two goals in mind. One goal was a reduction of DSARC reviews for programs meeting agreed objectives. The other was a request to put the responsibility on the services to report discrepancies.

G. DNSARC

HARPOON OPEVAL continued past the expected completion date of February 1976. A draft DCP 77 Rev B was prepared in April for a DNSARC to evaluate production options and system effectiveness. An internal Naval Material Command memo of June noted that ASD (I&L) had said that there would be no DSARC until after OPEVAL. The CEB was recommending informally that the Navy seek release of the last of FY76 funds and timely release of FY77 funds. A pre-CEB was scheduled in late June.

A DNSARC review was held on August 13, 1976. Its purpose was to review the program and to request release of remaining FY76 funds and timely release of FY77 funds for production and for parallel procurement of capsules and canisters. The key problem identified was the poor results in OPEVAL. The Under Secretary of the Navy issued a decision memo on August 20, with four decisions listed below:

- Continue production FY76.
- No FMS until PASU.
- Contract as planned in FY77.
- Withhold capsule and canisters.

The FY77 contract was signed on August 23, 1976, and a HARPOON Program Review was conducted by the VCNO on October 29, 1976. The OPEVAL problem continued to dominate. Due to the OPEVAL problem, the ASN (I&L) decided to procure only 120 of the 245 missiles authorized in FY77. The ASN (I&L) conducted another program review in November and reported to ASD (I&L) in a memo dated November 11, 1976. Highlights of that report included:

- o OPEVAL problem.
- o Decision to limit FY77 production.
- o DNSARC IIIB on completion of OPEVAL to decide full production go-ahead.
- o Tentatively schedule DNSARC IIIB for May 1, 1977.

ASN (R&D) set up a procedure for DNSARC in May 1977 which called for a two-step review of the DCP and identification of all potential issues followed by an intense OASN (R&D) detailed Program Review to solve problems and identify additional work before a DNSARC. All of this would then be subjected to a final in-depth Program Review before DNSARC. OPNAV staff questioned this procedure in internal memos as having "great potential for slowing progress along the DSARC trail".

SECNAV, in a memo to both ASN (R&D) and ASN (MRA&L) in June 1977, cited the HARPOON OPEVAL problem as a good example of a program to test the concept of horizontal division of responsibility in system acquisition. He noted that he wanted to know the options, costs, and engineering judgements used in reaching decisions.

OPEVAL was completed in June 1977. A memo from the Executive Secretary, DNSARC to the Principal Deputy (Logistics), OASD (MRA&L), set forth Navy plans for a DNSARC. Key points in this memo included:

- o Request for PASU.
- o Unsatisfactory reliability status in OPEVAL.
- o DNSARC review prior to FY77 production decision.
- o Need for updated DCP.
- o Completion of OPEVAL.
- o Need for procurement authorization by mid-July tosustain production rate.
- o Schedule for HARPOON DNSARC.

-- July 1 - distribute updated draft NDCP

-- July 11 (week) - ASN (R&D) PR

-- July 18 (week) - DNSARC

oo CNO recommendations

oo T&E issues

-- July 25 (week) - SECNAV decision memo

oo Balance FY77 funds released if approved

oo Guidance for balance of program

A Pre-CEB on HARPOON was held on July 8, 1977. The key issues addressed were reliability and the FY77 Production Rate. Two options for procurement were presented:

- o Option 1 - Increase rate to 20/month.
- o Option 2 - Remain at 10/month.

The recommended position was to

- o Increase production to 20/month.
- o Release balance of FY77 funds.
- o Continue Captive Carry Operations as part of T&E.

A CEB was held on July 18, 1977. An assessment of the risks associated with the various program alternatives was presented in addition to the Pre-CEB Presentation. PASU was requested based on the justification that, while HARPOON was not ready for Approval for Service Use (ASU), the problems were being solved at a rate sufficient to justify PASU. The CNO approved PASU on July 18, 1977.

The DNSARC was held on July 25, 1977. The briefings and recommendations were those presented at the CEB on the 18th. The SECNAV decision was transmitted on August 3, 1977, in an Information Memorandum. This memorandum noted the following points:

- o CNO grants PASU on July 18, 1977.
- o Increase of HARPOON production to 40/month.
- o Reliability warranty now in production contract.
- o Forthcoming request for release of additional funds.

The current HARPOON DCP is NDCP #W-0555-SH which superceded DCP 77 on March 13, 1978, and was revised on November 28, 1979.

CNO forwarded ASU to CNM on February 19, 1981.

APPENDIX R

TACTAS
PROGRAM STUDY REPORT

I. SYSTEM DESCRIPTION

The Tactical Towed Array Sonar (TACTAS), designated AN/SQR-19, is a passive long range submarine detection system to be installed on surface ships. The AN/SQR-19 Sonar System will provide full azimuth, long range detection capability against all current and anticipated threat submarines. Simultaneous broad band and LOFAR processing provide sensitivity to any radiated sound generated by the threat. Installation is planned on ships of the DD-963, DDG-993, CG-47, DDG-51 and FFG-7 classes.

The TACTAS installation provides the capability for long-range submarine detection and tracking required for escort of high speed task forces and in barrier surveillance missions. It also provides an important sensor input to the LAMPS MK III System.

The TACTAS System includes three main groups of equipment. They are:

- Towed Array Group (TAG).
- Handling and Storage Group (H&SG).
- Ship-based Electronics Subsystem (SES).

The TAG consists of an armored tow cable, a quiet towed array of sensors and telemetry units, and a fault isolation set. The tow cable is 5,600 feet in length and 1 inch in diameter. The towed array is 491 feet in length made up of 14 replaceable modules of 7 unique types. Each module is a maximum of 40 feet in length. The various types of modules incorporate hydrophones, environmental sensors, and telemetry electronics.

The H&SG includes the winch, handling drum, storage areas and other provisions to deploy, retrieve and store the towed array. A line drawing of the towed array and handling and storage group is shown in Figure R1.

The TACTAS SES receives, records and processes TACTAS signals and integrates them into the ships ASW Combat System. The SES is depicted in Figure R2.

The TACTAS is related to other programs as follows:

- AN/SQS-53B Hull Mounted Sonar.
- AN/SQQ-28(V) Sonar Signal Processing System.
- UYQ-25 Sonar In-Situ Mode Access System.
- MK-116 ASW Control System.

To provide high in-service reliability, TACTAS has a continuous monitoring and fault detection capability and on-line reconfiguration around failed elements.

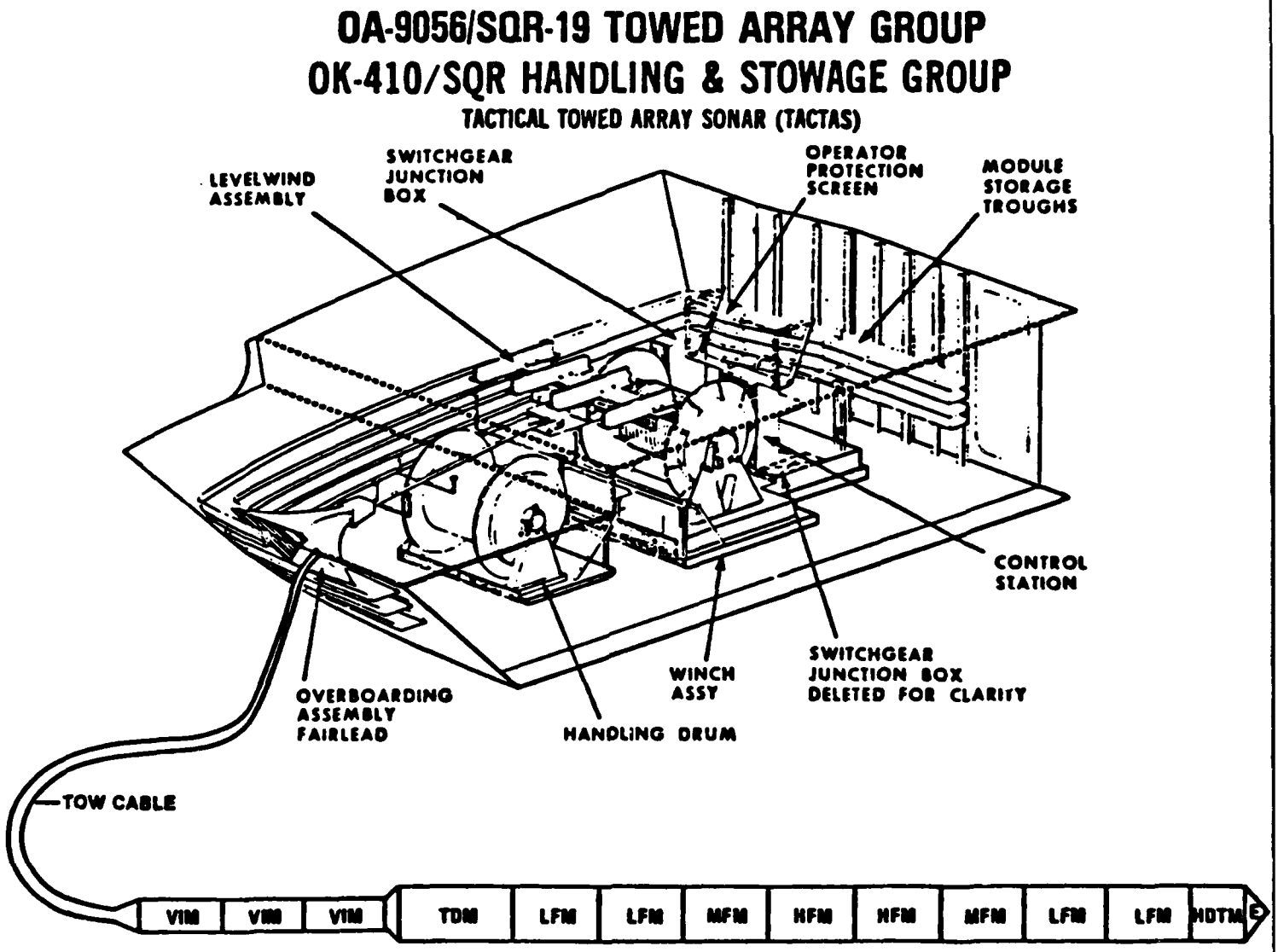


Figure - R1: Towed Array and Handling/Storage Group

AN/SQR-19 TACTICAL TOWED ARRAY SONAR (TACTAS) SHIP-BASED ELECTRONIC SUBSYSTEM (SES)

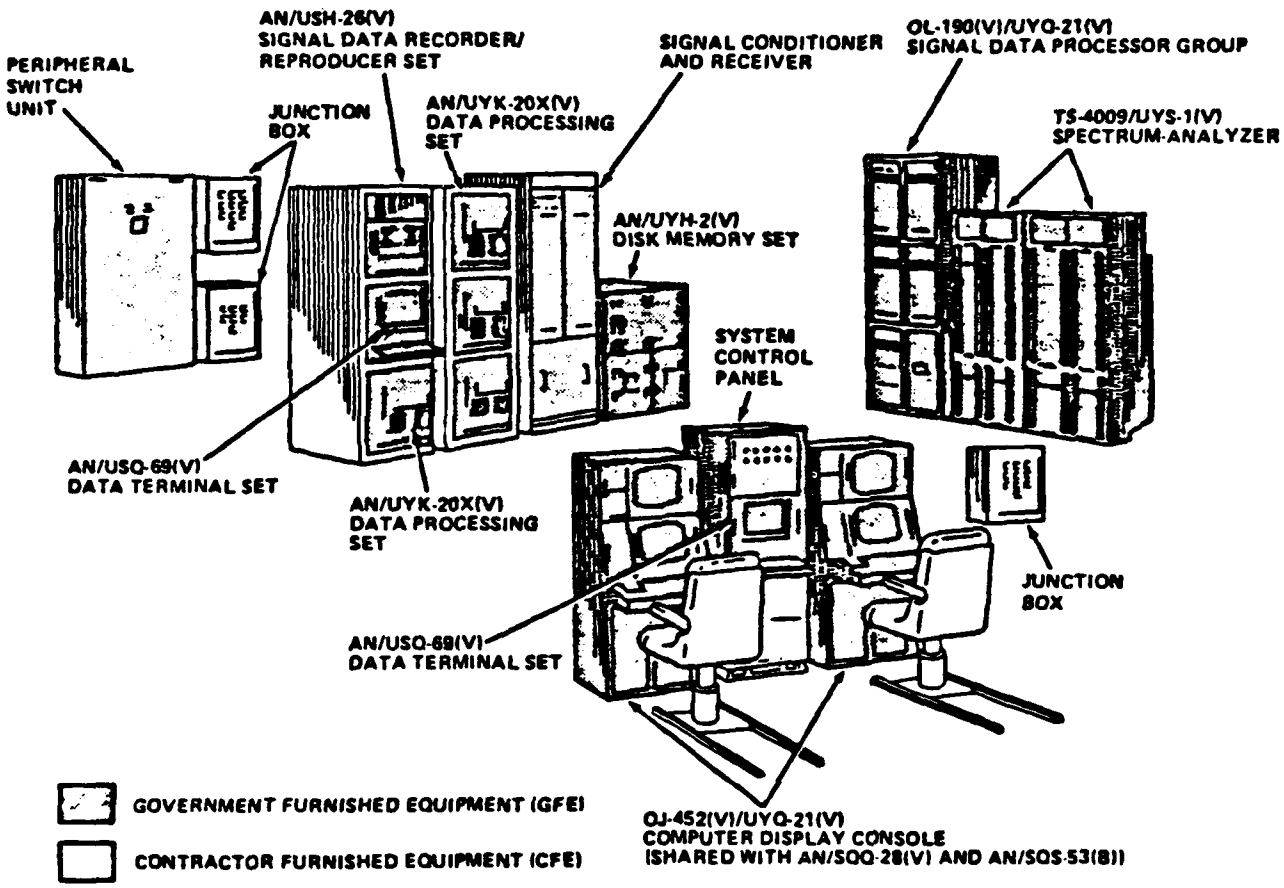


Figure - R2: Ship-Based Electronic Subsystem

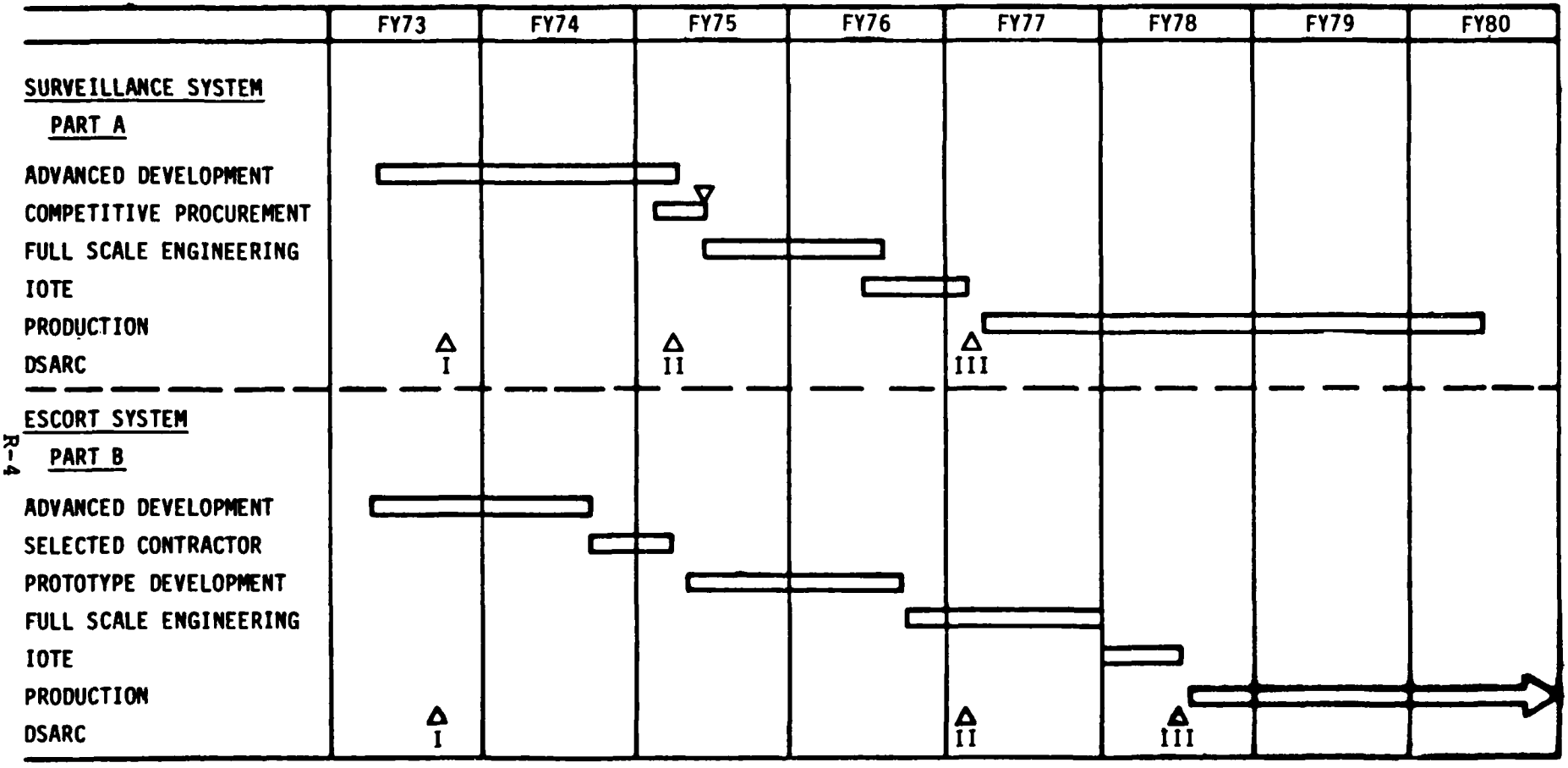


Figure - R3: INITIAL TASS/TACTLASS DEVELOPMENT PLAN

III. PROGRAM EVOLUTION

A. DSARC Milestone I - MAY 17, 1973

DDR&E issued a request for a Development Concept Paper (DCP) for the towed array source system in a memo of March 27, 1971. DCP 76 was submitted "For Comment" to DDR&E on December 12, 1973. The next reference to this DCP was in a memo from OAD(OC), ODDR&E to OPNAV on January 3, 1973. This memo, subject "DCP 92, TASS/ TACTLASS," discussed the need to have the Project Manager briefed on specific areas of the proposed DCP before a "For Comment" draft was circulated. None of the seven issues identified in this memo appear as issues in the final DCP. No reason could be assigned for the delay between the initial request for a DCP and its appearance. Funding for the TASS had been deferred in late 1972 as evidenced by a request for the release of these funds in a memo from OPNAV to DDR&E on February 7, 1973.

A "For Comment" draft DCP 92 was in circulation in OSD by March 1973 and was the subject of internal OASD (I&L) memos on March 28, March 29, and April 3 which provided comments and stated needs for more information. The "For Comment" draft was returned to the Navy in late March 1973.

A DSARC Review had been scheduled initially for April 19, 1973, but was postponed to May 3 and finally to May 17, 1973.

A revised version of DCP 92, dated April 24, 1973, was approved at the DSARC I Review. This draft DCP presented one key management issue, stated as follows: "To what extent should the undersea surveillance requirements and the tactical escort requirements documented in Section III be considered, and are separate systems solutions required?" Two alternate solutions were proposed, paraphased as follows:

- o Alternative I - upgrade an existing system.
- o Alternative II - develop a new system or, possibly, two separate systems.

The staffs of the DSARC Principals had reviewed the draft DCP and other material presented by the Navy. Their pre-DSARC comments were provided to DDR&E by memos of May 15 and 16, 1973. The DD/T&E noted a requirement for additional reports before a DSARC III Review while the CAIG said that the Navy was optimistic in their cost activities.

The DSARC I Review was held on May 17, 1973. A list of attendees is presented in Figure R4. The Navy presentation stated that there were two management issues, as follows:

- o "To what extent should the undersea surveillance requirement and the tactical escort requirements be considered separately, and are separate system solutions required?"

ODDR&E	Dr. J. S. Foster, Jr. (Chair)
OASD (I&L)	H. McCullough
OASD	D. Hessler
D/PA&E	Dr. J. Chistie
OASD (I)	Cdr. D.C. Dennison
ODDR&E (T&E)	Lt. Gen. Starbird
CAIG	Cdr. J. Edson
JCS	Col. W. Reed
DIA	Mr. Katz
Navy	Dr. P. Waterman (Acting ASN (R&D))
Presnter	Capt. V.F. Anderson - NAVLEX

Figure R4

TACTAS DSARC MILESTONE I ATTENDANCE
MAY 17, 1973

- "Is the technology sufficiently mature to allow development within FYDP funding levels?"

The same alternatives were presented. The Navy recommended Alternative II, the development of a new system or, possibly, two separate systems. The program proposed by the Navy was designed to develop as much of the new systems in common as possible to achieve cost savings. The Navy requested release of deferred funds.

The records of the DSARC Secretariate offer slightly more information as to the issues to be covered at the DSARC. The issues listed there include:

- Should undersea surveillance and tactical escort be performed by a single system?
- Should data be processed on board ship or relayed to shore for processing?
- Are towed arrays necessary for ASW missions?
- How does this program relate to similar programs?

A DepSecDef memo of June 22, 1973, to SECNAV approved Alternative II of DCP 92 and set these additional requirements to be accomplished prior to the DSARC II Review:

- Design-to-Cost (DTC) goals.
- Detailed test plans (90 days prior).
- System employment by ship types.
- Procurement and production plans.
- Total costs.
- Performance results.

DepSecDef signed the DCP on June 22, 1973. DSARC II for the Surveillance System was scheduled in early FY75 and for the Escort System early in FY77.

B. <u>DSARC Milestone II - July 13, 1976</u>

A revised "For Comment" draft of DCP 92, now titled "Tactical Towed Array Sonar (TACTAS)", was issued on October 14, 1975. The name change reflects the separation of the undersea surveillance requirement from the tactical escort requirement and the transfer of the escort system program to the Naval Sea Systems Command (NAVSEASYSCOM). The TACTLASS or Tactical Towed Linear Array Sonar System now consisted of two projects; the AN/SQR-18

(formerly Interim Escort Towed Array Sensor (IETAS)), and the AN/SQR-XX (formerly Escort Towed Array System (ETAS)). The AN/SQR-18 was intended to provide an interim capbility during the 1975-1980 period.

This version of the DCP had been prepared to provide information on the test experience with the new technology of towed arrays and guidance for operational integration of combat systems and new technology. It provided some of the answers to questions raised at the time of DSARC I in 1973 and would form the basis for seeking a Full Scale Development (FSD) decision for the AN/SQR-XX.

The October 1975 draft presented one issue: Has the AN/SQR-XX development and testing proceeded to a point that would warrant FSD?

Three alternatives plans were presented:

- o Alternative 1 - accelerated schedule.
- o Alternative 2 - (Navy preferred) same as Alternative 1 but over a longer period.
- o Alternative 3 - continue present program in an advanced development mode.

Preparation of this draft of the DCP apparently had been requested by DDR&E. Some $3M had been deferred based on the need for a revised plan. ASN (R&D) sent a memo to DDR&E on October 22, 1975, urging release of the deferred funds and citing several reviews of the draft DCP.

The TACTAS Project Manager on December 8, 1975, briefed the DDR&E Action Officer on the revised DCP 92 based on an earlier review on October 14. Key changes from the initial version were adjustments to the types and numbers of ships to receive TACTAS and cost growth in both the SQR-XX and SQR-18. Recommendations were to adjust the DCP schedules and milestones to reflect the impact of cost growth in accordance with the following schedule:

DCP 92 Schedule

Action	Date Available
o AN/SQR-XX Cost growth AN/SQR-18 Cost growth Draft Review Changes	December 17, 1975
o Sign DCP	January 5, 1976
o Ship Markets/Installation Availability	March 1, 1976
o All changes	March 1, 1976

In May 1976, the Senate Armed Services Committee, in considering the TACTAS Program, recommended that $8M be added to the budget to accelerate the introduction of this capability into the operating fleet.

On June 3, 1976, DDR&E sent a memo to ASN(R&D), subject "Revision to DCP Number 92, TACTAS." In this memo he stated that:

- It is essential that the DSARC II decision for TACTAS be reached as soon as possible.
- Advise of the earliest date possible for a TACTAS II DSARC.
- At DSARC, intend to review the performance objectives of both TACTAS and LAMPS III as related to their combined effectiveness.

Preparations were now in progress for a DSARC II Review somewhat earlier than scheduled at DSARC I. On June 18, DPA&E sent a memo to OAD(OC) presenting past comments on the TACTAS and LAMPS MK III systems. On June 25 the OSD Cost Analyses Group reviewed the TACTAS Program. DDR&E scheduled the DSARC meeting for July 13, 1976, by a memo of June 28. In his memo, DDR&E noted that the surveillance (SURTASS) part of the original program had been separated and was covered by a new DCP 137. Three issues were identified for the DSARC Review:

- Readiness for FSD.
- Adequacy of TACTAS to interact with LAMPS MK III.
- Capability of TACTAS vs. the current and projected threat.

A memo of July 6, 1976, reporting the Test and Evaluation Assessment of the TACTAS stated that testing had been adequate for the SQR-XX to transition to engineering development.

The Navy forwarded DCP 92 to DEPSECDEF on July 6 for the DSARC II Review and recommended Alternative II of the DCP.

The DSARC meeting was held on July 13 with DSARC Principals in attendance as shown in Figure R5. The issues for the Review as provided in the briefing sheet were:

- o Readiness for FSD.
- o Adequacy in detection and classification for LAMPS MK III.
- o Capability under environmental extremes.

DDR&E	Dr. Currie (Chair)
ASD (I&L)	F. Shrontz
ASD (C)	T. McClary
DP&E	A. Pennington
JCS	L/C G. Miller
DD (T&E)	Lt. Gen. W. Lotz
Navy	R Adm. C.P. Ekas, V/CHNAVMAT
CAIG	M. Margolis

Figure R5

TACTAS DSARC Milestone II Attendance
July 13, 1976

The memo from the DSARC Chairman to the DepSecDef of August 6, 1976, recommended approval of Alternative II of DCP 92. This memo expressed concern over the organizational structure of the program office and over cost control of Government Furnished Equipment (GFE) that was procured outside the control of the Project Manager.

DepSecDef signed the SDDM for the DSARC II on August 16, 1976, approving Alternative II. There were three major caveats:

- o TACTAS funds should not be reprogrammed without prior OSD consent.
- o The option for competitive contracts should be kept open.
- o An Advanced Procurement Plan (APP) must be submitted within 60 days.

The DepSecDef memo specifically singled out the Project Manager of TACTAS for special commendation. The DepSecDef did not sign the DCP.

An ASN (I&L) memo to DDR&E on September 21, 1976, subject "TACTAS Project Management," referred to a DDR&E memo of August 20, 1976, that stated the need to retain the TACTAS Project

Manager (then a Lieutenant Commander). ASN (I&L) noted that the Project Manager had been "deep selected" for Commander and would be "frocked" immediately. He had also been assigned duties in NAVSEA as the Towed Array Technical Consultant in the organization.

C. DNSARC Program Review - March 30, 1979

On December 6, 1976, ASN (R&D) sent a memo to DDR&E, subject "Tactical Towed Array Sonar (TACTAS) Full-Scale Development Threshold Breach." This memo formally reported the need to restructure the TACTAS program and the Navy intent to make a Cover Sheet Change revision to DCP 92 addressing funding and schedules. Delivery of the APP was delayed to December 15, 1976. The CNO also reported a potential DCP threshold breach of cost and schedules in May 1977.

On May 23, 1977, the Project Manager briefed the OSD staff on the threshold breaches. Causes for these breaches as stated in the briefing included:

- Delay in anticipated DSARC II decision of 4 months to August 1976 (discussed in a following paragraph).
- $4M reduction in FY77 funds selected in a 6-month program schedule delay.
- Cost growth in GFE.
- Contractor and project office management problems.
- Excess emphasis on alternative, studies and design changes.

The statement that there was a 4-month delay in receiving a DSARC II decision requires some explanation since the DSARC II Review occurred on July 13, 1976, and the SDDM was signed on August 16, 1976, a delay of 34 days. A review of the signature page of the Cover Sheet Number 1 revision to DCP 92 disclosed that DSARC Principals signed this page between April 9, 1976, and May 4, 1976. The TACTAS Project Manager stated in December 1975 that all changes to the DCP would be ready by March 1, 1976. Although no other material was available, it appears that a Cover Sheet change to the DCP was processed in the period between March 1 and April 9, 1976, and that the Navy had expected to have a DSARC II review by early May. The ability to respond to the DSARC II schedule on short notice indicates that the Navy had been ready for this DSARC Review some time prior to the DDR&E memos of June 3 and June 28, 1976.

A GAO review of the AN/SQR-18 and other aspects of the Towed Array Program took place beginning in March 1977.

The Project Manager briefed DDR&E on August 29, 1977. He covered the technology, schedule and funding with the following items highlighted:

- o Schedule - 8-month delay in IOC date from that in the DSARC II schedule.
- o Funding - shortfall in funding since DSARC II (increase in estimated costs from $62.4M to $91.6M).

The March 31, 1978, Selected Acquisition Report (SAR) to Congress noted that TACTAS had breached the cost and schedule thresholds established in DCP 92.

The continuing problems of schedule slippage, cost growth and management (both in the contractor and Navy organizations) reached such a point that the Navy terminated the Full Scale Development contract in May 1978. This was followed by a restructuring of the TACTAS Project management. A comparison of the organization before and after restructuring is provided in Figure R6.

A CEB review of the proposed TACTAS corrective actions on May 8, 1978, resulted in a CEB recommendation for a rapid development capability for the SQR-19 program.

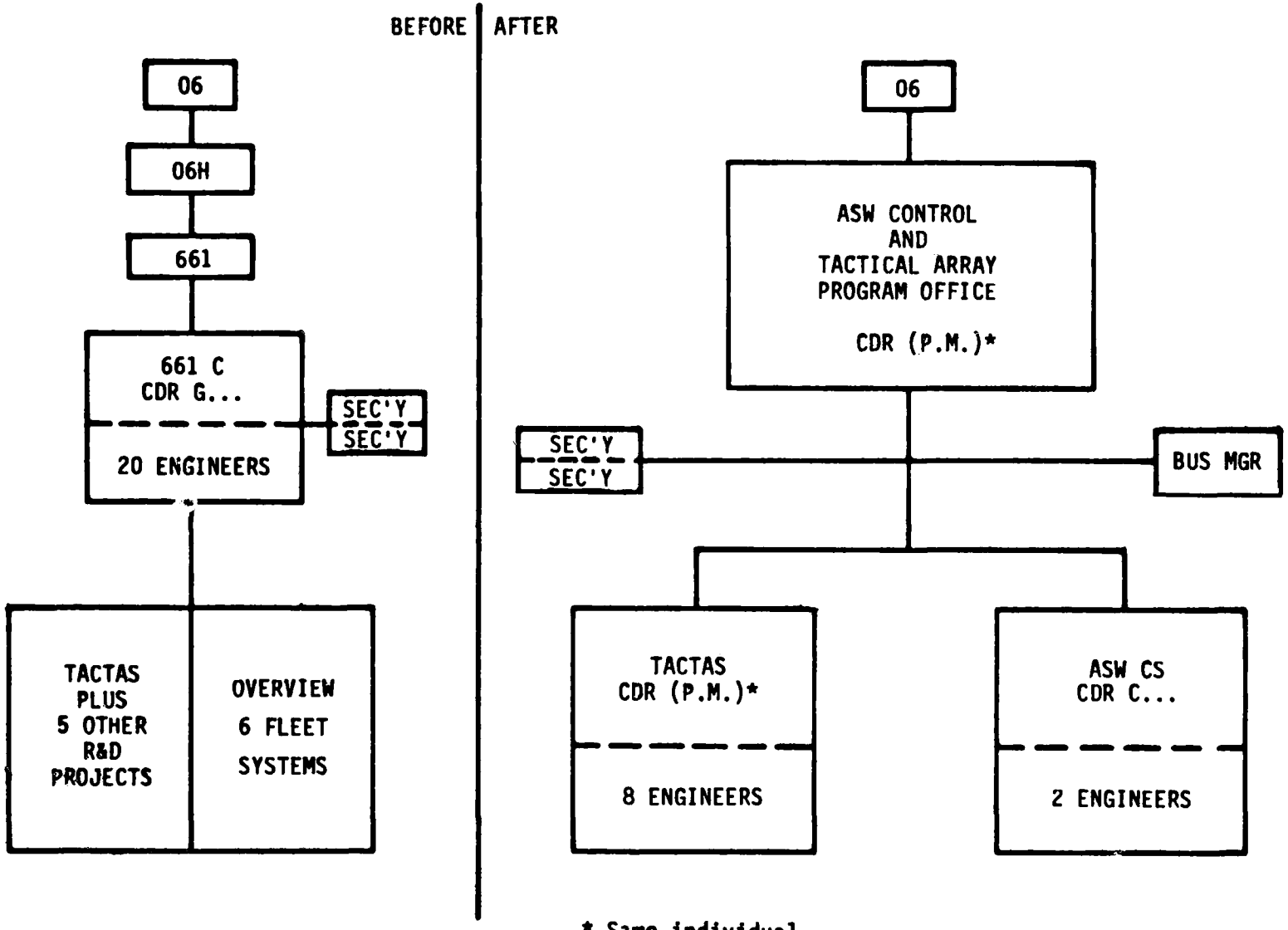
In the original organization, the TACTAS Project Manager had TACTAS and five other research and development projects plus six active fleet systems to support with a staff of 20 engineers. After reorganization, the TACTAS Project Manager was responsible for ASW Control and Tactical Arrays with the TACTAS project under his direct control and with eight engineers assigned. His deputy, with two engineers, was responsible for integration of TACTAS with the ship's ASW combat system and display and the sharing of computers between TACTAS and LAMPS MK III.

New contracts were awarded for development of the array and for the handling and storage equipment in August 1978.

The original contractor had also reorganized and FSD was restarted to meet a DSARC III Review in September 1983. Software was now reorganized as the critical path.

These modifications were approved by another CEB Review on August 29, 1978.

In October 1978 the Joint Appropriations Committee of Congress directed the Navy to compete the development contracts for TACTAS. Between October 1978 and February 1979, the Navy tried to gain relief from this constraint in a series of letters to Congressmen and in testimony, at SECNAV request, before the Defense Subcommittee, House Appropriations Committee on March 8, 1979. On March 14, 1979, in a letter to SECNAV, the Chairman,



* Same individual

Figure - R6: NAVSEA PROGRAM ORGANIZATION
(BEFORE/AFTER RESTRUCTURING)

Defense Subcommittee, House Appropriations Committee said that the committee had agreed to eliminate the requirement for competition for the SQR-19 but the committee required that work on the SQR-18 be continued as a backup.

With this go-ahead from the Congress, a Department of the Navy Systems Acquisition Review Council (DNSARC) Review of the TACTAS Program was held on March 30, 1979. The agenda for this review included:

- o Purpose - to present the restructured AN/SQR-19 program and to request SECNAV concurrence to proceed.
- o Review of TACTAS history.
- o Review of Congressional actions.
- o Reorganization of project management.
- o Development strategy.
- o Schedule to DSARC III in August 1983.
- o Alternatives to SQR-19--not recommended based on a combination of technical and schedule factors.
- o Procurement option -- initiate limited procurement after successful technical evaluation. Final decision can be delayed to later fiscal year.
- o Recommendations
  - Request Rapid Development Capability (RDC);
  - No alternative towed array sonar should be developed;
  - Keep option open for limited early procurement; and
  - Forward revised DCP to OSD and schedule a DSARC Program Review as soon as possible.

There was no DSARC review. TACTAS has continued in development in accordance with the DCP 92 revision approved by SECNAV based on the DNSARC Review. The current approved version of DCP 92 is dated August 1, 1979, but is the version approved at the March 30, 1979, DNSARC. The content of the August 1, 1979, DCP 92 is summarized as follows:

<u>Major Issue</u>

- o Extent of OT&E required prior for approval of AN/SQR-19 for production.

Alternatives

- o Alternative I - complete DT-III, OT-III, Production Approval, and DSARC III prior to production.
- o Alternative II - limited early procurement based on early sea testing and DT-III results.
- o Alternative III - program cancellation.

Related Issues

- o Cost estimates depend on fiscal year funding fluctuations.
- o Government Furnished Materiel (GFM) availability in accordance with schedule.

Recommendation

- o Alternative II

The DNSARC Review of March 30, 1979, led to a SECNAV decision to approve Alternative I which required DT-III, OT-III, ASU and DSARC III approval prior to production. DSARC III was scheduled for August 1983.

IV. CURRENT STATUS

The TACTAS Project is now in the Surface Ship ASW Combat System Project Office (PMS 411) of NAVSEA. The current organizational structure is shown in Figure R7.

A POM 83 decision compressed the testing and approval cycle and required meeting a DSARC III Review date of March 1983.

Planning for production began in early 1982. An overall AN/SQR-19 Production Planning Schedule as of October 1982 is shown in Figure R8. A blowup of the schedule covering the period from September 1982 through March 1983 is shown in Figure R9.

The Milestone Planning Meeting to start preparations for the DSARC Milestone III was held in mid-October 1982. Objectives of this meeting included:

- Familiarization of OSD staff with the current status of the program.
- Agreement on the schedule of preparation and delivery of specific types of information.
- Identification of potential issues that may arise during the preparation and review cycle.
- Identification and agreement on the more significant issues as early in the preparation phase as possible.

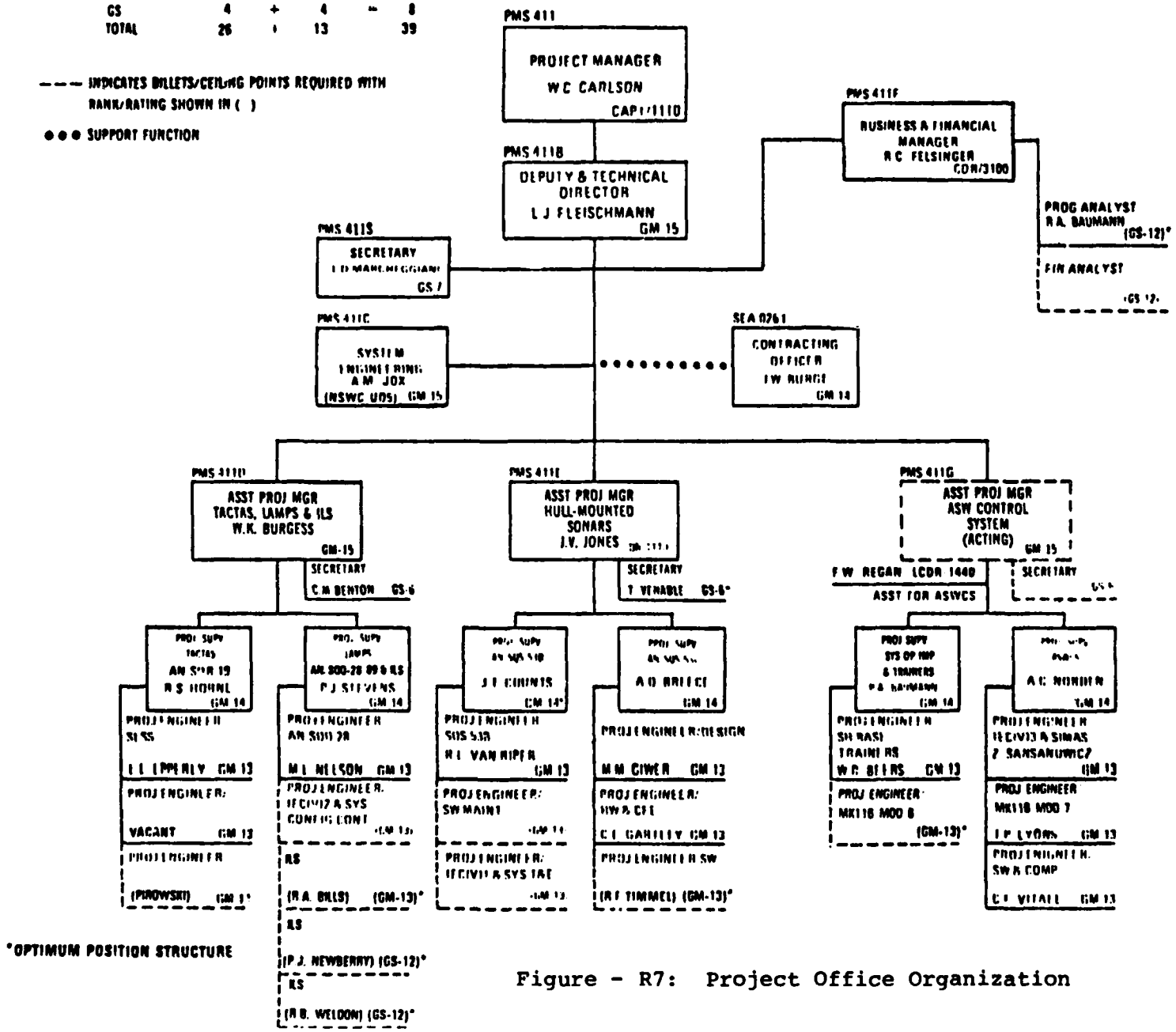
There will be a continuing dialogue between the Navy and elements of the OSD staff, particularly with USDR&E, T&E, MRA&L and PA&E, through DSARC III. The preparatory phase will conclude with the pre-DSARC meeting. As a result of the pre-DSARC meeting, the Navy will be told formally which issues need to be addressed before the DSARC III and which issues will be highlighted at the DSARC.

Informational visits for this study to the Project Office were made in late November 1982 and again in very early January 1983. As can be inferred from reference to Figure R9, the project staff was heavily involved in preparations for the Production Contract, securing Approval for Service Use, OPEVAL, and DSARC III. In addition to this workload, a Navy Audit Office review began in early November, a GAO team was coming and a visit by staff members of the House Appropriations Committee was expected. The NAVMAT NAVSEA Acquisition Review Board (ARB) meeting was scheduled for January 10, 1983.

STAFFING	CURRENTLY AVAILABLE		ADDITIONAL REQUIRED		
MILITARY	4	+	0	=	4
GM	18	+	9	=	27
GS	4	+	4	=	8
TOTAL	26	+	13		39

SURFACE SHIP ASW COMBAT SYSTEM PROJECT OFFICE

3 NOVEMBER 1982



*OPTIMUM POSITION STRUCTURE

Figure - R7: Project Office Organization

AN/SQR-19 PRODUCTION PLANNING SCHEDULE

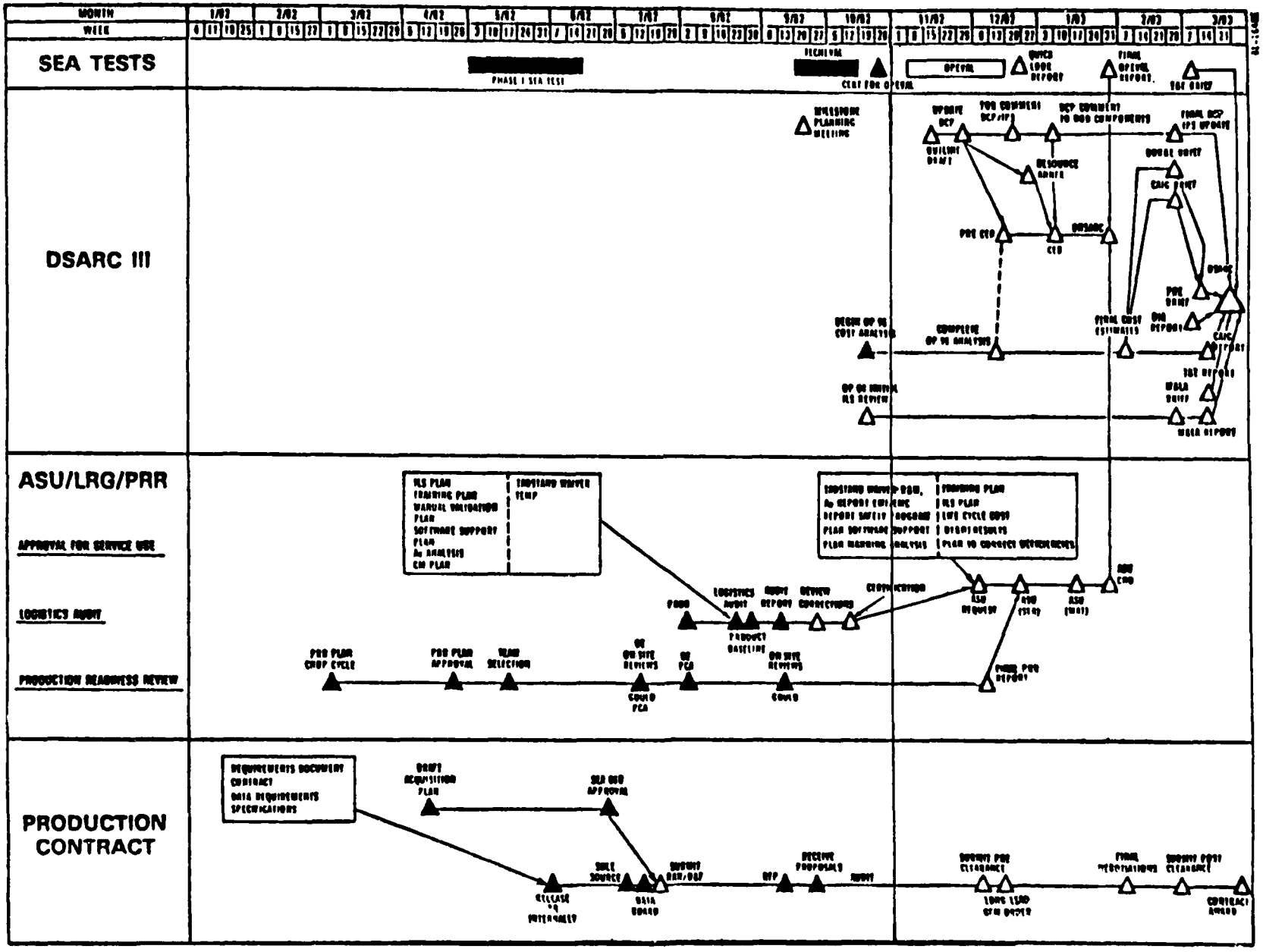


Figure - R8: AN/SQR-19 Production Planning Schedule

10/28/82
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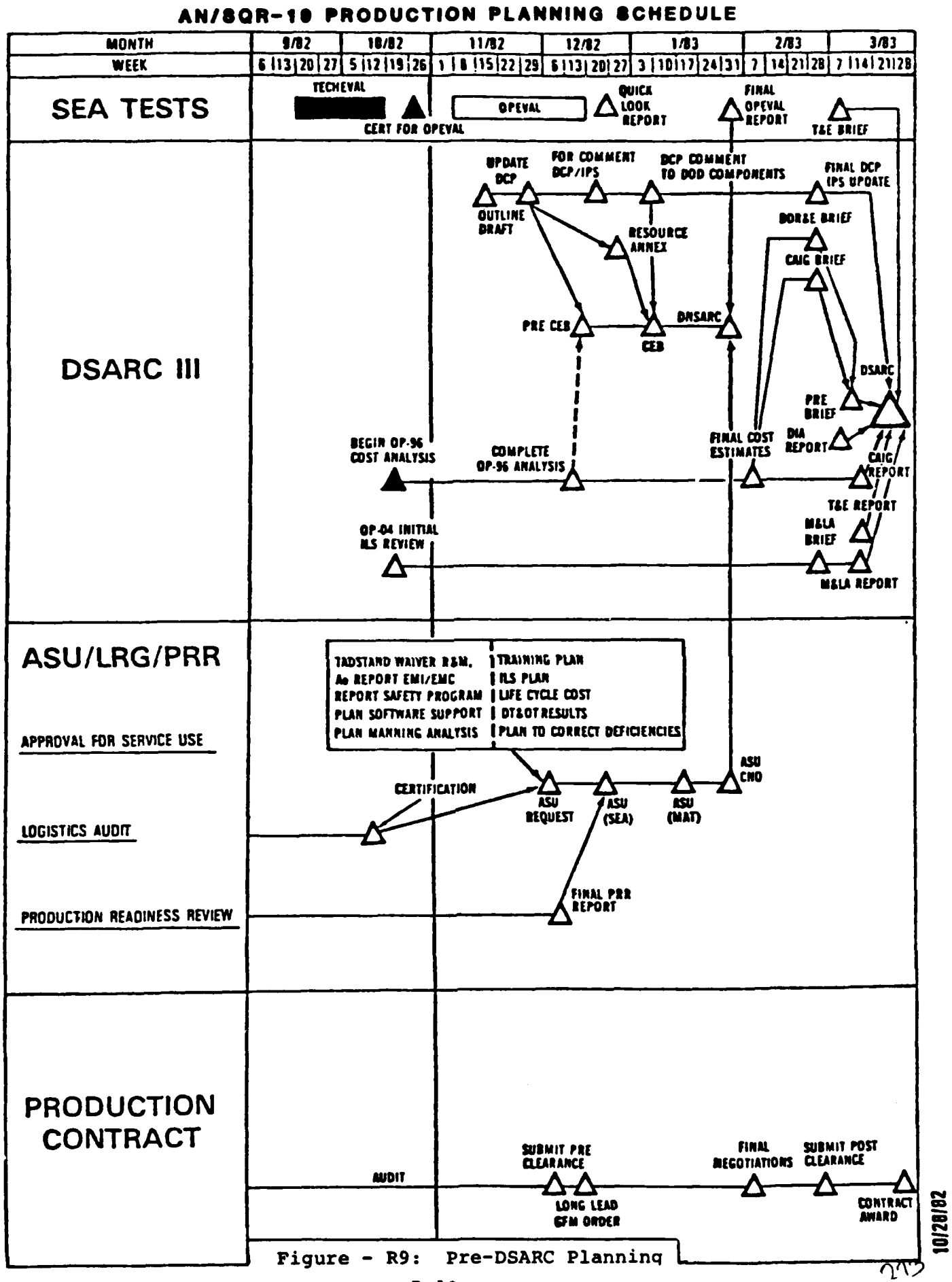

Figure - R9: Pre-DSARC Planning

OPEVAL has been completed and the final OPEVAL report is in preparation. All technical thresholds have been demonstrated successfully in OPEVAL. The OPEVAL "Quick Look" report commended the TACTAS System very highly.

The purpose of the late March 1983 DSARC review will be to request authorization for full production of the AN/SQR-19 and release of all FY83 SQR-19 production funds. The identified ship market through FY89 for the SQR-19 includes the DD-963, CG-47, DDG-57, and FFG-7 classes of ships. Procurement of over 100 units, including backfit and new construction options, is possible. A production contract is planned for around the end of March 1983 after the DSARC Review and the receipt of authorization for production.

Expected issues at the DSARC III include readiness for full production and the evolving threat. There are plans for long term follow-on development of an improved system to counter future threats.

END

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