DCN 1078

203 R

DATA CALL 64
CONSTRUCTION COST AVOIDANCES

Table 1: Military Construction (MILCON) Projects (Excluding Family Housing Construction Projects)

Installation Name:	**DAHLGREN VA NSWCTR DIV**
Unit Identification Code (UIC):	**N00178**
Major Claimant:	**NAVSEA**

Project FY	Project No.	Description	Appn	Project Cost Avoid ($000)
1994	267S	SEWAGE TREATMENT PLANT UPGRADE *	BRAC	4,252
1994	273S	COMBINED RESEARCH LAB *	BRAC	2,143
		Sub-Total - 1994		**6,395**
1998	215	ELEC WARFARE INTEG FAC ADD	MCON	7,360
		Sub-Total - 1998		**7,360**
1999	255	TOMAHAWK MSN PLNG DEV LAB	MCON	3,940
1999	256	RDT&E SUPT FAC RENOV	MCON	2,000
1999	263	COMPUTER CENTER ADDITION	MCON	6,400
		Sub-Total - 1999		**12,340**
2001	239	BACHELOR OFFICER QUARTERS	MCON	6,800
		Sub-Total - 2001		**6,800**
		Grand Total		**32,895**

(Revised 9 Dec 94) *(* - Cost Avoidance is less than project programmed amount)*

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

MAJOR CLAIMANT LEVEL

J. E. BUFFINGTON, RADM, CEC, USN
NAME (Please type or print)

Jack Buffington
Signature

COMMANDER
Title

12/9/94
Date

NAVAL FACILITIES ENGINEERING COMMAND
Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

DEPUTY CHIEF OF NAVAL OPERATIONS (LOGISTICS)
DEPUTY CHIEF OF STAFF (INSTALLATIONS & LOGISTICS)

W. A. EARNER
NAME (Please type or print)

W Earner
Signature

Title

12/9/94
Date

BRAC-95 CERTIFICATION

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

MICHAEL D. THORNTON
NAME (Please type or print)

M D Thornton
Signature

CDR, CEC, USN
Title

9 Dec 94
Date

MILCON PROGRAMMING DIVISION
Division

NAVAL FACILITIES ENGINEERING COMMAND
Activity

Document Separator

203

R

DATA CALL 64
CONSTRUCTION COST AVOIDANCES

Table 2: Family Housing Construction Projects

Installation Name:	**DAHLGREN VA NSWCTR DIV**
Unit Identification Code (UIC):	**N00178**
Major Claimant:	**NAVSEA**

Project FY	Project No.	Description	Appn	Project Cost Avoid ($000)
1996	H333	HOUSING OFFICE & SELF HELP CENTER	FHSG	520
		Sub-Total - 1996		**520**
		Grand Total		**520**

BRAC-95 CERTIFICATION

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

MICHAEL D. THORNTON
NAME (Please type or print)

M D Thornton
Signature

CDR, CEC, USN
Title

9 Dec 94
Date

MILCON PROGRAMMING DIVISION
Division

NAVAL FACILITIES ENGINEERING COMMAND
Activity

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MAJOR CLAIMANT LEVEL

J. E. BUFFINGTON, RADM, CEC, USN
NAME (Please type or print)

Jack Buffington
Signature

COMMANDER
Title

12/9/94
Date

NAVAL FACILITIES ENGINEERING COMMAND
Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

DEPUTY CHIEF OF NAVAL OPERATIONS (LOGISTICS)
DEPUTY CHIEF OF STAFF (INSTALLATIONS & LOGISTICS)

W. A. EARNER
NAME (Please type or print)

W Earner
Signature

Title

12/17/94
Date

Document Separator

Document Separator

DATA CALL 64

CONSTRUCTION COST AVOIDANCES

Table 1: Military Construction (MILCON) Projects (Excluding Family Housing Construction Projects)

Installation Name:	**DAHLGREN VA NSWCTR DIV**
Unit Identification Code (UIC):	**N00178** #303
Major Claimant:	**NAVSEA**

Project FY	Project No.	Description	Appn	Project Cost Avoid ($000)
1994	267S	SEWAGE TREATMENT PLANT UPGRADE	FHN	3,628
1994	273S	COMBINED RESEARCH LAB	BRAC	2,838
		Sub-Total - 1994		**6,466**
1998	215	ELEC WARFARE INTEG FAC ADD	MCON	7,360
		Sub-Total - 1998		**7,360**
1999	255	TOMAHAWK MSN PLNG DEV LAB	MCON	3,940
1999	256	RDT&E SUPT FAC RENOV	MCON	2,000
1999	263	COMPUTER CENTER ADDITION	MCON	6,400
		Sub-Total - 1999		**12,340**
2000	274	GYMNASIUM ADDITION	MCON	1,400
		Sub-Total - 2000		**1,400**
2001	239	BACHELOR OFFICER QUARTERS	MCON	6,800
		Sub-Total - 2001		**6,800**
		Grand Total		**34,366**

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

MAJOR CLAIMANT LEVEL

J. E. BUFFINGTON, RADM, CEC, USN
NAME (Please type or print)

Jack E Buffington
Signature

COMMANDER
Title

7/13/94
Date

NAVAL FACILITIES ENGINEERING COMMAND
Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

DEPUTY CHIEF OF NAVAL OPERATIONS (LOGISTICS)
DEPUTY CHIEF OF STAFF (INSTALLATIONS & LOGISTICS)

W. A. EARNER

NAME (Please type or print)

W A Earner
Signature

Title

7/18/94
Date

BRAC-95 CERTIFICATION

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

MARK E. DONALDSON	M E Donaldson
NAME (Please type or print)	Signature
CDR, CEC, USN	12 July 1994
Title	Date

MILCON PROGRAMMING DIVISION
Division

FACILITIES PROGRAMMING AND CONSTRUCTION DIRECTORATE
Department

NAVAL FACILITIES ENGINEERING COMMAND
Activity

Enclosure (1)

BRAC DATA CALL NUMBER 64
CONSTRUCTION COST AVOIDANCE

Information on cost avoidance which could be realized as the result of cancellation of on-going or programmed construction projects is provided in Tables 1 (MILCON) and 2 (FAMILY HOUSING). These tables list MILCON/FAMILY HOUSING projects which fall within the following categories:

1. all programmed construction projects included in the FY1996 - 2001 MILCON/FAMILY HOUSING Project List,

2. all programmed projects from FY1995 or earlier for which cost avoidance could still be obtained if the project were to be canceled by 1 OCT 1995, and,

3. all programmed BRAC MILCON/FAMILY HOUSING projects for which cost avoidance could still be obtained if the project were to be canceled by 1 OCT 1995.

Projects listed in Tables 1 and 2 with potential cost avoidance were determined as meeting any one of the following criteria:

Projects with projected Work in Place (WIP) less than 75% of the Current Working Estimate (CWE) as of 1 OCT 1995 .

Projects with projected completion dates or Beneficial Occupancy Dates subsequent to 31 March 1996.

Projects with projected CWE amount greater than $15M.

The estimated cost avoidance for projects terminated after construction award would be approximately one-half of the CWE for the remaining work. Close-out, claims and other termination costs can consume the other half.

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DATA CALL 64

CONSTRUCTION COST AVOIDANCES

Table 2: Family Housing Construction Projects

Installation Name:	**DAHLGREN VA NSWCTR DIV**
Unit Identification Code (UIC):	**N00178** #203
Major Claimant:	**NAVSEA**

Project FY	Project No.	Description	Appn	Project Cost Avoid ($000)
1996	H333	HOUSING OFFICE/SELF HELP CENTER	FHSG	520
		Sub-Total - 1996		**520**
		Grand Total		**520**

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

MAJOR CLAIMANT LEVEL

J. E. BUFFINGTON, RADM, CEC, USN
NAME (Please type or print)

Jack E Buffington
Signature

COMMANDER
Title

7/13/94
Date

NAVAL FACILITIES ENGINEERING COMMAND
Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

DEPUTY CHIEF OF NAVAL OPERATIONS (LOGISTICS)
DEPUTY CHIEF OF STAFF (INSTALLATIONS & LOGISTICS)

W. A. EARNER
NAME (Please type or print)

W A Earner
Signature

Title

7/18/94
Date

BRAC-95 CERTIFICATION

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

MARK E. DONALDSON
NAME (Please type or print)

CDR, CEC, USN
Title

MILCON PROGRAMMING DIVISION
Division

FACILITIES PROGRAMMING AND CONSTRUCTION DIRECTORATE
Department

NAVAL FACILITIES ENGINEERING COMMAND
Activity

M E Donaldson
Signature

12 July 1994
Date

Enclosure (1)

BRAC DATA CALL NUMBER 64
CONSTRUCTION COST AVOIDANCE

Information on cost avoidance which could be realized as the result of cancellation of on-going or programmed construction projects is provided in Tables 1 (MILCON) and 2 (FAMILY HOUSING). These tables list MILCON/FAMILY HOUSING projects which fall within the following categories:

1. all programmed construction projects included in the FY1996 - 2001 MILCON/FAMILY HOUSING Project List,

2. all programmed projects from FY1995 or earlier for which cost avoidance could still be obtained if the project were to be canceled by 1 OCT 1995, and,

3. all programmed BRAC MILCON/FAMILY HOUSING projects for which cost avoidance could still be obtained if the project were to be canceled by 1 OCT 1995.

Projects listed in Tables 1 and 2 with potential cost avoidance were determined as meeting any one of the following criteria:

Projects with projected Work in Place (WIP) less than 75% of the Current Working Estimate (CWE) as of 1 OCT 1995.

Projects with projected completion dates or Beneficial Occupancy Dates subsequent to 31 March 1996.

Projects with projected CWE amount greater than $15M.

The estimated cost avoidance for projects terminated after construction award would be approximately one-half of the CWE for the remaining work. Close-out, claims and other termination costs can consume the other half.

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DATA CALL 64

CONSTRUCTION COST AVOIDANCES

Table 1: Military Construction (MILCON) Projects (Excluding Family Housing Construction Projects)

Installation Name:	**WALLOPS IS VA NSURFWPNCND**
Unit Identification Code (UIC):	**N46411**
Major Claimant:	**NAVSEA**

Project FY	Project No.	Description	Appn	Project Cost Avoid ($000)
1994	338	SHIP SELF DEFENSE ENGINEERING FACILITY *	MCON	2,603
		Sub-Total - 1994		**2,603**
2000	300	WARFARE SYS INTEGR LAB	MCON	10,500
		Sub-Total - 2000		**10,500**
		Grand Total		**13,103**

(Revised 9 Dec 94) *(* - Cost Avoidance is less than project programmed amount)*

BRAC-95 CERTIFICATION

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

MICHAEL D. THORNTON
NAME (Please type or print)

MDThornton
Signature

CDR, CEC, USN
Title

9 Dec 94
Date

MILCON PROGRAMMING DIVISION
Division

NAVAL FACILITIES ENGINEERING COMMAND
Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

MAJOR CLAIMANT LEVEL

J. E. BUFFINGTON, RADM, CEC, USN
NAME (Please type or print)

Jack Buffington
Signature

COMMANDER
Title

12/9/94
Date

NAVAL FACILITIES ENGINEERING COMMAND
Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

DEPUTY CHIEF OF NAVAL OPERATIONS (LOGISTICS)
DEPUTY CHIEF OF STAFF (INSTALLATIONS & LOGISTICS)

W. A. EARNER
NAME (Please type or print)

Signature

Title

12/17/94
Date

Document Separator

203 R

DATA CALL 64

CONSTRUCTION COST AVOIDANCES

Table 2: Family Housing Construction Projects

Installation Name:	**WALLOPS IS VA NSURFWPNCND**
Unit Identification Code (UIC):	**N46411**
Major Claimant:	**NAVSEA**

Project FY	Project No.	Description	Appn	Project Cost Avoid ($000)
1997	H268	20 NEW UNITS	FHSG	3,460
		Sub-Total - 1997		**3,460**
		Grand Total		**3,460**

BRAC-95 CERTIFICATION

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

MICHAEL D. THORNTON
NAME (Please type or print)

M D Thornton
Signature

CDR, CEC, USN
Title

9 Dec 94
Date

MILCON PROGRAMMING DIVISION
Division

NAVAL FACILITIES ENGINEERING COMMAND
Activity

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J. E. BUFFINGTON, RADM, CEC, USN
NAME (Please type or print)

Jack Buffington
Signature

COMMANDER
Title

12/9/94
Date

NAVAL FACILITIES ENGINEERING COMMAND
Activity

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DEPUTY CHIEF OF NAVAL OPERATIONS (LOGISTICS)
DEPUTY CHIEF OF STAFF (INSTALLATIONS & LOGISTICS)

W. A. EARNER
NAME (Please type or print)

Signature

Title

12/11/94
Date

Document Separator

MILITARY VALUE DATA CALL

TECHNICAL CENTERS

Category	**Technical Centers**
Technical Center Site	**Dahlgren**
Location/Address	**17320 Dahlgren Rd. Dahlgren, VA 22448-5100**

MILITARY VALUE MEASURES

MISSION

1. **Mission Statement.** State the officially assigned mission of this activity and cite the reference document(s) that assigns the mission.

DAHLGREN DIVISION MISSION STATEMENT

Provide research, development, test and evaluation, engineering, and fleet support for surface warfare systems, surface ship combat systems, ordnance, mines, amphibious warfare systems, mine countermeasures, special warfare systems, and strategic systems. Execute other responsibilities as assigned by the Commander, Naval Surface Warfare Center.

Authority: OPNAVNOTE 5450 ser 09B22/1U510577 of 23 Dec 91

The Dahlgren site is one of three large specialized sites (Dahlgren, White Oak, and Panama City) in the Dahlgren Division. This Division is the consolidated Navy capability for warfare concepts, technology, lifetime systems engineering and development, systems acquisition support, and warfare analysis, simulation and modeling--

- **For the multi-warfare combat systems and individual weapon systems of the Surface Fleet, increasingly focused on joint strike warfare, individual ship defense, and theater defense needs, associated with regional conflict;**
- **For the challenge of effective weapons control systems and weapon "kill" mechanisms (warheads, explosives...) in the regional conflict environment of mixed "hostiles" and "non-hostiles";**
- **For the re-emphasized lessons of mine warfare from recent conflict in the Persian Gulf; and**
- **For the changing role of Navy strategic offense and defense.**

The Dahlgren site focuses its research in science, technology development, and engineering of complex systems capabilities on--

- **The AEGIS Fleet of cruisers (TICONDEROGA, etc.) and destroyers (BURKE, etc.) and future options such as the DDV and DD21 concepts, and**

roles such as anti-tactical ballistic missile defense.

*** The cruise missile weapon system (now TOMAHAWK Weapon System) in joint strike warfare;**

*** The integrated-by-design individual ship defense capability (needing an unprecedented architecture for information "fusing" and a new mix of weapons and controls) to become crucial in the future smaller Navy in regional conflict context;**

*** The thoroughly correct and reliable computer programs for strategic targeting and weapons control (and related re-entry vehicle technology from White Oak) for assured performance; and**

*** The related warfare analysis, simulation and modeling, and the design knowledge for bringing electronic warfare, electromagnetic environment effects, and CBW defense into combat systems engineering.**

2. **Joint Service Missions.** State any officially assigned joint/lead service assignments missions and cite the document(s) that assigned them.

(1) Dr. Glen R. Moore: Navy representative on the Joint Army-Navy-NASA-Air Force (JANNAF) Exhaust Plume Technology Subcommittee Technical Steering Group.

Ref: (a) JANNAF Interagency Propulsion Committee Annual Report, 1 Jan - 30 Dec 93, Feb 94.

(2) Dr. Glen R. Moore: Navy representative on Tri-Service Theater Ballistic Missile (TMD) Test Coordination Working Group.

Ref: (a) USASSDC ltr CSSD-SD-DP (70-ly) of 4 Apr 94.

(3) Mr. Roger Gibbs (B51) was assigned Chairman of the Modeling and Threat Assessment Subpanel of the Technical Panel for CB Defense (TPCBD) under the Joint Directors of Laboratories (JDL).

Ref: (a) U. S. Army ERDEC ltr of 30 Mar 93.

(4) David S. Malyevac - Navy Principal Member, Joint Technical Coordinating Group for Munitions Effectiveness (JTCG/ME)

(5) George A. Williams - Alternate Navy Principal Member, Joint Technical Coordinating Group for Munitions Effectiveness (JTCG/ME)

(6) J. Harold Jones - Chairman, Delivery Accuracy Working Group, Joint Munitions Effectiveness Manual for Surface-to-Surface (JMEM/SS)

(7) Danny Brunson - Surface Navy Senior Member, Joint Munitions Effectiveness Manual for Anti-Air (JMEM/AA) Steering Committee

(8) Thomas Wasmund - Co-Chairman, Aerial Target Vulnerability, Joint Munitions Effectiveness Manual for Anti-Air (JMEM/AA) Working Group

(9) Larry Beuglass - Co-Chairman, Gun Evaluation, Joint Munitions Effectiveness Manual for Anti-Air (JMEM/AA) Working Group

(10) Wallace Morton - Co-Chairman, Special Operations Working Group (SOWG)

Ref: (a) 61JTCG/ME-1-6, Program and Organization Handbook, Revision 2 of 22 Feb 93.
(b) NSWCDD ltr, 8800/2, G202-GEH of 22 Apr 93
(c) NSWCDD ltr, 8800/2, G202-GEH of 2 Jun 93
(d) NSWCDD ltr, 8800/2, G202-GAW of Feb 94

(11) Tom Smith - Chairman, Warheads and Explosives Sub Panel of the Joint Service Technology Panel for Conventional Air/Surface Weaponry

(12) FY95 Joint Service Program Plan Rev of 23 Mar 94

Ref: (a) OPNAV/O8J-0178-89 of 28 Mar 89, Subj: Manage to Payroll Increase Request
(b) OPNAV/Ser N89-0039-93 of 17 Mar 93, Subj: Proposal for Establishment of a Shore Activity with One Shore Detachment
(c) OPNAV/Ser 09B22/3U510474 of 12 Apr 93, Subj: Establishment of Naval Warfare Analysis Center and Detachment
(d) JCS/20318-0300 of 18 Jan 94, Subj: Joint Warfare Analysis Center

Since 1989, two independent actions have taken place with significant Joint Service mission impacts:

1. Reference (a) documents the designation of NSWCDD as the lead laboratory and Executive Service Technical Coordinator for a classified tri-service program. The Deputy Secretary of Defense appointed the Navy as Lead service. Tri-Service Technical coordination is managed by the Navy through the Warfare Systems Department at the Dahlgren Division.

2. References (b) through (d) document the creation of the Naval Warfare Analysis Center and the the Joint Warfare Analysis Center out of a portion of the Warfare Systems Department at NSWCDD. The creation of this Echelon II

Command, reporting directly to JCS (J3) points to the importance of this work to the National Defense. NSWCDD continues to make significant technical contributions to the Joint Warfare Analysis Center.

(13) Shipboard Short Range (SR) Unmanned Aerial Vehicles (UAV) Combat System Integrator

Ref: (a) Defense Airborne Reconnaissance Office (DARO) Program Plan of Jan 94 for acquisition of UAV cites the existence of Joint Project Office (JPO) for UAVs, including Shipboard variant.
(b) Funding Document N0001993WX8NCPD cites NSWCDD tasking as Combat System Integrator for shipboard UAV.

(14) Air Courses of Action Assessment Model (ACAAM) Developer

Ref: (a) Funding Documents MIPR DJAM 4 0052 and 4 0112 from Joint Staff Comptroller.

(15) JADO/JEZ: Tasked by PMS-400 and JADO/JEZ office to provide engineering and analysis support for the development and test of a Joint Air Defense Operations/Joint Engagement Zone operational capability for joint tactical operations. In performing this task, we have engineered and installed significant warfighting upgrades on CG-47 (USS TICONDEROGA) to improve her joint warfighting capabilities in the areas of tactical data links, tactical ID, voice comms, and intelligence.

Ref: (a) Official Memorandum from CDR T. Bush, of 19 May 1993, Subj: JADO/JEZ Nearland Test Update

(16) JOINT TACTICAL INFORMATION DISTRIBUTION SYSTEM (JTIDS): The Joint Tactical Information Distribution System (JTIDS)/Link 16 is a joint tactical data link which provides a secure, high capacity, high bandwidth, air control and command and control data link capability. NSWCDD is responsible for defining, evaluating, and implementing Link-16 message standards into the AEGIS Combat System, and being the PMS-400 representative to all Navy and Joint Link message standard forums. NSWCDD is also responsible for integrating Link-16 Model 4 and Model 5 capabilities on AEGIS Cruisers and Destroyers.

Ref: (a) Chief of Naval Operations Memo of 16 Oct 1985; Subj: JTIDS

(17) UNMANNED AERIAL VEHICLE (UAV): Tasked by CU PEO to build a UAV command and control system which can control and process information from joint service UAV assets.

Ref: (a) Naval Air Systems Command ltr 4200, SER AIR-21722/122, of 3 Mar 93, Subj: Synopsis No. 70066-92; System Integration of the Vertical Take and Landing (VTOL) Demonstration Program; Change in Acquisition Strategy

(18) THEATER MISSILE DEFENSE (TMD): In support of the AEGIS Program Office, NSWCDD is working with the joint services to define AEGIS Theater Missile Defense (TMD) command, control and communications requirement and associated format of link messages (i.e., Link 11 and Link 16). Other joint service efforts include radar-to-radar cuing and defining the information required from a space based cue.

Ref: (a) Task statement for funding document # N000249WRA0556 FY93 and FY94 SeaTasks

(19) AEGIS/PATRIOT TBM TESTING: Tasked by PMS-400 to conduct an AEGIS to Patriot interoperability test to determine the capability of the AEGIS ship and the Patriot batteries to exchange real time tactical information for the purpose of cuing radar systems to acquire, ID, and engage enemy targets. The test was conducted in April with data analysis underway.

Ref: (a) Naval Message 041900Z Aug 93; Subj: AEGIS Patriot Interoperability Test

(20) Joint Interoperability Certification of C3I SYSTEMS: DOD Directive 4630.5 established the requirement for joint interoperability certification of C3I systems. NSWCDD is tasked by PMS400 to perform this function for the AEGIS Combat System and is an official member of the following groups:

- Technical Interoperability Standards Group
- Operational Interoperability Requirement Group
- Joint and Navy Air Control Working Groups
- Joint Change Control Board

Ref: (a) DOD Directive 4630.5, Compatibility, Interoperability, and Integration of Command, Control, Communications, and Intelligence (C3I) Systems
(b) Navy Interoperability Configuration Management Plan of 10 May 91 (cites NSWCDD membership)

(21) NSWCDD performs a unique role in the support of the Submarine Launched Ballistic Missile (SLBM) strategic weapon system. In addition to the development of tactical fire control and targeting software, NSWCDD provides U. S. Strategic Command (USSTRATCOM) with strategic targeting and mission planning software and data for all SLBM systems. NSWC also provides SLBM mission planning software and data to the National Command Centers. This support is mandated by the SLBM Software Development Memorandum of Agreement between USSTRATCOM and Strategic

Systems Programs (SSP) dated 4 Mar 94. Further, the Strategic Retargeting System Operational Requirements Document (OR #196-02-88 in 1988 and draft update dated Mar 93) directed NSWCDD to provide the capability in facilities and people to support the strategic targeting requirements of the SLBM SWS. This support includes testing and validation of all preplanned SLBM targeting data and testing and transfer of all SLBM strategic targeting data and documentation among USSTRATCOM, NSWCDD and the CTFs to comply with the responsiveness requirements associated with changing strategic targeting.

TECHNICAL FUNCTIONS

3. Technical Functions Resource Allocations. Appendix A provides a list of numbered functional support areas that cover the spectrum of naval warfare and support operations. Additionally, Appendix A provides a list of numbered life-cycle work areas that cover the "cradle to grave" spectrum of Navy systems acquisition. Utilizing the two lists at Appendix A, each activity will break out its entire FY1993 technical program within any applicable intersections of these two defining schemes (for example, functional support area #5.2 - life cycle work area #3 will identify the activity's level of resources allocated to sensors and surveillance systems, radar systems in advanced development). Definitions for each functional support and life cycle work area are provided in Appendix B for reference.

a. Use the form at Tab A of this data call to provide data on work years and expenditures for FY1993 to support each applicable intersection of functional support areas and life cycle work areas. When necessary, estimate data to the best of your ability

b. Similarly, use the Tab A forms to report separately on your detachments or sites that have not received this data call directly. This data may be consolidated when the detachments or sites perform work in the same area. When necessary, estimate data to the best of your ability.

MANPOWER

4. Work Breakdown Structure.

a. Use Table 4.1 (below) to provide data on the general support functions at your activity. Report data as of 31 March 1994. If you are collocated with one of your subordinate base keeper commands (i.e., a NAWS or NAS collocated with a NAWC Division), describe the differences in the functions of each and provide a separate Table 4.1 for the subordinate command. Include this command in the Table 4.1 submission for your Activity.

b. Similarly, use Table 4.2 (below) to provide general support function data for all your detachments or sites that did not receive this data call directly. Consolidate data from all of these detachments into one table (4.2). Provide a list of the detachments whose data is included in Table 4.2. For each identified detachment in this list, include its name, location, UIC, and number of civilian and military personnel onboard.

In addition, if any of your detachments or separate sites not receiving an individual data call have over 50 civilian personnel or own technical facilities, provide separately a description of the site, the functions performed there, photographs showing the facilities and state the reason for that site's existence and the necessity for it to be at that location.

c. Use Table 4.3 (below) to provide estimated data, for your activity only, to reflect the anticipated impact of previous BRAC decisions that have not yet been implemented. This data should provide the deltas from Table 4.1.

NOTES:

[1] Use the following definitions when providing data for the tables below:

Workyears: Consistent with those used in the preparation of inputs to the President's budget.

Contract Workyears: Actual or estimated workyears performed by support contractors with workyears defined consistent with the definition used in the President's budget.

Civilian Personnel Onboard: Full Time Permanent (FTP) employees.

[2] Any categories of personnel that are employed to support other Activities should be noted with the name of the additional Activity supported.

Table 4.1, General Support Resources for
(Activity: NSWC Dahlgren Division, Dahlgren, VA) (UIC: 00178, 47629, 48629)

Function	Space allocated (Gross SQFT)	Work Years	Civilian Persnel on board	Contract Work Years	Military Personnel Onboard	
					Off	Enl
ADMINISTRATION						
Command (CO/XO/TD/etc.)	9,146	33.1	24	6.0	2	0
* Comptroller	11,615	84.1	68	8.0		
Admin	10,169	32.1	25	0.0	1	1
* Human Resources	21,133	72.7	62	11.4		
OPERATIONS SUPPORT						
* Supply Management	92,432	145.6	111	35.9	1	0
* Consolidated Computational Computer Support	4,101	25.5	20	9.6		
* Information Systems and Communications	36,717	156.2	125	30.9	1	1
*Safety/OSH/Environmental	10,220	35.3	29	0.0		
INFRASTRUCTURE						
* Physical Security	7,606	63.7	51	0.0		3
* Public Works/Staff	118,740	304.0	244	62.6	2	0
* Fire Protection	9,850	29.3	28	0.0		
Medical/Dental	--	N/A	N/A	0.0		
* Military Support	245,708	42.6	30	0.0	2	39

* Air/Waterfront Operations	294,291	54.6	46	0.0		27
Other			N/A	0.0		
TECHNICAL STAFF						
Technical Operations			2024	2187.5	16	3
Totals	871,728	1078.7	2887	2346.5	25	74

1 Work Years annualized for 1994 by multiplying actuals through 2 Apr 94 by 1.992.

* NOTE: Besides supporting the duties at DD activity, these functions support all tenants residing at our activity.

Table 4.2, General Support Resources for all Detachments
(Activity: Dahlgren Site) (UIC: N00178)

Not Applicable

Function	Space allocated (Gross SQFT)	Work Years	Civilian Persnel onboard	Contract Work Years	Military Personnel Onboard	
					Off	Enl
ADMINISTRATION						
Command (CO/ XO/ TD/etc.)						
Comptroller						
Admin						
Human Resources						
OPERATIONS SUPPORT						
Supply Management						
Consolidated Computational Computer Support						
Information Systems and Communications						
Safety/OSH/Environmental						
INFRASTRUCTURE						
Physical Security						
Public Works/Staff Civil Engr						
Fire Protection						
Medical/Dental						
Military Support						
Air/Waterfront Operations						
Other						
TECHNICAL STAFF						
Technical Operations						
Totals						

Table 4.3, Previous BRAC Impact to General Support Resources for (Activity: Dahlgren Site) (UIC: N00178)

Note: The Dahlgren Site (UIC N00178) support functions will not change due to previous BRAC decisions. There will be an increase in technical staff with support functions being provided with existing Dahlgren support staff. The additional support can be handled within existing staff because of general downsizing occurring at the Dahlgren Site.

Function	Space allocated (Gross SQFT)	Work Years	Civilian Persnel onboard	Contract Work Years	Military Personnel Onboard	
					Off	Enl
ADMINISTRATION						
Command (CO/XO/ TD/etc.)						
Comptroller						
Admin						
Human Resources						
OPERATIONS SUPPORT						
Supply Management						
Consolidated Computational Computer Support						
Information Systems and Communications						
Safety/OSH/Environmental						
INFRASTRUCTURE						
Physical Security						
Public Works/Staff Civil Engr						
Fire Protection						
Medical/Dental						
Military Support						
Air/Waterfront Operations						
Other						
TECHNICAL STAFF						
Technical Operations			757	197.3	3	0
Totals			757	197.3	3	0

page 11 of 138
UIC N00178

5. Technical Staff Qualifications.

a. Use Table 5.1 (below) to provide data on the civilian personnel allocated to Technical Operations having the educational and experience levels indicated in the table for your activity. Report data as of 31 March 1994. Similarly, use Table 5.2 (below) to provide data for all your separate detachments or sites that did not receive this data call directly. Consolidate data from all of these detachments into one table (5.2). Provide a list of the detachments whose data is included in Table 5.2.

Table 5.1, Technical Staff Education Level for (Activity: NSWC Dahlgren Division, Dahlgren VA) (UIC: 00178)

Highest Degree Attained	Years of Government and/or Military Service					
	Less than 3 Years	3-10 Years	11-15 Years	16-20 Years	More than 20 Years	Total
Grade School	0	0	0	0	4	4
High School	2	106	69	58	271	506
B.A./B.S	22	528	159	98	302	1109
M.A./M.S	12	113	42	30	137	334
Ph.D M.D.	4	14	5	6	42	71
Total	40	761	275	192	756	2024

Table 5.2, Technical Staff Education Level for all Detachments
(Parent Activity: Dahlgren Site) (UIC: N00178)

Not Applicable

Highest Degree Attained	Years of Government and/or Military Service					
	Less than 3 Years	3-10 Years	11-15 Years	16-20 Years	More than 20 Years	Total
Grade School						
High School						
B.A./B.S						
M.A./M.S						
Ph.D./ M.D.						
Total						

203 Revised pg

b. Use Table 5.3 (below) to provide data on the number of civilian personnel allocated to Technical Operations with graduate degrees and at least three years of applicable experience that have their highest degree in the fields indicated. Report data as of 31 March 1994. Similarly, use Table 5.4 (below) to provide data for all your separate detachments or sites that did not receive this data call directly. Consolidate data from all of these detachments into one table (5.4). Provide a list of the detachments whose data is included in Table 5.4

Table 5.3, Technical Staff Academic Fields for (Activity: NSWC Dahlgren Division, Dahlgren, VA) (UIC: 00178)

R

Academic field	Number
Physics	67
Chemistry	6
Biology	0
Mathematics/Statistics/ Operations Research	90
Engineering	172
Medical	0
Dental	0
Computer Science	34
Social Science	0
Other Science	1
Non-Science	7
Total	377

b. Use Table 5.3 (below) to provide data on the number of civilian personnel allocated to Technical Operations with graduate degrees and at least three years of applicable experience that have their highest degree in the fields indicated. Report data as of 31 March 1994. Similarly, use Table 5.4 (below) to provide data for all your separate detachments or sites that did not receive this data call directly. Consolidate data from all of these detachments into one table (5.4). Provide a list of the detachments whose data is included in Table 5.4

Table 5.3, Technical Staff Academic Fields for (Activity: NSWC Dahlgren Division, Dahlgren, VA) (UIC: 00178)

Academic field	Number
Physics	156
Chemistry	9
Biology	1
Mathematics/Statistics/ Operations Research	305
Engineering	714
Medical	0
Dental	0
Computer Science	271
Social Science	0
Other Science	3
Non-Science	565
Total	2024

Table 5.4, Technical Staff Academic Fields for all Detachments (Parent Activity: Dahlgren Site) (UIC: N00178)

Not Applicable

Academic field	Number
Physics	
Chemistry	
Biology	
Mathematics/Statistics/ Operations Research	
Engineering	
Medical	
Dental	
Computer Science	
Social Science	
Other Science	
Non-Science	
Total	

c. Are there unique aspects of the activity's location that help or hinder in the hiring of qualified personnel?

The Dahlgren Site recruiting is done in conjunction with the White Oak Facility recruiting because they are only 66 miles apart. This has been a major contribution in successful professional recruitment. In the areas of campus recruiting and Cooperative Education hiring, it has been especially helpful for our school managers and recruiters to highlight the rural, clean air, water-oriented aspects of the Dahlgren site as well as the DC/Baltimore proximity of the more suburban White Oak Facility. Since the BRAC93

decision was to disestablish the White Oak Facility, our college recruiting program may suffer. We will probably no longer appeal to the graduate wishing to locate in a larger metropolitan area.

The Dahlgren Site has extensive sophisticated computing and technical facilities and attractive working environment. Dahlgren, VA is included in the Washington, DC wage survey and special salary rate areas. It has adequate housing, shopping and schools as well as several major colleges and universities within easy commuting distance. The proximity to colleges and universities has, over the years, enabled the activity to provide its S&E's a vigorous graduate training program. In past years, when hiring S&E's with advanced degrees was difficult, this proximity to a large university community allowed the activity to equip its S&E's with needed advanced technical skills. Furthermore, the closeness of numerous colleges and universities has greatly facilitated technical interactions between its in-house S&E's and academia, keeping the activity at the forefront of the scientific and engineering disciplines inherent in surface warfare RDT&E.

The differences between the Dahlgren Site and the White Oak Facility are remarkable and have allowed us to appeal to a very wide variety of job seekers. The diverse worksites/locations have always helped us to attract the best and the brightest and, at the same time, appeal to the various lifestyles and personalities that these candidates represent. Yet, the cohesiveness and unity of the Dahlgren Division's mission and departmental structure allowed for consistent employee development, cross-site details and training as well as uniform focus and initiatives. The BRAC93 decision to disestablish the White Oak Facility has these benefits.

d. List all articles written by the in-house technical staff that were published or accepted for publication in refereed journals since 1 January 1990.

The formal documentation and publication of NSWCDD organizational technical results and products is grossly under represented in the following listing.

This data call contains entries to only refereed journal articles and books/chapters, which are a small subset of the technical publication output and interaction of our organization. The refereed journal articles represent only the most formal of basic research, an obviously important area of contribution, but misrepresentative of this full spectrum technical center.

We publish in the formal proceedings of national and international symposia, conferences, workshops, congresses often from presentation at their invitation. We publish in the formal proceedings and transactors of scientific, technical and professional societies; again, often at their invitation to our scientists and engineers. We issue formal archival

technical reports on all scientific and technical efforts, the development of technology, devices and systems, and the test and evaluation of materials, inventions, engineering models, full scale weapons and systems. Unclassified reports are released to national information services. Classified reports are released to DoD central distributors. We contribute standards documentation to national and international organizations. We publish technical and operational reference manuals for military equipment. We publish technical reports in multi-media formats, such as video tapes and computer disk to present dynamic visual information in the documentation. We give invited technical papers to scientific, technical, engineering, technology, military, and management bodies throughout the world. We conduct symposia, conferences, workshops, etc., to provide face-to-face contact among scientists and engineers in our domains. We transfer technical information electronically throughout the communities of interest (among defense, universities and industry) in our areas of capability and competence.

The total "publication" product represented above is a useful indication of the broad contribution of NSWCDD technical information. Thousands of events and items are thus involved beyond the listing below.

Refereed Journal Submissions:

Baran, R. H., "Neural Network Approach to Data Fusion in Automatic Target Recognition," International Journal of Neural Networks: Research & Applications, Vol. I, pp.68-77, 1989.

Baran, R.H., "Convergence Time in Asymmetric Neural Networks," Modeling and Simulation, Vol. 20, pp.2169-2175, 1989.

Choi, J. S., Kim, D. E., Choi, D. I., Yang, S. C., and Uhm, H. S., "Theory of Free Electron Laser Instability for Relativistic Electron Beam Propagating in Dielectric-Loaded Waveguide," Physics of Fluids, B1, 1316, 1989.

Choi, E. H., Uhm, H. S., Choi, D. I., and Shin, H. M. "Influence of Hall Current on the Stability Properties of Azimuthally Symmetric Perturbations in a Self-pinched Intense Electron Beam," Journal of Applied Physics, 65, 3356, 1989.

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Uhm, H. S., "Wakefield Theory of a Relativistic Electron Beam," Physics Letters A, 1990, in press.

Miller, J. D., Nguyen, K. T., Schneider, R. F., Struve, K. W., and Weidman, D. J., "Pulse Shaping a High Current Relativistic Electron Beam in Vacuum," Rev. Sci. Instrum., 1991.

Miller, J. D., Schneider, R. F., Weidman, D. J., Uhm, H. S., and Nguyen, K. T., "Observation of Plasma Wakefield Effects During High Current Relativistic Electron Beam Transport," Physical Review Letters, 67, 1747, 1991.

Rhee, M. J., and Boulais, K. A., "Root-mean-square Emittance of Multiple Beam System," Physics of Fluids, B3 (7), July 1991.

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Spano, M. L.; Lynn, H. D.; and Wun-Fogle, M., "Basal Plane Magnetostriction and Anisotropy of $(Tb_05Dy_{0.5})xGd_{1-x}$ Single Crystals," J. Mag. & Mag. Mat. 104-107, 1537 (1992). (GP1)

Uhm, H. S., "A Theory of Relativistic Electron Beam Bunching by the Plasma Wakefield Effects," Phys. Fluids B: Plasma Physics 4, 2021 (1992). (GP6)

Szu, H.; Sheng, Y.; and Chen, J.,"The Wavelet Transform as a Bank of Matched Filters," Applied Optics, Vol. 31, pp. 3267-3277, Jun. 1992. (IS1)

Szu, H.; Telfer, B.; and Lohmann, A.,"Causal Analytical Wavelet Transform" Opt. Engineering Vol. 31, pp.1825-1829, Sept. 1992. (IS1)

Telfer, B. and Szu, H.,"New Wavelet Transform Normalization to Remove Frequency Bias," Opt. Engineering Vol. 31, pp.1830-1834, Sept. 1992. (IS1)

Szu, H.; Telfer, B.; and Kadambe, S.;"Adaptive Wavelets for Signal Representation and Classification," Opt. Engineering Vol. 31, pp.1907-1916, Sept. 1992. (IS1)

Sheng, Y.; Roberge, D.; and Szu, H.,"Optical Wavelet Transform," Opt. Engineering Vol. 31, pp. 1840-1845, Sept., 1992. (IS1)

Caulfield, H. J. and Szu, H.,"Parallel Discrete and Continuous Wavelet Transforms," Opt. Engineering Vol. 31, pp.1835-1839, Sep. 1992 (IS1)
Yang, X.; Szu, H.; Sheng, Y.; and Caulfield, H. J.,"Optical Haar Wavelet Transforms of Binary Images," Opt. Engineering Vol. 31, pp. 1846-1851, Sept. 1992. (IS1)

Phuvan, S.; Oh, T. K.; Li, Y.; Caviris, N.; and Szu, H.,"Texture Analyses by Space-Filling Curves and 1-D Haar Wavelets," Opt. Engineering, Vol.31, pp.1899-1906, Sept. 1992. (IS1)

Rogers, G. W.; Solka, I. L.; Priebe, C. E.; and Szu, H. H.,"Optoelectronic Computation of Waveletlike-Based Features," Optical Engineering, Vol. 31, pp. 1886-1892, (1992). (IS1, IS4)

Cawley, R. and Hsu, G-H., "SNR Performance of a Noise Reduction Algorithm Applied to Coarsely Sampled Chaotic Data," Phys. Lett. A, pp. 188-196, (1992). (IS6)

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Vohra, S.; Spano, M.; Shlesinger, M.; Pecora, L.; and Ditto,W., Eds., Proceedings of the 1st Experimental Chaos Conference, World Scientific, Singapore, 1992. (GP1)

Ko H., An Analytical Basis for Signal Detectability Enhancement by Backpropagation Network as a Novelty Filter, Bell & Howell Information Co., 1992. (IS2)

Athale, R., Yang, X-Y and Szu, H., "Optical Implementation of Weber-Law Neurons Based on the Dynamic Behavior of Electronic Trapping Materials, *Opt. Comm.* 101, 10 (1993).

Ayres, V. M., Chen, H. C., Stark, R. A., Uhm, H. S., and Brandt, H. E., "Diocotron Instability for Relativistic Non-Neutral Electron Flow in Planar Magnetron Geometry," *Phys. Fluids B: Plasma Physics* 4, 3396 (1992).

Hathaway, K. and Clark, A. E., "Magnetostrictive Materials," *Materials Research Bulletin* 18, 34 (1993).

Oh, T-K, Caviris, N., Li, Y., Szu, H., and Phuvan, S., "Texture Analysis by Space-Filling Curves and 1-D Haar Wavelets," *Opt. Eng.* 31, 1899 (1992).

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Spano, M. L., Wun-Fogle, M., and Ditto, W. L., "Experimental Observation of Stochastic Resonance in a Magnetoelastic Ribbon," *Phys. Rev. A* 46, 5253 (1992).

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Szu, H., "Automatic Fault Recognition by Image Correlation Techniques," *IEEE Trans. Industrial Electronics*," 40, 197 (1993).

Szu, H. and García, J. P., "Radar Jitter Suppression by a Self-Reference Matched Filter," *Electronics Letters* 29, 1045 (1993).

Szu, H., Yang, X-Y, Telfer, B., and Sheng, Y., "Neural Network and Wavelet Transform for Scale-Invariant Data Processing," *Phys. Rev. E*, 48, 1497 (1993).

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Szymczak, W. G., Rogers, J. C. W., Solomon, J. M., and Berger, A. E., "A Numerical Algorithm for Hydrodynamic Free Boundary Problems," *Journal of Computational Physics* 106, 319 (1993).

Telfer, B. and Szu, H., "New Wavelet Transform Normalization to Remove Frequency Bias," *Opt. Eng.* 31, 1830 (1992).

Telfer, B., Szu, H., and Kiang, R., "Classifying Multispectral Data by Neural Networks," *Telematics & Informatics* 10, 209 (1993).

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Uhm, H. S., "A Theory of Ferromagnetic Waveguide Accelerators Driven by Electron Beam," *Phys. Fluids B: Plasma Physics* 5, 972 (1993).

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Szu, H. and Telfer, B., "Automatic Target Recogntion," ***The Handbook Brain Theory and Neural Networks*****, 15-1, M. A. Arbib, ed., Bradford Books/MIT Press (1993).**

Szu, H., Feng, L., and Landa, J., "Ambiguity Figure and Ground Recognition," ***Ambiguous Perception*****, 7-1, H. Haken, ed., Springer-Verlag (1993).**

Szu, H., Telfer, B., Rogers, G., Gobovic, D., Hsu, C., Zaghloul, M., Freeman, W., "Spatiotemporal Chaos Information Processing in Neural Networks," ***Rethinking Neural Networks Quantum Fields and Biological Data*** **, 443-464, K. Pribriam, ed., Lawrence Erlbaum (1993)**

e. List all technical books and/or chapters written by the in-house technical staff that were published or accepted for publication since 1 January 1990.

1993 - "Dynamics of Atmospheric Reentry" AIAA Education Series

Author: Frank J. Regan
Satya M. Anandakrishnan

f. Identify any Nobel laureates employed at this activity.

None.

g. List all non-governmental awards for research or technical excellence given to members of your technical staff since 1 Jan 90.

(1) William Farr - Award: Software Quality Engineering Award for Significant Contributions to Software Measurement from the Software Quality Engineering Institute, 1991

(2) Carey Priebe - Award: The Outstanding Ph.D. Dissertation in Statistical Science

Award from George Mason University, 1993

(3) David Stoudt - Award: IEEE Pulsed Power Student Award June 1993

(4) Dr. F. G. Moore - Award: Dr. Moore was selected as one of six invited lecturers to present lecture notes on a missile aerodynamics course sponsored by AGARD and to be held in Brussels, Belgium and Ankara, Turkey in June 1994. Of the six lecturers, only three were from the U.S. He has also been requested to give these lectures at NAWC/China Lake and Army Missile Command/Huntsville.

(5) John S. Weisel - Award: Special Act or Service Award by U.S. Army Strategic Defense Command, Feb 93

(6) Dr. J. R. Goeller - Award: ADPA Bronze Medal Award for Excellence in Undersea Warfare, 19 Nov 92.

(7) Dr. Alan Evans - Award: Selected for 2nd edition of Marquis' "Who's Who in Science and Engineering", Feb 94.

(8) Virginia Curtis - Award: Who's Who Among Students in American Universities and Colleges, 1993-1994

(9) Dr. William M. Farr - Award: Annual Software Measurement Award by Software Quality Engineering, 1991

h. List all governmental awards for research or technical excellence given to members of your technical staff since 1 January 1990.

(1) 1993, A. Glazman - Navy Meritorious Civilian Service Award

(2) 1990-1991, W. Furchak - Naval Scientific Advisory Program Award (NSAP) - Support to Desert Storm

(3) 1990-1991, W. Pugh, W. Blakley - Naval Scientific Advisory Program Award (NSAP) - Theater Support to Desert Storm

(4) 1990-1991, M. Pugh, W. Blakley - Secretary Navy - Certificate of Appreciation Desert Shield and Desert Storm

(5) 1990-1991, M. Pugh, W. Blakley - United States Marine Corp (USMC) Certificate of Commendation Development & Installation of Battlefield IFF Equipment on USMC Vehicles

(6) 1990, R. Staton, K. Krueger, R. Stapleton - Office of Naval Technology Award for Top Accomplishment in the Navy's Exploratory Development Program For FY90. Presented Jan 91 (Point Defense Radar Demonstration System).

(7) 1990, T. Clayton, A. Corda, D. Green, B. Hiles, P. Irey, D. Marlow - Defense Standarization Program Outstanding Performance Award

(8) 1990, D. Marlow - Navy Meritorious Civilian Service Award

(9) 1990, B. Telfer - Office of Naval Research Young Navy Scientist Award (1990-1993), one of only three awarded in 1990 throughout the Navy.

(10) 1991, R. Gibbs - Defense Nuclear Agency Desert Storm Achievement Award (DNA)

(11) 1993, G. Grittner - Navy Meritorious Civilian Service Award

(12) 1993, G. Brown - Navy Civilian Tester of the Year

(13) 1994, R. Gibbs - The Technical Cooperation Program Achievement Award

(14) 1993, PEO(TAD) Commendation for SSDS MK1 Demonstration

(15) SPAWAR Commendation for SCADS Prototype Development

(16) NAVSEA Commendation for $(IC)^2$ Validation and Demonstration

(17) 1991, K. Krueger, R. Stapleton - Chief of Naval Research Certificate of Commendation for Extraordinary Accomplishment in the Navy's 1990 Exploratory Development

Program for major advances in developing radar technology for future shipboard point defense combat systems

(18) Dr. F. G. Moore - Associate Fellow of the American Institute of Aeronautics and Astronautics (AIAA)

(19) 1992, L. M. Williams, III - Navy Superior Civilian Service Award

(20) 1992, C. E. Gallaher - Navy Meritorious Civilian Service Award

(21) 1991, J. Blackwelder, M. Jenkins - PEO(CU): Total Quality Management Award

(22) 1990, BGPHES Program Team - Navy: Navy Award of Merit for Group Achievement for Technical Excellence

(23) 1990-1991, Tactical Computer Systems Branch - U.S. Army XVIII Airborne Corps: Award for technical support in Desert Shield and Desert Storm

(24) 1993, R. S. Pitts, III - NAVY Superior Civilian Service Award in recognition of his outstanding leadership of the Navy's AEGIS Program at NSWCDD.

(25) S. Franklin, P. Hamburger, P. Herron, T. Thaing, W. Stone, J. Sullivan, M. Campbell, G. Miller, D. Burnett, C. Galloway, LT G. Herndon, J. Rech - Received AEGIS Excellence Awards for various technical contributions to the AEGIS Program.

(26) D. Schultz, P. Hamburger - AEGIS Excellence Awards

(27) 1990, J. Clark - MK Torpedo Warhead Advanced Quality Control Award

(28) 1992, J. Clark - Department of the Navy, Desert Shield-Desert Storm Cert

(29) 1992, Dr. J. A. Barnes - Department of the Navy, Meritorious Civilian Service Award

(30) J. Lunney - Navy Unit Citation Award (SSP)

(31) M. A. Cummings - RADM Grace Munrary Hopper Award (NPS)

(32 J. Dooley, J. Lunney, S. Young - Navy Superior Civilian Service Award (SSP)

(33) J. M. Elliott, R. V. Gates, W. M. Horton, Dr. D. W. Lando, H. J. Boyles, W. L. Davis, A. J. Dean, D. D. Duncan - Navy Meritorious Civilian Service Award (SSP)

i. List all patents awarded to the in-house technical staff members of this activity since 1 January 1990.

CASENBR	PAT_#	PAT_ISSUED	TITLE
56451	4951571	08/28/1990	GENERAL PURPOSE LOGIC MODULE
63759	4961383	10/09/1990	COMPOSITE TUNGSTEN-STEEL ARMOR PENETRATORS
70986	4967665	11/06/1990	RF AND DC DESENSITIZED ELECTROEXPLOSIVE DEVICE
63172	4974514	12/04/1990	EXPLOSIVE SAFETY JUNCTIONS
54688	4977323	12/11/1990	360 DEGREE OPTICAL SURVEILLANCE SYSTEM
54686	4980565	12/25/1990	ELECTRO-OPTICAL TARGET ACQUISITION SYSTEM
54617	4982092	01/01/1991	360 DEGREE INFRARED SURVEILLANCE WITH PANORAMIC DISPLAY
63427	4989516	02/05/1991	SAFE EXPLOSIVE DELAY PATH
55987	4992988	02/12/1991	UNDERWATER ACOUSTIC CONTROL SYSTEM

71517	4991513	02/12/1991	SAFETY VENTS FOR EXPULSION SYSTEM CARGO DISPENSING AMMUNITION
63400	4998963	03/12/1991	EXPLOSIVE LOGIC CLOCK
56988	5004183	04/02/1991	A SWITCHED COMPARATOR SCHEME FOR OBTAINING DYNAMIC RANGE
63406	5009162	04/23/1991	EXPLOSIVE LOGIC RESOLVER NETWORK
53735	5014062	05/07/1991	ELECTRONIC PROJECTILE MPACT SPOTTING DEVICE
66215	5022027	06/04/1991	A COMMUNICATION INTERFACE AND SYSTEM FOR RADIATION RECOVERY OF .....
72287	5020400	06/04/1991	WING FOLD TOOL
72337	5021738	06/04/1991	CONTROLLABLE EFFECTIVE DIAMETER EDDY CURRENT PROBE
63426	5022326	06/11/1991	ASYNCHRONOUS EXPLOSIVE LOGIC SAFING DEVICE
72668	5030957	07/09/1991	DEVICE AND METHOD TO DETERMINE RELATIVE GRAVITY VECTOR
72667	5036323	07/30/1991	ACTIVE RADAR STEALTH DEVICE
72700	5095312	03/10/1992	IMPULSE TRANSMITTER AND QUANTUM DETECTION RADAR SYSTEM
73607	5119730	06/05/1992	COMPOSITE SHEET STRINGER ORDNANCE SECTION
66617	5138325	08/11/1992	SHIPBOARD SENSOR EXERCISER (SENSEX)
73659	5145257	09/08/1992	MINIATURE FIBER OPTIC TEMPERATURE SENSOR

73767	5159918	11/03/1992	HOT WATER STORAGE TANK FOR SOLAR COLLECTORS
73773	5214433	05/15/1993	TARGET TRACKING DEVICE
73807	5214483	05/25/1993	DIGITAL LASER RANGE FINDER EMULATOR
74029	5218517	06/08/1993	TRANSLATING WEDGE HEAT SINK
74057	5220328	06/15/1993	TARGET MOTION DETECTING IMPULSE DOPPLER RADAR SYSTEM
74228	5220124	06/15/1993	LAUNCHING SYSTEM
73808	5233902	08/10/1993	SLIDING BREECH-BLOCK ELECTROTHERMAL GUN
72449	5247630	09/21/1993	M-DIMENSIONAL COMPUTER MEMORY WITH M-1 DIMENSIONAL HYPERPLANE ACCESS
74500	5251052	10/05/1993	SYSTEM FOR SOLVING BOOLEAN EQUATIONS USING OPTICAL LOOKUP TABLES
74663	5261300	11/16/1993	WRENCH FOR INSTALLING AN ELECTRICAL CONNECTOR
73238	5276319	01/04/1994	METHOD AND DEVICE FOR IMPROVED IR DETECTION WITH COMPENSATIONS FOR
72302	5278966	01/11/1994	TOROIDAL COMPUTER MEMORY FOR SERIAL AND PARALLEL PROCESSORS
73855	5280287	01/18/1994	CODED IDENTIFICATION AND POSITIONING SYSTEM
74156	5280335	01/18/1994	FIBER-OPTIC TESTING SYSTEM HAVING A DETECTION CIRCUIT
75334	5294936	03/15/1994	RADAR SECTOR BLANKER

75029	**5297227**	**03/22/1994**	**DISENGAGABLE ADAPTER FOR AN OPTICAL FIBER CONNECTOR**
71677	**4892629**	**01/09/1990**	**ELECTROCHEMICALLY PREPARATION OF SILVER OXIDE ELECTRODES HAVING ......**

j. List all patents applied for by the in-house technical staff members of this activity since 1 January 1990.

APPL_MAIL	CASE #	TITLE
		ENERGETIC COMPOSITIONS CONTAINING NO VOLATILE SOLVENTS
01/28/1992	**73750**	**MULTISTAGE DYNAMIC ARMOR**
02/07/1994	**75721**	**INSENSITIVE INITIATING DEVICES**
02/19/1992	**73767**	**HOT WATER STORAGE TANK FOR SOLAR COLLECTORS**
02/12/1993	**74744**	**SELF ADJUSTING OBTURATOR FOR PROJECTILE LAUNCHING**
02/21/1991	**72668**	**DEVICE AND METHOD TO DETERMINE RELATIVE GRAVITY VECTOR**
03/23/1994	**74824**	**PROCESS OF MAKING A BISTABLE PHOTOCONDUCTIVE COMPONENT**
03/20/1992	**74057**	**TARGET MOTION DETECTING IMPULSE DOPPLER RADAR SYSTEM**
03/09/1990	**71517**	**SAFETY VENTS FOR EXPULSION SYSTEM CARGO DISPENSING AMMUNITION**
03/22/1990	**71823**	**MULTISTAGE PENETRATING WEAPON**

03/15/1993	75029	DISENGAGABLE ADAPTER FOR AN OPTICAL FIBER CONNECTOR
04/12/1991	72700	IMPULSE TRANSMITTER AND QUANTUM DETECTION RADAR SYSTEM
04/06/1990	72419	MULTIPLE BIDIRECTIONAL BROADBAND FREQUENCY CABLE TO SINGLE PAIR OPTICAL
04/29/1993	74218	IMPROVED OPTICAL PSEUDOSPARK SWITCH
04/20/1992	73238	METHOD AND DEVICE FOR IMPROVED IR DETECTION WITH COMPENSATIONS FOR
05/31/1991	73660	PORTABLE AIRCRAFT FUEL TANK AIR EDUCTOR
05/20/1992	74156	FIBER-OPTIC TESTING SYSTEM HAVING A DETECTION CIRCUIT
05/06/1992	73808	SLIDING BREECH-BLOCK ELECTROTHERMAL GUN
05/04/1992	73749	I/O INTERFACE BETWEEN VME BUS AND ASYNCHRONOUS SERIAL DATA COMPUTER
05/28/1993	74805	INTERACTING MULTIPLE BIAS MODEL FILTER SYSTEM FOR TRACKING MANEUVERING
05/22/1992	73854	METHOD OF DEFENDING AGAINST CHEMICAL AND BIOLOGICAL MUNITIONS
05/14/1993	75247	PROGRAMMABLE MODULAR NETWORK INTERFACE
05/07/1992	69874	MICROWAVE ABSORBING LAMINATE
05/15/1992	74029	TRANSLATING WEDGE HEAT SINK
06/26/1992	74457	RADIO FREQUENCY CABLE TO OPTICAL FIBER CABLE CONVERTER/INTERFACE
06/12/1992	73773	TARGET TRACKING DEVICE
06/04/1993	75334	RADAR SECTOR BLANKER

06/22/1992	74228	LAUNCHING SYSTEM
06/26/1990	72302	TOROIDAL COMPUTER MEMORY FOR SERIAL AND PARALLEL PROCESSORS
06/29/1992	73855	CODED IDENTIFICATION AND POSITIONING SYSTEM
06/15/1993	75294	GUIDANCE AND METHOD FOR UNTHROTTLED, SOLID-FUEL DIVERT MOTORS
06/15/1992	74240	HIGH PERFORMANCE PULSE GENERATOR
07/31/1991	73606	FRAGMENTING NOTCHED ROD
07/24/1992	74297	ARTIFICIAL NEURAL SYSTEM FOR LOCAL DETECTION OF BOUNDARY MISALIGNMENTS
07/06/1990	72449	M-DIMENSIONAL COMPUTER MEMORY WITH M-1 DIMENSIONAL HYPERPLANE ACCESS
07/07/1993	75331	A NOVEL CROSSEYE SYSTEM AND METHOD
07/31/1991	73608	COMPOSITE FRAGMENTING ROD
07/31/1991	73607	COMPOSITE SHEET STRINGER ORDNANCE SECTION
08/03/1992	73807	DIGITAL LASER RANGE FINDER EMULATOR
08/09/1991	73659	MINIATURE FIBER OPTIC TEMPERATURE SENSOR
08/26/1992	74126	SELF-ORGANIZING NEURAL NETWORK FOR CLASSIFYING PATTERN SIGNATURES
08/04/1992	74059	VARIABLE CYCLE STORABLE FUELS ENGINE
08/28/1992	74500	SYSTEM FOR SOLVING BOOLEAN EQUATIONS USING OPTICAL LOOKUP TABLES
09/04/1992	74869	N-DIMENSIONAL COMPUTER MEMORY
09/20/1991	72945	ARMOR PIERCING WARHEAD WITH PYROPHORIC FOLLOW-THROUGH
09/13/1990	72667	ACTIVE RADAR STEALTH DEVICE

09/11/1992	74842	SOLID FUEL, SINGLE-EVENT FUEL-AIR EXPLOSIVE
09/01/1992	74060	REMOTELY CONTROLLED VEHICLE CONTROL AND INTERFACE SYSTEM
10/23/1992	74663	WRENCH FOR INSTALLING AN ELECTRICAL CONNECTOR
10/12/1993	75495	DYNAMIC ARMOR PROJECTILE CONDITIONING SYSTEM
11/04/1992	73934	CONSTANT FALSE PROBABILITY DATA FUSION SYSTEM
11/23/1993	74359	NON-LINEAR RESISTIVE GRID KERNEL ESTIMATOR USEFUL IN SINGLE FEATURE,
12/10/1991	73768	DYNAMIC ARMOR PROTECTION AGAINST ARMOR PIERCING PENETRATORS
12/16/1991	72871	A PARTICULATE CARRIER FOR FUEL OR ENERGETIC MATERIAL IN A FUEL-AIR
12/02/1993	75602	CRYOGENIC TEMPERATURE CONTROL AND TENSION/COMPRESSION ATTACHMENT STAGE

k. Identify any in-house staff that are members of the National Academy of Engineering.

None.

l. Identify any in-house staff that are members of the National Academy of Sciences.

None.

m. How many Cooperative Research and Development Agreements (CRDAs) have been signed by the activity since 1 January 1990?

Total for NSWCDD is 5. In addition, NSWCDD has over 70 joint ventures with other laboratories, universities, and industries.

n. What has been the activity's annual royalty income from CRDAs and patent licenses for each year since 1 January 1990?

		PATENT ROYALTIES				
FY	$CRDAs	$Tot Rcd		$Awards		$ NSWCDD USE
90	**25,000**	**20,476**	=	**5,000**	+	**15,476**
91	**-**	**5,000**	=	**3,000**	+	**2,000**
92	**17,795**	**5,000**	=	**3,000**	+	**2,000**
93	**13,992**	**5,000**	=	**3,000**	+	**2,000**
94	**8,438**	**6,250**	=	**1,250**	+	**5,000**
TOTALS	**$65,225**	**$41,726**		**$15,250**		**$26,476**

o. List and describe any major end item prototypes, either product or process technology, developed in-house by the activity that are currently in production and/or are currently in use by the U.S. Armed Forces or by industry. Cite a published reference that documents the work.

(1) B - (G. Moore). MK 70 Booster Suppression System was designed and tested at NSWCDL. The system prototype was installed on the USS MAHAN, DDG-42 and all NTU Terrier Missile Ships now have this system installed.

Ref: (a) Moore, G. R., Kordrich, M. M., and Chenard, J. H. CAPT, "Shipboard Explosive Safety and Reliability", Naval Engineers Journal, May 1985.

(2) Guided Missile Launching System MK26 Mods O-5 Blast Protection ORDALT 15720 was jointly designed and tested by NSWCDL and FMC Corporation, Northern Ordnance Division. The System prototype was installed on the USS SCOTT (DDG-995) and is now installed on all NTU Tartar and MK 26 AEGIS Cruiser Missile Ships.

Ref: (a) NAVSEA ltr SWS Technical Instruction No. 2322 FMC No. 037, Ser 6272/3540 of 6 Jan 87.

(3) Guided Missile Launching System MK13 MOD 7 Blast Protection ORDALT 15782 was jointly developed, designed and tested by NSWCDL and FMC Corp., Northern Ordnance Division. The initial ORDALT was installed on the USS CALIFORNIA (CGN-36) in 1992 and is presently completing installation on the USS SOUTH CAROLINA (CGN-37).

Ref: (a) NAVSEA ORDALT 15782 and NSWC ltr 8800 H13-GRM of 19 Feb 88.

(4) B30 - DATA ACQUISITION AND REDUCTION PROCESSOR:

- **May 1992 delivered DARP System to Spanish Navy.**
- **Four (4) DARP Systems currently in use at FCDSSA, Dam Neck, VA.**
- **DARP System currently used in TOMAHAWK Lab, AEGIS Lab, and Shipboard Gridlock System/Auto Correlation (SGSAC) Project at NSWCDD.**
- **Expecting $140K in July 1994 to build DARP System for Royal Australian Navy.**

THE ATTACHED CITES PUBLISHED REFERENCE THAT DOCUMENTS THE WORK.

(a) Combat System Simulation Environment (CSSE). The CSSE was developed by B32 to support the development and testing of the Advanced Self Defense Combat System (ASDCS) ATD. The CSSE consists of a distributed network of high-fidelity sensor, weapon and target environment simulations which run in realtime and employs Defense Mapping Agency (DMA) databases. The CSSE accurately determines target and sensor interaction with the environment. The actual tactical system displays for each of the sensors and weapons are modeled in detail and allow for either operator or automated control.

The following sensors and weapons are currently modeled: MK 23 Target Acquisition System, AN/SPQ-9 (I), AN/SLQ-32, MK 36 Decoy Launching System (DLS), Close-In-Weapon System (CIWS), NATO Seasparrow Surface Missile System (NSSMS), Rolling Air Frame Missile (RAM) System, Infrared Search and Track (IRST) System.

The CSSE will provide the capability to do realistic laboratory testing of the ASDCS. Additionally, the CSSE would have applications in evaluation of combat systems, or training.

Supported by NAVSEA: N0002493WX70026 and N0002493WX70129.

(5) VAPOR, LIQUID AND SOLID TRACKING (VLSTRACK). Model for chemical and biological warfare hazard assessment. Currently in use by Army, Navy, Air Force, DNA BMDO, IDA and others.

(6) MK 15, MOD O OTTO FUEL DETECTOR. This detector is used as a monitor on submarines for leaking torpedo propellent. The propellent's active component, PGDN, is used in the MK 36, MK 47 and MK 48 and is toxic in the closed environment of a sub. The MK 15 detector will detect at a concentration at or below the Threshold Limit Value (TLV) for this chemical.

(7) VEHICLE IFF DEVICE. A specialized device designed to prevent vehicle to vehicle and air to ground vehicle friendly fire. Deployed on all operating USMC units in Desert Storm.

(8) SHIPBOARD COLLECTIVE PROTECTION (CPS). A specialized shipboard ventilation system that prevents entry of CBR contaminants. Installed on DDG-51, LHD-1, LSD-44, AOE-6, and LPD-17 ship classes.

Ref: (a) Pompeii, M., Lamoy, C., and Atwell, C., "Developmental Testing (DT-IIF) of the Collective Protection System (CPS) Aboard USS GUNSTON HALL (LSD-44), "NSWCDD/TR-93/89, NSWCDD, Dahlgren, VA, Apr 93.

(9) SELECTED AREA COLLECTIVE PROTECTION SYSTEM (SACPS). A relatively inexpensive back-fit version of Shipboard CPS used to protect selected spaces on ships (i.e., CIC, C3I, etc.). Installed on FF-1090, CG-27, LHA-2, LHA-4, with more ships to follow.

Ref: (a) LaMoy, C., Culbertson, D., and Pompeii, M., "Development of the

Selected Area Collective Protection System (SACPS)," NSWC TR 91-749, NSWCDD, Dahlgren, VA, Dec 91.

(10) SHIPBOARD CHEMICAL-HAZARD ASSESSMENT GUIDE (C-HAG). A Commanding Officers guide to decision making in a shipboard chemical warfare environment. Reproduced as Appendix A of the Naval Ships' Technical Manual (NSTM), Chapter 470, S9086-QH-STM-000, Shipboard BW/CW Defense and Countermeasures, 1 Sep 91.

Ref: (a) Pompeii, M., "Chemical-Hazard Assessment Guide, "NSWC Technical Report H33/MAP, NSWCDD, Dahlgren, VA, 15 Aug 89.

(11) SHIPBOARD PERSONNEL DECONTAMINATION PROCEDURES. Procedures in use by the fleet for donning and doffing CBR personnel protective equipment. Reproduced as Section 4.5 of NSTM Chapter 470, S9086-QH-STM-000, Shipboard BW/CW Defense and Countermeasures, 1 Sep 91.

Ref: (a) Pompeii, M., "Shipboard Personnel Chemical Decontamination Procedures, "NSWC Technical Report H33/MAP, NSWCDD, Dahlgren, VA, Nov 88.

(12) CHEMICALAGENT POINT DETECTION SYSTEM (CAPDS). An automatic nerve agent detection system installed on all major Navy warships.

Ref: (a) NSWC Technical Report, Dahlgren, VA 22448

(13) NAVY CHEMICAL PROTECTIVE OVERGARMENT (CP0). The standard chemical protective suit in use by all Navy ships and shore facilities.

Ref: (a) NSWC Technical Report, Dahlgren, VA 22448

(14) MCU-2/P PROTECTIVE MASK. The standard CBR protective mask in use by all Navy ships and shore facilities.

Ref: (a) NSWC Technical Report, Dahlgren, VA 22443

(15) Airborne Electronic Support Measures (ESM) Analysis System (AEDAS) and Airborne Reconnaissance Integrated Electronic System (ARIES II) for EP-3Es in VQ1 and VQ2. ARIES II-SP-VDD(B019)-00-06/92

(16) Ground Support System (GSS) to support EP-3E ESM ground processing. ARIES II-GSS-VDD(5.4)-00-04-93

(17) Shipboard Gridlock System (SGS) and Shipboard Gridlock System with Auto Correlation (SGS/AC) computer programs.

Ref: (a) AEGIS Ships Ref: NSWCDD ltr 9000, N25-WHC of 15 Apr 94
(b) Non-Aegis Ships Ref: NAVSEA ltr 9401, Ser 91K/100 of 8 Mar 94.

(18) MK 34 Mod O Gun Weapon System for DDG 51 Class Ships. Current Baseline Computer Program Performance Specifications TW221-GC-PSP-010/MK34/0 REV2 and TW221-GC-PDP-010/MK34/0 REV 2

(19) AN/FYQ-17 Rapid ASM Integrated Defense System (RAIDS) currently in initial production for FFG7 and DD963 Class Ships.

Ref: (a) Acquisition Strategy Report of 23 Sep 93

(20) EX 167 MOD 0 RF-Insensitive Electric Primer replacement for DoD 20mm gun ammunition. Improves safety and eliminates Fleet restrictions on PHALANX Gun System.

Ref: (a) NAVSEA Drawing No. X6261477, "Primer, Electric, RF-Insensitive, EX 167 MOD 0"

(21) Dahlgren Bridge Attenuator for 2.75" rocket. Used to replace MK4/MK40 rocket motors. Improved safety.

Ref: (a) NWL Technical Note TN-F-65, "An Investigation of the Dahlgren Bridge Filter," 30 Jun 70

(22) NSWC AEROPREDICTION CODE. The NSWC aeroprediction code has been produced in five versions since 1972. The latest version, produced in FY 93 and named AP93, has been requested by and transitioned to 53 US government contractors, US government agencies, or universities. Several foreign countries are attempting to buy this code through the FMS office. The fourth version of the code (AP81) was transitioned to over 60 US agencies and seven foreign countries. The code is one of the best in the world for obtaining aerodynamics rapidly, cheaply, and with reasonable accuracy.

Ref: (a) Moore, F.G.; Hymer, J.C.; McInville, R.M., "Improved Aeroprediction Code: Part I - Summary of New Methods and Comparison with Experiment", NSWCDD TR-93/91.
(b) Moore, F.G.: McInville, R.M.; Hymer, T.G.: "Improved Aeroprediction Code: Part II - Computer Program User's Guide and Listing", NSWCDD TR-93/241, Aug 93.

THE FOLLOWING IS A LIST OF MAJOR IN-HOUSE VLS PROTOTYPES.

(23) Incorporation of additional ablative into the aft end of the MK14 TOMAHAWK Missile Canister for protection against canister damage during a restrained rocket motor burn in VLS: NSWCDD designed and documented the modification and prototyped it in conjunction with the contractor prior to Engineering Change Proposal (ECP) approval and release for production.

(24) Incorporation of baffles into the aft end of the MK15 VLASROC Missile Canister for prevention of upper canister overpressure and reduction of lower canister cable damage during missile flyout or during a restrained rocket motor burn in VLS: NSWCDD designed and documented the modification and prototyped it in conjunction with the contractor prior to ECP approval and release for production.

(25) Incorporation of support and restraint hardware for transport of MK14 VLS encanistered TOMAHAWK missiles in a converted Submarine Tender: NSWCDD

defined a design, documented it on Navy drawings and provided the drawings to Charleston Naval Shipyard.

(26) Vertical Launching System Support of TOMAHAWK Weapon System Development: Since 1984, G21 personnel have continuously supported the development of the vertical launch surface ship TOMAHAWK Weapon System (BLKs 0, I, II, III) by installing, tactical/simulation equipments in the TOMAHAWK laboratory at NSWCDD. They have also provided considerable assistance in the resolution of VLS problems encountered during system level testing. G21 efforts have provided a significant contribution to the success of the TOMAHAWK program.

(27) Support of Vertical Launching System Missile Simulator Development: Since 1982, NSWCDD G21 personnel have continuously supported the development of missile simulators for use with the Vertical Launching System (VLS) by specifying requirements, conducting design validation testing and investigating reported problems. Included among these are three generations of Interface Test Sets (ITS), two major upgrades of VLS Operational Test Sets (VOTS) and multiple baselines of Missile Echo Cards (MEC) and Missile Echo Units (MEU). G21 efforts have provided a significant contribution to the successful development and use of a variety of missile simulators in support of VLS installation and testing.

(28) Development of a VLS canister Coding Plug: NSWCDD G21 VLS personnel, in conjunction with Naval Research Laboratory (NRL) personnel, designed and developed a 16 bit reconfigurable coding plug that is presently included in all VLS canisters (MK13, MK14, MK15, MK21, and MK22). The coding plug is connected to the canister cable assembly when the missile is loaded and provides the following functions: (1) identifies the type of missile contained in the canister, its payload, and its down link frequency code; (2) inventory of missile identifications performed by launch control computer program at the Launch Control Unit; (3) inventory is sent to the Weapons Control System upon request. NSWCDD G21 VLS personnel designed, fabricated, environmentally tested, electrically tested, and produced the technical data package for the Coding Plug (NAVSEA DWG. 6264000) which was placed in production in 1987. The Coding Plug is still being produced and used in every VLS canister.

(29) **Development of a Module Cell Fit Check Tool: NSWCDD G21 VLS personnel designed a Fit Check Tool, Canister Adapter/Cell Cover (NAVSEA DWG 6387335) for the purpose of tracking modules from the manufacturers to the shipyard so that a determination could be made as to how VLS modules were becoming twisted. The Navy/Manufacturers were concerned about whether this was happening during the process of hauling, loading/unloading from the shipping trailer, or during installation aboard ship. The Fit Check tool was designed by NSWCDD G21 VLS personnel and the technical data package was developed by MMA&NS in late 1991 and signed off by NSWCDD the same year. A sub-contractor produced the tool and delivered it to MMA&NS in July 1992. NSWCDD and MMA&NS participated in dimensional check and fit test of the tool prior to use in module dimensional testing.**

(30) **MK15 Snubber Shear Pin Redesign: NSWCDD G21 performed an analysis that resulted in the determination that the MK15 snubber shear pins were excessively strong and would not shear under all flyout loading parameters. G21 analyzed effects of using a weaker pin to resist non-flyout vibration and shock loads. G21 worked with United Defense, Martin Marietta, and LORAL in defining pin strength and testing the hardware.**

(31) **PHOENIX MISSILE WARHEAD (WDU-29B): The fragmenting warhead currently in the PHOENIX missile.**

Ref: (a) NSWC TR-87-99

(32) **SPARROW MISSILE WARHEAD (WAU-17B): The fragmenting warhead currently in the SPARROW missile.**

Ref: (a) NSWC TR-86-155 (unpublished)
(b) NSWC MP-80-270
(c) NSWC MP-80-310

(33) **STANDARD MISSILE WARHEAD (MK 115 MOD 0): The fragmenting warhead currently in the fleet for the STANDARD missile. This has older explosive and is**

being phased out as assets are used.

Ref: (a) NAVSWC MP 90-217
(b) NSWC MP 81-278
(c) NSWC TR 82-479
(d) NSWC TR 81-376

(34) STANDARD MISSILE WARHEAD (MK 115 MOD 1): The fragmenting warhead currently in the fleet for the STANDARD missile.

Ref: (a) NSWC TR 89-139
(b) NAVSWC TR 90-53

(35) FRAGMENTATION WARHEAD OF MODULAR CONSTRUCTION: United States patent 4,781,117, used in current warhead.

(36) STANDARD MISSILE WARHEAD (MK 125): The fragmenting warhead currently entering service in the STANDARD missile.

Ref: (a) NSWC TR 89-113
(b) NSWC MP 89-61
(c) NSWC MP 89-59

(37) BULLPUP A WARHEAD: The MK19 MOD O warhead currently used (in slightly modified form) in the PENGUIN missile.

Ref: (a) NWL-7-43/59
(b) NWL Report No. 1864

(38) BULLPUP B. WARHEAD: The WDU 25/B warhead (in slightly modified form) used in the TOMAHAWK missile system.

Ref: (a) NWL Report No. 1785

(39) WHDEVAL - This simulation is a high fidelity end-game program which is used to evaluate the interaction of a fragmenting warhead and a aerial target. The program requires detailed warhead and target vulnerability data as inputs, and produces estimates of weapon system effectiveness. The simulation is used for warhead design trade studies and performance disclosure of weapon systems. WHDEVAL is the STANDARD Missile program's primary end-game effectiveness assessment simulation.

(40) WHDHIT - An end-game simulation derived from WHDEVAL and used by all STANDARD Missile agencies including the Applied Physics Laboratory, the Naval Air Warfare Center's Weapons Division in China Lake, Raytheon, and Hughes. The simulation is used by these centers to evaluate the impact of planned system design changes on weapon performance.

(41) FASTGEN - This simulation is used to assess an aerial target's vulnerability to fragmenting warheads by tracing fragment shotline intersections with a geometric computer representation of the target. This simulation is officially sanctioned by the Joint Technical Coordinating Group for Munitions Effectiveness, a DOD tri-service organization. It is also used by the Denver Research Institute, the New Mexico Institute of Mining and Technology, and Oklahoma State University.

(42) COVART - A target vulnerability simulation incorporating equations describing the penetration of warhead fragments into a target vehicle. Principally applied to aerial threats, the simulation determines the damage to threat subsystems attributable to each fragment intersecting the target and provides and overall summary of estimated probability of kill. This simulation is officially sanctioned by the Joint Technical Coordinating Group for Munitions Effectiveness, a DOD tri-service organization. It is also used by the Denver Research Institute, the New Mexico Institute of Mining and Technology, and Oklahoma State University.

(43) FATEPEN2 - This simulation incorporates penetration methodology for warhead fragments against a variety of air and surface targets. Major users of the simulation include: Naval Air Warfare Center's Weapons Division in China Lake,

MICOM, Army Research Laboratory's Survivability/Lethality Analysis Directorate, Wright Laboratory at Eglin AFB and Wright Patterson AFB, Defence Research Agency in the United Kingdom, the Materials Research Laboratory in Australia, IABG in Germany, and the Boeing Company.

(44) HISVART - This air target vulnerability assessment code is the "next generation" version of COVART. This advanced code allows the assessment of vulnerability due to fragments and debris striking internal target components along individual shotlines, and includes the ability to examine the effects of debris striking components on adjacent shotlines. Major users of the simulation include: Naval Air Warfare Center's Weapons Division in China Lake, MICOM, Army Research Laboratory's Survivability/Lethality Analysis Directorate, Wright Laboratory at Eglin AFB and Wright Patterson AFB, and the Defence Research Agency in the United Kingdom.

(45) WHDET - This simulation incorporates a methodology for predicting the vulnerability of cruise missile type warheads to impact by defensive warhead fragments. The simulation's focus is on prompt detonation of the threat warhead. Major users of WHDET include the Naval Air Warfare Center's Weapons Division in China Lake, and MICOM.

(46) PROTOTYPE SHIPBOARD MISSION PLANNING AND CONTROL SYSTEM. (PS-MPCS) for UAV. The prototyping and shipboard demonstration of the short range UAV is documented in the DoD UAV Master Plan of 31 Mar 93. Funding document N0001993WX8NCPD cites the tasking to NSWCDD. Based on the results to date with the prototype, funding is in work for NSWCDD in FY94 to start efforts to add the additional functionality to turn the prototype into a production system.

PS-MPCS is a TAC-3 computer based system that controls the mission planning, launch, flight, and recovery of a shipboard launched UAV, and the integration of its sensor data into the combat system.

(47) ELECTRONIC TOMAHAWK EMPLOYMENT PLANNING PACKAGE (ETEPP). This NSWCDD developed prototype is in use in the fleet, and is also

undergoing full-scale development for production, as cited in NSWCDD document MP-93/057 (System Specification for the production system). In addition, funding document N0001993WX8EBMP cites the computer equipment purchase to outfit 150+ ships; the computers are being used at present to run the prototype software and will be used later in FY94 to execute the production software.

ETEPP is a PC-based computer system for automated storing, querying, editing, and printing of TOMAHAWK missions. It replaces the hard-copy books containing similar information.

(48) ADVANCED TOMAHAWK WEAPON CONTROL SYSTEM (ATWCS), PHASE II. The Launch Control Functionality for the ATWCS has been prototyped by NSWCDD, and based on the results of demonstrations to fleet personnel and to sponsors, approval is expected in late FY94 to evolve it into a production function to satisfy the new Operational Requirements Document for Advanced TOMAHAWK Weapon Control System (ATWCS) of 20 Apr 94. Funding document N0001993WX8B08R cites tasking to NSWCDD to develop the prototype. The effort is also documented in a draft Technical Report dated Jun 94 entitled "Real Time Analysis of TAC-3 for ATWCS Phase II".

ATWCS Phase II Launch Control Functionality is an NDI based computer software system to control the selection and launch of TOMAHAWK missiles from surface and sub-surface platforms. It will replace the present militarized computer capability with a higher performance, windows based, state-of-the-art function.

(49) GRAPHICS WORKSTATION UPGRADE (GWU) and VMI EMULATOR. SPAWAR Task Statement letters Ser PMW 161-11A2/0188 of 5 Oct 92 and Ser PMW 161P8/122 of 28 Sep 93 (and associated funding documents) tasked NSWCDD to develop a prototype to replace the outdated graphics and alpha-numeric workstation terminals in the Ocean Surveillance Information System (OSIS) Baseline Upgrade (OBU). The GWU prototype was fielded for operational use early FY93 and the VMI Emulator prototype was fielded in early FY94. The work is documented in NSWCDD rpt 3883/OSIS of 13 Jan 93, and NSWCDD rpt 3883/OSIS of 27 Jan 94, respectively.

(50) ASW Control System MK 116 MOD 7 Builds 8 and 9 tactical operational software are being used on Surface Combatants. Work documented by PEO-USW/PMO411 Task Instructions and NSWC generated PPSs, Version Description Documents and Operational Guidelines.

(51) Tactical Decision Support Subsystem (TDSS) Prototype currently being used on two Surface Combatants (DD 963 Class). Work documented by Software Documentation and Specifications prepared for the productization of the prototype.

(52) ASW Simulation & Stimulation Systems currently being utilized by Westinghouse and Navy Training Facilities. Work documented by Operator Manuals and Software Specifications and Descriptions.

(53) Fourteen AEGIS Weapon System and ASW Computer Program Baselines

(54) AIR GUN CAPABILITY. In response to fleet requests from Mid-east deployed AEGIS cruisers for a capability to fire the MK86 5" Guns at incoming air targets, we developed a rapid upgrade to allow manual hand-off of STANDARD Missile engagements to the Gun Weapon System. This provided a capability to use guns to fire warning shots or to engage targets when use of missiles was not practical or limited by Rules Of Engagement. System is currently deployed on AEGIS cruisers CG-47 through CG-58. Our prototype system was later expanded into an automated system that was incorporated into AEGIS Weapon Systems still under development and all future systems.

Ref: (a) Weapon Specification 10555/1B Specification Change No. 70053A of 25 Aug 87
(b) Weapon Specification 10553/2A of 1 Aug 92

(55) SARTIS. The Iranian Airbus incident involving the AEGIS cruiser, USS VINCENNES, identified a need for a more reliable way to discriminate between non-cooperative civilian and military aircraft. Following this incident we developed an experimental program to integrate into the AEGIS Weapon System a tri-service prototype device that could provide aircraft identification. The device later was

called Shipboard Advanced Radar Target Identification System (SARTIS). This experimental system provided ships with target ID using the ship's missile Fire Control System (FCS) CW illuminators. The experimental system was successfully demonstrated in at-sea trials on the USS SAN JACINTO (CG-56) and subsequently was expanded into a fully integrated production version in AEGIS cruisers, CG-47 through CG-51. SARTIS identification of tracks was a significant contributor to recent Joint Air Defense Operation/Joint Engagement Zone (JADO/JEZ) operations.

Ref: (a) For the Experiment: Test Report For AEGIS Weapon System (AWS)/Non-Cooperative Target Recognition (NCTR) (U), SECRET, 2 Oct 89, Naval Surface Warfare Center, Weapons Direction Systems Branch (G71), Dahlgren VA 22448
(b) For production: AN/UPX-34(V), Technical Evaluation Quick Look Report
(U), SECRET/NOFORN, 5 Nov 93, Naval Electronic Systems Engineering Activity (NESEA), Code 2113
(c) Weapon Specification 10553/2A of 1 Aug 92

(56) AIR CONTROL UPGRADE. AEGIS Air Control upgrade capability was an important feature in the Desert Storm Air Control operations. This capability provides the AEGIS air control officers with the ability to vector more of our aircraft to enemy aircraft. The upgrade doubled the number of aircraft that could be controlled by AEGIS ships using Link-4A communications. In addition, this upgrade removed pairing limitations from the original AEGIS design which restricted the console assignments and numbers of aircraft each shipboard operator could control.

Ref: (a) Weapon Specification 10555/1B Specification Change Nos. 70075 and 70072 of 20 Oct 87
(b) Weapon Specification 10553/2A of 1 Aug 92

(57) TRIAL TRACK. The Air Tactical Control Operator on an AEGIS ship receives data on submarine positions from various sources. This may be electronic or voice data. He uses this data to locate submarines and estimate future position. This

position is used to direct his LAMPS Helo pilot for further localization or to launch torpedoes. At times when the ASW surveillance system has no track on the actual submarine the operator must use a manual method that is tedious and not very accurate. Being produced is a new feature which allows the shipboard operator to get a computer generated trial solution for a course, speed and predicted position of a suspected subsurface track. These tracks can then be transformed into tentative manual tracks for possible prosecution with weapons systems. This will be first deployed in AEGIS cruisers, CG-52 through CG-64.

Ref: (a) Weapon Specification 10555/7 Specification Change No. 571337 of 26 May 93
(b) Weapon Specification 10553/5 w/SCN 2 Specification Change No. 71355B of 2 Mar 94

(58) SONOBUOY ENTRY. On AEGIS ships, sonobuoy data is critical for the generation of accurate tracks, used to locate and monitor or to attack submarines. During a mission P3 aircraft drop these sonobuoys at intervals that are short enough to prevent the AEGIS shipboard operator from entering all of them into his data base. The primary cause of this loss is the long set of required console entries. A much improved and simplified method of entering sonobuoy deployment and parametric data is being currently produced. This replaces a labor intensive process of entering data on sonobuoys deployed in support of ASW missions. This will be first deployed in AEGIS cruisers, CG-52 through CG-64.

Ref: (a) Weapon Specification 10555/7 Specification Change No. 571336 of 2 Jun 93
(b) Weapon Specification 10553/5 w/SCN 2 Specification Change No. 70906.1 of 2 Jun 93

(59) RAPID LAUNCH ENABLE. Rapid Launch Enable Prototype for the Vertical Launching System (VLS) Launch Control Computer Program. The launch enable signal is a signal which must be present in order for VLS to launch a missile. A problem currently exists between the AEGIS Weapons Control System and VLS on CG-47 and DDG-51 class ships which, under certain situations, may cause up to a 20 second delay in launching missiles. This delay is due to the way VLS reports

the presence of the launch enable signal. The Rapid Launch Enable Prototype reports the presence of the launch enable signal quick enough so that the AEGIS Weapons Control System will never be delayed more than approximately 2-3 seconds in launching missiles.

Ref: (a) Naval Surface Warfare Center, Dahlgren Division Technical Report TR 93/563

(60) JOINT INTEROPERABILITY IMPROVEMENTS. As a result of Desert Storm and other fleet feedback reports, interoperability improvements including IFF/SIF enhancements, SCRAM processing, ID Conflict reduction and others have been incorporated into the Baseline 1.4.1 (CG47-51) computer program and are planned for all AEGIS baselines. These improvements were successfully demonstrated in an experimental version during November 1993 AEGIS/PATRIOT tests and further demonstrated in the tactical computer program during the March 1994 Joint Air Defense Operations/Joint Engagement Zone (JADO/JEZ) Near Land Test.

Ref: (a) Weapon Specification 10553/2A SCN 1 of 15 Sep 93

(61) PPI PATTERNS. As a result of fleet feedback, including Desert Storm Lessons Learned, a minimal capability to display patterns (including operator drawn OPAREAS, maps, airways, etc.) has been incorporated into the Baseline 2.9/3.3 computer program (CG52-64), which will be delivered to the fleet in early 95. Substantial core reduction and a detailed analysis was required to implement this capability into the core restricted AN/UYK-7 computer program.

Ref: (a) Weapon Specification 10553/5 w/SCN 2 Specification Change Nos. 71525A of 15 Dec 93

(62) Q-32/LAMPS/OBT TRAINING TRACK INTEGRATION. As a result of upgrades to EW training capabilities, modifications were incorporated into the C&D Baseline 2.9/3.3 (CG52-64) computer program to provide for integrated training with the baseline introduction into the fleet in early 95.

Ref: (a) Weapon Specification 10553/5 w/SCN 2 Specification Change No. 71363B of 2 Mar 94

(63) MK 50 UPGRADE. As a result of the introduction of the Mk 50 torpedo into the fleet and its potential threat to surface platforms, C&D designed and implemented into the tactical computer program Mk 50 improvements. This included an appropriate modification to the NOTACK Zone for both the Mk46 and Mk 50 torpedoes. This design will be initially introduced into the fleet in 1995 with Baseline 2.9/3.3 (CG52-64) and 5.2 (CG65 and up).

Ref: (a) Weapon Specification 10553/5 w/SCN 2 Specification Change No. 71349C of 16 Mar 94

(64) GLOBAL POSITIONING SYSTEM INTEGRATION. The capability was incorporated into the Baseline 1.4 computer program (CG47-51) with associated equipment upgrades to accept position and velocity data from either the WRN-5 or GPS. This provides improved accuracy due to increased frequency of satellite updates and improved precision in the GPS system, greatly enhancing the capabilities of the AEGIS fleet.

Ref: (a) Weapon Specification 10553/2A of 1 Aug 92

(65) SPY DOCTRINE/STATUS DISPLAYS. These upgrades incorporate an improved human-computer interface to provide a coherent radar doctrine/status picture throughout CIC (ADS, C&D, and SPY consoles). It includes upgraded displays for new SPY radar capabilities and was initially incorporated in Baseline 1.4 (CG47-51).

Ref: (a) Weapon Specification 10553/2A of 1 Aug 92

(66) IFF IMPROVEMENTS. As a result of a confidential analysis of MOBILE SEA RANGE EXERCISE 94-1, firing events for USS ARKANSAS (CGN 41), USS ANTIETAM (CG 54), and USS CHANCELLORSVILLE (CG 62), and based on the use of automated data reduction programs generated by NSWCDD, IFF improvements have been identified which are being incorporated in the Baseline

5.0.Y (Dec 94) and future computer programs.

Ref: (a) AEGIS Data Analysis of Mobile Sea Range Exercise 94-1 Pacific Missile Test Center, Point Mugu, CA, 2 Nov 93, AEGIS Document - 94/3 (U)

(67) DESERT STORM IMPROVEMENTS. As a result of Operation Desert Storm Lessons Learned, which addressed over 1600 observations from operations personnel in the areas of equipment, computer programs, combat system operational procedures, and training, a number of upgrades have been incorporated into all AEGIS Computer Programs. These include Display, Interoperability, ID/IFF, HCI, and Training improvements. The fleet introduction of these improvements occurred in 1993.

Ref: (a) DESERT STORM: Analysis of AEGIS Operations, TR-91/265
(b) DESERT STORM: Analysis of AEGIS Operations; Second Addendum - NSWCDD TR 92/427, Apr 94

(68) TACTICAL BALLISTIC MISSILE DEFENSE. The requirements for development of the Tactical Ballistic Missile Defense (TBMD) Initial Operational Capability (IOC) in AEGIS have been identified and incorporated into a series of three fleet experiments, each adding capability, prior to the first operationally deployable program currently scheduled for 1997.

Ref: (a) Operational Requirements Document for AEGIS Battle Management/Command, Control and Communications (BM/C3) MP-94/131
(b) Battle Management Command, Control and Communications (BMC3) Function Descriptions and AEGIS System Impacts/PMS 400B51 of 30 Aug 93

(69) AUTO-ID 1990-91. The Auto-ID System provides automatic identification of friendly and hostile air tracks for Naval units during Battle Group Operations. N22 supported the experimental integration of AUTO ID into the AEGIS Combat System. This experiment provided an assessment of the value added to the

identification process from incorporation of the features of the Auto ID system. The C&D computer program modifications were completed, but shipboard tests were not executed due to budget restrictions. However, information obtained from this experiment is being incorporated into the design for the AEGIS ID Upgrade currently targeted for Baseline 6.

Ref: (a) AutoID/AEGIS Critical Experiment Functional Description, FS-90-101 of Dec 91

(70) TRACK LOAD CONTROL. Model used real C&D track data to evaluate the effectiveness of design options for track load control, eventually identifying the optimum design. That design has been incorporated into Baseline 5 Phase II and will be delivered to the fleet in 1995 for evaluation prior to deployment in 1996.

Ref: (a) Weapon Specification 21253/3 w/Specification Change No. 2010 of 1993

(71) DOCTRINE COMPARE. Prototype system to determine the feasibility to automatically (in real-time) compare C&D and SPY doctrine parameters and provide operator alerts if the active doctrines are incompatible. This safety feature will ensure that the coverage provided by the AEGIS system accomplishes the operational requirements. The system went through several iterations to determine the optimum design which has been incorporated into the baseline 5 Phase II computer program and is scheduled for fleet introduction in 1995/6.

Ref: (a) Weapon Specification 21253/3 w/Specification Change No. 2009 of 1993

(72) COMMAND SUPPORT AT SEA EXPERIMENT. The Command Support at Sea Experiment (CS@SE), was installed and integrated into the shipboard environments of AEGIS cruisers (USS ANTIETUM and USS LEYTE GULF) and an aircraft carrier (USS AMERICA). The CS@SE provides experimental advanced graphics displays (color large screen displays and operator console color displays) in the combat information center (CIC) to prototype potential command support capabilities in an at-sea environment. These prototype displays validate and refine requirements for planned production system upgrades. Findings from the usage of

the experimental computer programs have impacted AEGIS baselines 1.4, 2.9, 3.3, and 5 for the AEGIS Display System and the Tactical Graphics Capability.

Ref: (a) ASNE Paper of May 1990
(b) Weapon Specification 19710 of Jan 1994

(73) TACTICAL GRAPHICS CAPABILITY (TGC) HUMAN COMPUTER INTERFACE MODEL. **Complex database queries and graphical menus are incomprehensible from software requirements specifications. A model of the HCI of the TGC computer programs requirements specification provided AEGIS engineers with a visual, graphical representation of the menus for the query of the Naval Intelligence Database (NID) and allowed N91 engineers to provide technical recommendations for TGC computer program changes in Baseline 5 Phase III (currently under development by Martin Marietta, targeted for fleet introduction in FY96).**

Ref: (a) Baseline 5 Phase III Preliminary Design Review Data package for Software Requirements Specification for Tactical Graphics Capability and for Interface Design Specification for Tactical Graphics Capability and Host Computer Envelope Messages, 15 Apr 93
(b) Naval Surface Warfare Center, Dahlgren Division, AEGIS Technical Program Review of 6 Jan 94, Briefing package "Tactical Graphics Capability Human Computer Interface Model Demonstration"

(74) AEGIS ENGINEERING REPLAY. **For Desert Storm Analysis, N91/ AEGIS Display System developed a replay capability for Baselines 1 and 2 based upon the GE Baseline 3 replay design. By participating in analysis of Desert Storm information gathered from AEGIS ships (using the Replay Capability), N91 personnel provided technical recommendations for computer program design upgrades.**

Ref: (a) Naval Surface Warfare Center, Dahlgren Division, Combat Systems Department, DESERT STORM: Analysis of AEGIS Operations; Second Addendum of Apr 94
(b) Naval Surface Warfare Center, Dahlgren Division, Combat Systems

Department, DESERT STORM: Analysis of AEGIS Operations (U) of Jul 91 (SECRET)

(75) MAP DATA BASES. In 1991, N91, AEGIS Display System produced a polygonized version of the ADS Map Data Base to support color display capabilities in ADS Baseline 4 computer programs. The data base also includes upgraded polar map data which was included as an upgrade to the ADS Baseline 1.4. A workstation display program was developed and is being used by AEGIS Combat Training System and the High Performance Distributed Processing experiments.

Ref: (a) Weapon Specification 19690/1, of Nov 90
(b) Weapon Specification 19690/2, of Oct 91
(c) American Society of Naval Engineers paper, May 90 issue

(76) COMBAT DIRECTION SYSTEM DISTRIBUTED ARCHITECTURE & HIGH PERFORMANCE DISTRIBUTED ARCHITECTURE (HiPer-D). N22 (now N91) supported the joint N35/N22 distributed architecture experiment through several design reviews to final demonstration. This experiment was intended to evaluate the concept of a distributed architecture in a shipboard combat system. HiPer-D is a joint project between GE (now Martin Marietta), Johns Hopkins/Applied Physics Laboratory, and NSWCDD. N91 provided extensive inputs into the system definition of NSWCDD portion of this project, the AEGIS Air Engagement Controller (AEC) and have generated several detailed specifications for the computer programs. Findings from these continuing experiments will impact AEGIS baselines 6, 7 and the Navy's 2003 ships.

N91 is also doing timing studies of C&D's Baseline 4.2.5 program with plans to compare to the timings of the HiPer-D AEC programs in Ada. Results of these studies will assist AEGIS in establishing requirements for timing of AEGIS baselines 6, 7 and after.

Ref: (a) Naval Surface Warfare Center, Dahlgren Division, Combat Direction System Branch, Interface Specification for the High Performance Distributed Computing Experiment (Integration One), of 19 Apr 93

(b) Naval Surface Warfare Center, Dahlgren Division, HiPer-D IPR 2 report, of 14 Dec 92

(77) AEGIS COMMENT MANAGEMENT SYSTEM (ACMS). The ACMS is used to establish and maintain control of the large number of questions, issues, and action items identified by AEGIS Element review teams during formal design reviews for AEGIS ship combat system baselines. The ACMS provides a consistent vehicle for the originations, transmission, disseminations and configuration management of AEGIS design review questions and issues. This system has transitioned from a single N22 (now N91) user to the entire AEGIS Navy Review Team. Improvements that the ACMS provides are streamlining the work effort required by participants in the design review process and in making the large amount of information generated during the design review process more accessible, understandable, and manageable. The current use of this system has impacted C&D, ADS, and TGC for Baseline 5 Phase I, Phase II, and III.

Ref: (a) Naval Surface Warfare Center, Dahlgren Division, Combat Direction System Branch, AEGIS Comment Management System User's Guide, v2.17, of Jan 94

(78) LONG RANGE TARGET DECISION AID. In support of the Standard Missile II Block IV, Martin Marietta proposed a Long Range Target Decision Aid for AEGIS Display System displays for determining long range orbiting targets. After N91 modeled the proposed design, actual target data was used to determine whether the aids would be useful to the operator. Using this model, N91 was able to identify those portions of the design which would provide useful data. Technical recommendations resulted in design upgrades for the ADS Baseline 5 Phase I computer program.

Ref: (a) Weapon Specification 10628/1, of 28 Feb 92

(79) DITEG/DUMP COMPARISON PROGRAM. AEGIS Display System personnel wrote an analysis tool in C to compare a dump of the Digital Tevelision Generator (DITEG) refresh memory data to a core dump of ADS. Then a Pascal program was used to plot the map contents of the DITEG on to a personal computer. These

programs were used in analyzing a problem aboard the USS MONTEREY (CG 61) in 1992.

Ref: (a) Naval Surface Warfare Center, Dahlgren Division, Combat Systems Department, N22-BCL Memo of 7 Dec 92 on USS MONTEREY (CG 61) Diteg problems.

(80) COMPUTER SYSTEMS ARCHITECTURE CONCEPTS FOR FUTURE CS. This is an effort to establish systems architecture concepts for the combat system of the 2010-2030 timeframe that satisfy the needs of the next generation of surface combatants. It builds upon the current AEGIS computer systems architecture, expanding that architecture while preserving, and adhering to, the AEGIS fundamental principle of thorough system engineering, dedicated to maintaining a well integrated, highly reliable, and easily operable combat system. N91 personnel provided inputs to a paper.

Ref: (a) American Society of Naval Engineers paper, May 1990 issue

(81) AEGIS COMPUTER PROGRAM PROCESS IMPROVEMENT. An initial step in the formal process to improve the Computer Program Maintenance Methodology was begun by the AEGIS Program at the NSWCDD in 1990. A committee of personnel from each of the AEGIS Elements and system disciplines provided a model of the AEGIS computer program development process. This effort progressed into the AEGIS software engineering process which represents the formal delineation of the software engineering processes as defined by the Software Engineering Process Group (SEPG) of the AEGIS Program. The purpose of this effort is to document a standard for the AEGIS software engineering process conducted at the NSWCDD. It provides guidance and information about practices and procedures and a model of the process.

Ref: (a) Naval Surface Warfare Center, Dahlgren Division, Combat Systems Department, MP-93/85 AEGIS Document-93/1, Aug 93
(b) Naval Surface Warfare Center, Dahlgren Division, Combat Systems Department, MP-91/19, 1991

(82) SATRACK II is an instrumentation and analysis system that provides weapon system accuracy evaluations for the TRIDENT II D5 fleet ballistic missile development and operational flight tests. In support of SATRACK II, the Space and Geodesy Branch (K12) provides precise NAVSTAR Global Positioning System (GPS) orbit, clock, and covariance estimates to the Applied Physics Laboratory (APL) of the Johns Hopkins University. In addition, NSWCDD regularly provides APL an assessment of these orbit, clock, and covariance estimates.

Ref: (a) "Estimating GPS Orbits, Clocks, and Covariances in Support of SATRACK II", NAVSWC TR 91-539, Cunningham, James P. and Curtis, Virginia L.

(83) OMNIS Orbit Computation Software System developed for use by the Defense Mapping Agency for their operational orbit computation requirements (GPS & Transit).

Ref: (a) Requirements document NSWC TR84-173 of Nov 1984
(b) "GPS Orbit/Clock Estimation Based on Smoothed Pseudarange Data from a Ten-Station Global Network", by Everett R. Swift
(c) Proceedings of the IUGG General Assembly IAG Symposium G-2- Permanent Tracking Networks for Geodesy and Geodynamics, held in Aug 1991 in Vienna, Austria
(d) "Mathematical Description of the GPS Multisatellite Filter/Smoother", by Everett R. Swift, NSWCTR 87-187, Oct 1987.

(84) NSWCDD Global Ocean Tide Model.

Ref: (a) NSWC TR 81-254 "The NSWC Global Ocean Tide Data Tape (GOTD), Its Features and Application, Random-Point Tide Program, E. W. Schwiderski and L. T. Szeto, Jun 1981. Accepted worldwide standard for global tides.

(85) NSWCDD was a major participant in the development of WGS-84, a DOD-wide geodetic system for target and asset positioning, satellite orbit computation, and geophysical data reduction. Gravity field model represents Department of Defense standard.

Ref: (a) Defense Mapping Agency Technical Report 8350.2 (Second Edition) "Department of Defense World Geodetic System 1984"

(86) NSWCDD has developed a number of end items intended for support of the SLBM systems. Some of these items have been used by contractors in support of the program while others have received wider use. Some examples in the first category are the TRIDENT Higher Level Language (THLL)--which was developed by NSWCDD for use with TRIDENT I and then extended for TRIDENT II--and its language support system (compilers, linkers, librarian, symbolic debugger); the Real Time Operating System (RTOS) and the TRIDENT II Operating System--two real time operating systems incorporating real time system control and distributed process control; the Direct to Forces (DTF) system--a handheld calculator system using NSWCDD software on commercial PROMs, later replaced by a laptop computer, used for retargeting of SLBMs from airborne command posts; and the Verification and Evaluation System for TRIDENT (VEST)--a system of hardware and software providing non-intrusive performance evaluation and system performance monitoring for the TRIDENT I and TRIDENT II fire control systems. VEST was developed by NSWCDD and built by General Electric Ordnance Systems (now Martin Marietta Defense Systems). It also influenced the design of a standard Navy shipboard computer--the UYK-43. These are documented in the following references.

Ref: (a) THLL: THLL II Reference Manual, NSWCDD TR 85-141, Oct 1983
(b) RTOS/TRI II OS: TRIDENT II Fire Control System MK98 MOD 1 RTOS Design Disclosure Document, OD 55663
(c) DTF: U.S. Navy SLBM Weapon System At Sea Retargeting, OD 44770 Volume II Part 1, Sep 93
(d) VEST: Verification and Evaluation System for TRIDENT (VEST): A Summary to Management, NSWCDD TR 80-122

(87) In addition, there are other items which have received wider use in industry. These include the Statistical Modeling and Estimation of Reliability Functions for Software (SMERFS)--a tool which provided a complete reliability analysis of a software application using any of a number of well known software reliability models--and the SMERFS Expert Assistant (SMERT)--an application of artificial intelligence and

expert systems to enhance the user interaction with SMERFS. More than 300 copies of SMERFS have been distributed within industry. Another example are the guidance schemes, applicable to ballistic missile or satellite interception, that have been developed and patented by NSWCDD staff. More than 100 requests for information have been received from contractors actively involved or interested in the development of interceptors. These are documented in the following references.

Ref: (a) SMERFS: A Survey of Software Reliability Modeling and Estimation, NSWCDD TR 82-71, Sep 83

(b) Statistical Modeling and Estimation of Reliability Functions for Software (SMERFS) User's Guide, NSWC TR 84-373 REV 3, Sep 93

(c) Guidance: "A Method of Kalman Filtering for Estimating the Position and Velocity of a Tracked Object", SN 5,051,751, Sep 91

(d) "A Method of Guiding an Inflight Vehicle to a Desired Flight Path, SN 5,071,087, Dec 91

(e) "A Method of Guiding an Inflight Vehicle Towards a Target", SN 5,082,200, Jan 92

FACILITIES AND EQUIPMENT

6. **Special Facilities/Equipment Resources.** Include a copy of the form provided at Tab B of this data call for each facility and "major" piece of equipment located at this activity. Include information on separate detachments. The following definitions will apply:

Facilities - Will include such things as rocket firing bays, towing tanks, anechoic chambers, hypervelocity gun ranges, hyperbaric chambers, wind tunnels, simulation/emulation laboratories, etc. Include buildings that are integral to the facility/equipment. Do not include major outdoor ranges or land.

Also, describe modeling and simulation capabilities, hardware in-the-loop facilities and analysis or wargaming capabilities.

Equipment - Resources used to support the operation of the site with a replacement value of $500,000 or greater. Do not include land or buildings in this category. In reporting equipment, provide information to indicate the degree of portability of the equipment. Class 3 Personal Property items ("plant equipment" or "equipment in place") by definition are highly portable and can be moved easily. Some Class 2 Installed Equipment, such as Main-frame computers, test stands and small hyperbaric chambers, require more extensive utilities support and assembly of components, but can be relocated without damage to the facility or equipment, and therefore are considered "moveable" assets. Other Class 2 items are so large and/or integral to the facility that houses them that major demolition and construction would be required to relocate them, and therefore are considered "fixed" assets. Where appropriate, pieces of equipment can be aggregated for the purposes of completing Tab B.

7. General Facilities.

a. Is there any cash revenue generated by this activity? Example: Electricity generated at this activity and sold to the local community. If yes, describe.

No.

b. What MILCON projects are currently programmed to be completed by the end of FY1995? For each project provide:

(1) A description of the proposed facility with title and project number. Be sure to include the trailing alpha designator for BRACs-88, 91 and 93 realignment projects, i.e., P-xxxR, P-xxxS, P-xxxT .

P-225. EW Integration Lab. This project will construct a secure RDT&E facility to consolidate fragmented organizational units responsible for the Center's electronic warfare and Cryptologic compartmented research, design, development and integration of Electronic Warfare Systems requiring both GENSER and SCI information handling and storage.

P-262. Fleet Requirements Support. This project will construct a facility of maximum physical and computer security in support of N08 Naval Warfare efforts. This includes conceptual warfare initiatives, platform and weapon requirements, orchestration of naval assets, warfare simulation and wargaming.

P-267. Force Main at C Gate Area. The construction of this facility will replace the existing sewage treatment plant that was built in 1948 and permitted for an average daily flow of 400,000 gallons. The present facility requires that upgrading and modernization to accommodate present and projected demands and to meet the EPA and Virginia waste management standards.

(2) The functional support area(s) that the new facility will support. Refer to Appendix A.

P-225 - 3. Combat System Integration
3.3 Surface
P-262 - 10. General Mission Support
10.9 Activity Mission & Function Support
P-267 - 10. General Mission Support
10.9 Activity Mission & Function Support

(3) Identify installed equipment to be provided based on the threshold guidance of paragraph 6, page 12, of this data call.

P-225 - General electronic laboratory equipment. Specifics not known at this time.
P-262 - Specific equipment cannot be identified due to classification.
P-267 - N/A

(4) The additional square footage that this project will provide to the functional support area(s).

P-225: This project will add 42,350 sq.ft. to category code 310-33.
P-262: This project will add 51,500 gross sq.ft. to category 310-33.
P-267: N/A measurement to GPM.

(5) The current working estimate (CWE) & planned beneficial occupancy date (BOD) of the project.

P-225: CWE - $7.4M BOD - 8/94
P-262: CWE - $7.4M BOD - 5/94
P-267: CWE - $600K BOD - 5/94

c. What MILCON projects are currently programmed to be executed/completed after FY1995? For each project provide:

(1) A description of the proposed facility with title and project number.

P-267S. Upgrade Sewage Treatment Plant. The construction of this facility will replace the existing plant that was built in 1948 and permitted for an average daily flow of 400,000 gallons. The present facility requires upgrading and modernization to accommodate present and projected demands and to meet EPA and Virginia waste management standards.

P-269. School Addition. This project will construct a single addition to and renovate the NSWCDD Kindergarten through Grade 8 Section 6 DoD School. It will provide four new classrooms, a media center lab, two special instruction labs, a health service unit, and administrative space for staff. Accessibility for the handicapped will be provided. The project will also involve the demolition of two Quonset huts.

P-273S. Consolidation RDT&E Lab Facility. The construction of this project is required to implement the consolidation of NSWCDD as proposed by the Secretary of Defense to the Defense Base Closure/Realignment Commission. The facility will support the programs being relocated to NSWCDD, Dahlgren, Virginia from NSWCDL, White Oak, Maryland, Naval Coastal Systems Center (NCSC), Panama City, Florida, and Naval Ocean Systems Center (NOSC) San Diego, California.

P-338. Ship Self-Defense. The Ship Self-Defense Combat System (SSDCS) Engineering Facility will be a two-story structure configurated to support engineering, test and evaluation of surface ship warfare systems. This facility is required to support the RDT&E of future Naval Surface Combatant systems to effectively counter the anti-ship missile threats of the 21st century. The facility will also support development of tactics for single ship and multi-ship self- and local area defense scenarios.

H-197. Family Housing. This project will demolish 29 existing family housing units and construct 150 units for a net gain of 131 units. The units will be two-story multi-family structures complete with covered parking and recreational areas. The project is based on the growth of military personnel of both NSWCDD and its tenants.

(2) The functional support area(s) the new facility will support.

P-267S - 10. General Mission Support
10.9 Activity Mission & Function Support
P-269 - 10. General Mission Support
10.9 Activity Mission & Function Support
P-273S - 3. Combat Systems Integration
3.3 Surface
P-338 - 3. Combat Systems Integration
3.3 Surface
H-197 - 10. General Mission Support
10.9 Activity Mission & Function Support

(3) The identified installed equipment to be provided based on the threshold guidance of paragraph 6, page 12, of this data call.

Equipment for these facilities has not yet been specified.

(4) The additional square footage this project will provide to the functional support area(s).

P-276S - N/A. This measurement is gallons.
P-269 - N/A. This project provides space for the tenant dependant school.
P-273S - This project will add 165,700 gross sq. ft. to category 310-33.
P-338 - This project will add 32,500 gross sq. ft. to category 310-33.
H-197 - This project will provide a net gain of 131 units of multi-familty housing.

(5) CWE & planned BOD.

P-267S	**CWE - $22.4M**	**BOD - 1/96**
P-269	**CWE - $1.3M**	**BOD - 3/97**
P-273S	**CWE - $26.4M**	**BOD - 1/96**
P-338	**CWE - $10.3M**	**BOD - 2/96**
H-197	**CWE - $13.2M**	**BOD - 2/96**

d. What is the distance (in miles) to the nearest military airfield and/or pier not located at your site? Describe. Assume all previous BRAC closures have been executed.

Nearest Airfield: NSWCDD Dahlgren site to Patuxent River, MD = 46 miles.
Nearest Pier: NSWCDD Dahlgren site to Washington Navy Yard = 55 miles.

e. How many certified magazines, used for the storage of explosives, does this activity own or control? What is the total explosive weight storage capacity?

Total Number of Certified Magazines used for Explosives Storage: 42
Maximum Capacity: 5,343 tons

LOCATION

8. Geographic Location.

a. Is there an imperative in facility, function or synergy that requires the installation/base/facility to be in its present location? If yes, describe.

Yes. Synergism in facility and function is a key characteristic of the Dahlgren Site.

As a product of years of involvement in the DoN Surface Warfare Systems mission area, Dahlgren has put into place an extensive complex of inter-connected warfare system facilities, many of which have links to the Operational Fleet. Some of these facilities are unique, one-of-a-kind installations supporting both the U.S. and our Allies. The Potomac River Test Range (PRTR) located at the Dahlgren Site is another unique capability being the only instrumented "over the water" range for RDT&E of surface ship gun weapon ordnance systems, ship self-defense systems, and ship electronic systems.

Dahlgren is host to several major tenant commands (i.e., the AEGIS Training Center (ATC) and Naval Space Command (COMNAVSPACECOM)) as well as a joint services command (Naval Warfare Analysis Center (NAVWAC)). The commands complement the Dahlgren mission areas and possess direct linkage with the Dahlgren warfare systems complexes permitting information sharing and direct functional support.

The clustering of inter-connected surface warfare systems/subsystems and tenant commands provide for significant synergism in the primary mission areas of the Dahlgren Site. This characteristic has also made Dahlgren the focal point for the Navy's technical expertise in surface combat system/weapon system development and engineering.

b. What is the importance of the present location relative to customers supported?

The relative proximity of the Dahlgren Site to the Washington, DC Department of Defense complex (55 miles) enables personal interaction with customers to occur as frequently as necessary with minimum notification or travel arrangements.

Dahlgren customers benefit extensively from the clustering of complex weapons systems programs and tenant commands which complement the Dahlgren mission areas. Tenants such as the ATC, NAVWAC, and COMNAVSPACECOM provide synergism in technical activities and technical expertise directed at the development of Surface Ship Combat Systems, Mission Control System, Strategic and Space Systems, and Surface Ship Defense Systems. The opportunity for interaction with major Fleet customers is also enhanced by the clustering of commands.

Dahlgren is located in a relatively rural environment providing a unique "over the water" range capability coupled with extensive inter-connected weapon systems complexes. The facilities provide the customer with a broad-based RDT&E capability critical to the systems engineering of current and future complex warfare systems. The availability of space at Dahlgren for expansion of appropriate RDT&E activities has greatly supported our DoD customers in the past and remains an option for the future.

FEATURES AND CAPABILITIES

9. **Computational Facilities.**

a. Describe the general and special computational capabilities at this site. Include super computing, parallel computing, distributed computing and networking. Include high-speed data transfer, fiber optic links, microwave links, network interconnectivity and video teleconferencing capabilities. Do not discuss desktops and laptops except as they relate to networking.

Unclassified networks at the Dahlgren Division are comprised of a variety of media in a flexible infrastructure that facilitates implementation of appropriate service (media) as the need arises. The inter-building infrastructure consists of a flexible duct system installed between communications sheds which in turn are connected to buildings where users are located. The duct system makes it possible to quickly install whatever media is needed to meet bandwidth requirements. Wiring presently being installed in buildings consists of a mix of twisted pair and fiber optics that is expected to support present and future bandwidth requirements.

The primary unclassified network (NSWC-Net) supports multiple protocols (TCP/IP/, IPX, DECNET, and Appletalk) and has multiple connections to the Internet (SURANet, Interim DREN, NAVNET). On-site backbone service is presently FDDI. Plans are underway to transition to SONET and ATM.

The Scientific and Engineering (S&E) Computing Facility provides high performance vector/scalar computing in support of R&D programs. A Cray Y-MP2E supercomputer system provides classified services up to the Secret level and runs in the System High mode; it is one of the few Navy systems providing general purpose Secret services during prime shift. A Cray EL98 entry level system will provide unclassified services once it is up and running in early FY95. A CDC 995E system is currently providing unclassified services; it will be phased out by the end of FY95.

Both systems are modest in capacity as compared to the "grand challenge" resources being provided by the DoD High Performance Computing Modernization Program;

however, they fill a high performance niche not covered by the HPCC but much needed locally. The largest users of the Secret system are the Submarine Launched Ballistic Missile (SLBM) Operational Support Facility and the SLBM Weapons System Development Facility, both located at the Dahlgren Site. Currently, the Secret system capacity is about 70% used during prime shift. The unclassified system is in transition from the larger CDC 995E to an entry level Cray to modernize the capabilities and to better size the offering to current demand. The capacity of all the machines is very expandable, primarily by adding additional CPUs, memory, and disk. Space in the facility is available for such expansion, or for the installation of systems moved from other sites.

The Division has an Intel Paragon multiprocessor computer located at the Dahlgren Site. This computer is a parallel processing asset. It is a commercial non-shared memory multiprocessor and was developed by ARPA CSTO under its supercomputing initiative. It has been placed at NSWCDD as a part of the High Performance Computing Program (Hi-Per-D). The NSWCDD Paragon has a total of 23 i860-based processor nodes, 16 of which are available for user application programs and 6 of which are used for systems services such as I/O and disk paging (one node is currently not in use due to memory limitations); it can be upgraded to a total of 64 nodes. The nodes are interconnected within the cabinet via a cartesian mesh consisting of router chips originally designed by Chuck Seitz. The mesh interconnect currently operates at 30 MB/sec but enhancements are planned to upgrade the interconnect to 200 MB/sec. The i860 risc processor is rated nominally at 40 MIPS. A second i860 on each node is planned for use in managing I/O across the mesh but these second processors are not yet in use. The NSWCDD Paragon also has a VME interface capability which could be used, for example, to implement NTDS interface channels through some third party vendor. NSWCDD anticipates having a second identical Paragon available within a few months.

Video Teleconferencing (VTC) at the Dahlgren site is provided by the VTC facility operated by the AEGIS Training Center. The primary function of the VTC facility is to conduct interactive meetings with one or more other sites having similar capabilities. These meetings allow for full duplex video, audio, and graphics transmission for all sites involved. The studio has seating for 12 people but can accommodate up to 30. The facility has the capability to conduct point to point meetings, three-way continuous meetings, or multi-point meetings with up to 24 sites on line at a time. It is part of the

Defense Commercial Telecommunication Network (DCTN). The DCTN consists of over 150 VTC studios located throughout the United States. Cross connecting to different networks is available through DCTN for worldwide connection to thousands of corporate and private installations.

The Dahlgren Site uses satellite programming (downlink) from education and information networks across the nation as part of its employee training program. Three satellite dishes are used. One is a 5 meter SIMULSAT (fixed dish) which allows placement of multiple feedhorns for accessing up to 32 satellites simultaneously, one is a 3.8 meter PRODELIN (steerable dish) which allows access to lesser used satellites, and one is a special 1.8 meter fixed dish from which the National Technology University educational network is accessed. Future plans are to connect broadcasts to the network system to deliver training courses directly to the workplace.

A training classroom specially designed for satellite courses is currently being used. It contains 8 small group workstations, each equipped with a VCR and monitor for single or multiple person use. Multiple receivers and an electronic switching system allow the offering of up to 8 courses simultaneously to a maximum of 40 students.

Many of the Special Facilities described in TAB B include locally netted and interconnected complexes of medium speed computers, graphics, displays, and a wide variety of specialized military and commercial hardware and software used for weapon system/combat system RDT&E.

10. **Mobilization Responsibility and Capability.**

a. Describe any mobilization responsibility officially assigned to this site. Cite the document assigning the responsibility.

The Dahlgren Site would operate under the Navy's OPNAVINST S3061.1D in the case of mobilization. The primary function of the Dahlgren Site is to conduct a wide range of research and development efforts within its mission areas of leadership and capabilities. The basic mission is not anticipated to change in the case of mobilization. Rather, it is expected that much of the ongoing effort will continue with the emphasis and priority shifting to the completion of efforts that can be applied to the current fleet requirements

and to the solution depend upon the particular nature and duration of the crises situation. of operational problems as they occur. The specific ways in which mobilization affects the Dahlgren Site will

(1) What functional support area(s) does this responsibility support? Refer to Appendix A for the list of functional support areas?

See above for a description of the work that would occur at this site in the event of mobilization.

(2) What portion of the work years and dollars, as reported in each applicable functional support area reported in Tab A, are spent solely on maintaining your activity's readiness to execute the mobilization responsibilities?

None.

(3) How many additional personnel (military & civilian) would be assigned to your activity as part of the mobilization responsibility? Include separately any contractor assets that would be added.

None.

b. Does your activity have adequate facilities to support your mobilization responsibilities? (yes/no)

Yes, however, there may be a shortage of messing and billeting space due to the increase of students attending the AEGIS Training Center (a tenant command).

(1) If yes, is any space assigned for the sole purpose of maintaining mobilization readiness? (yes/no) If yes, list the square footage assigned.

No.

(2) If no, what repairs, renovations and/or additions are required to provide adequate facilities? What is the estimated cost of this work?

There are no anticipated renovations and/or additions planned for this facility in the case of mobilization.

(3) Are there any restrictions that would prevent work (noted in paragraph 10.b.(2) above) from taking place (i.e., AICUZ, environmental constraints, HERO, etc.)? If yes, describe.

N/A.

c. Describe any production facilities that would be activated in case of a future contingency.

N/A.

d. Is your activity used as a Reserve Unit mobilization and/or training site?

Yes.

11. **Range Resources**. Include a copy of the form provided at Tab C of this data call for each range located at this activity or operated by this activity. Also, report ranges at detachments and sites not receiving a separate data call. The following definition of a range will apply:

Range - An instrumented or non-instrumented area that utilizes air, land, and/or water space to support test and evaluation, measurements, training and data collection functions, but is not enclosed within a building.

QUALITY OF LIFE

12. Military Housing

(a) Family Housing:

(1) Do you have mandatory assignment to on-base housing? (circle) yes no

No.

(2) For military family housing in your locale provide the following information:

Type of Quarters	Number of Bedrooms	Total number of units	Number Adequate	Number Substandard	Number Inadequate
Officer	4+	18	18		
Officer	3	19	19		
Officer	1 or 2	0	0		
Enlisted	4+	4	4		
Enlisted	3	101	101		
Enlisted	1 or 2	12	12		
Mobile Homes					
Mobile Home lots					

(3) In accordance with NAVFACINST 11010.44E, an inadequate facility cannot be made adequate for its present use through "economically justifiable means". For all the categories above where inadequate facilities are identified provide the following information:

Facility type/code:
What makes it inadequate?
What use is being made of the facility?

What is the cost to upgrade the facility to substandard?
What other use could be made of the facility and at what cost?
Current improvement plans and programmed funding:

Has this facility condition resulted in C3 or C4 designation on your BASEREP?

(4) Complete the following table for the military housing waiting list.

Pay Grade	Number of Bedrooms	Number on List[1]	Average Wait
O-6/7/8/9	1		
	2		
	3		
	4+		
O-4/5	1		
	2		
	3	5	3 - 6 months
	4+		
O-1/2/3/CWO	1		
	2		
	3	13	12 months
	4+	1	12 months
E7-E9	1		
	2	58	24 months
	3	22	3 - 6 months
	4+		

Pay Grade	Number of Bedrooms	Number on List[1]	Average Wait
E1-E6	1		
	2		
	3		
	4+		

(5) What do you consider to be the top five factors driving the demand for base housing? Does it vary by grade category? If so provide details.

	Top Five Factors Driving the Demand for Base Housing
1	Cost of local Rentals
2	Rural Area
3	Lack of Housing
4	Convenience to Work
5	Availability of on-base DoD school

(6) What percent of your family housing units have all the amenities required by "The Facility Planning & Design Guide" (Military Handbook 1190 & Military Handbook 1035-Family Housing)?

The on-base housing is old and modest. None of the units meet all of the requirements in the design guide. Many of the shortcomings are as follows:

Lead base paint
Asbestos
Electrical Updates (including hardwired smoke detectors)
Dishwashers/Garbage Disposals lacking
Garage/Carport
Air Conditioning
Landscaping

Sidewalks
Outside Storage (7 units have none)

(7) Provide the utilization rate for family housing for FY 1993.

Type of Quarters	Utilization Rate
Adequate	97.40%
Substandard	
Inadequate	

(8) As of 31 March 1994, have you experienced much of a change since FY 1993? If so, why? If occupancy is under 98% (or vacancy over 2%), is there a reason?

Vacancy due to relocation of families in preparation of MILCON construction (vacating units to be demolished).

(b) BEQ:

(1) Provide the utilization rate for BEQs for FY 1993.

Type of Quarters	Utilization Rate
Adequate	129%
Substandard	114%
Inadequate	0%

(2) As of 31 March 1994, have you experienced much of a change since FY 1993? If so, why? If occupancy is under 95% (or vacancy over 5%), is there a reason?

Yes. There has been an increase in the student loading of the AEGIS Training Center (a tenant command).

(3) Calculate the Average on Board (AOB) for geographic bachelors as follows:

AOB = (# Geographic Bachelors x average number of days in barracks)

365

54

(4) Indicate in the following chart the percentage of geographic bachelors (GB) by category of reasons for family separation. Provide comments as necessary.

Reason for Separation from Family	Number of GB	Percent of GB	Comments
Family Commitments (children in school, financial, etc.)	**35**	**0.68**	
Spouse Employment (non-military)	**0**	**0**	
Other	**17**	**0.32**	**Duty under instruction**
TOTAL	**52**	**100**	

(5) How many geographic bachelors do not live on base?

19

(c) BOQ:

(1) Provide the utilization rate for BOQs for FY 1993.

Type of Quarters	Utilization Rate
Adequate	**44%**
Substandard	**88%**
Inadequate	**0%**

(2) As of 31 March 1994, have you experienced much of a change since FY 1993? If so, why? If occupancy is under 95% (or vacancy over 5%), is there a reason?

Yes. There has been an increase in the student loading of the AEGIS Training Center (a tenant command).

(3) Calculate the Average on Board (AOB) for geographic bachelors as follows:

$$AOB = \frac{(\text{\# Geographic Bachelors x average number of days in barracks})}{365}$$

6

(4) Indicate in the following chart the percentage of geographic bachelors (GB) by category of reasons for family separation. Provide comments as necessary.

Reason for Separation from Family	Number of GB	Percent of GB	Comments
Family Commitments (children in school, financial, etc.)	**8**	**100**	
Spouse Employment (non-military)	**0**		
Other	**0**		
TOTAL	**8**	**100**	

(5) How many geographic bachelors do not live on base?

Unknown.

(d) BOQ/BEQ Housing and Messing.

(1) Provide data on the BOQs and BEQs assigned to your current plant account. The desired unit of measure for this capacity is people housed. Use CCN to differentiate between pay grades, i.e., E1-E4, E5-E6, E7-E9, CWO-O2, O3 and above.

Facility Type, Bldg. # & CCN	Total No. of Beds	Total No. of Rooms	Adequate		Substandard		Inadequate	
			Beds	Sq Ft	Beds	Sq Ft	Beds	Sq Ft
BQ 215	**10**	**10**	**10**	**365**				
BQ 217	**29**	**29**	**1**	**900**				
			6	**500**				
			6	**400**				

Facility Type, Bldg. # & CCN	Total No. of Beds	Total No. of Rooms	Adequate		Substandard		Inadequate	
			Beds	Sq Ft	Beds	Sq Ft	Beds	Sq Ft
			17	**250 - 399**				
CBQ 962	**127**	**97**			**127**	**136**		
BEQ 960	**147**	**75**	**147**	**180**				
BEQ 959	**98**	**92**	**98**	**180 - 360**				
PCS In/Out 909	**16**	**8**	**12**	**892**				

(2) In accordance with NAVFACINST 11010.44E, an inadequate facility cannot be made adequate for its present use through "economically justifiable means". For all the categories above where inadequate facilities are identified provide the following information:

a. FACILITY TYPE/CODE:

b. WHAT MAKES IT INADEQUATE?

c. WHAT USE IS BEING MADE OF THE FACILITY?

d. WHAT IS THE COST TO UPGRADE THE FACILITY TO SUBSTANDARD?

e. WHAT OTHER USE COULD BE MADE OF THE FACILITY AND AT WHAT COST?

f. CURRENT IMPROVEMENT PLANS AND PROGRAMMED FUNDING:

g. HAS THIS FACILITY CONDITION RESULTED IN C3 OR C4 DESIGNATION ON YOUR BASEREP?

(3) Provide data on the BOQs and BEQs projected to be assigned to your plant account in FY 1997. The desired unit of measure for this capacity is people housed. Use CCN to differentiate between pay grades, i.e., E1-E4, E5-E6, E7-E9, CWO-O2, O3 and above.

Facility Type, Bldg. # & CCN	Total No. of Beds	Total No. of Rooms	Adequate		Substandard		Inadequate	
			Beds	Sq Ft	Beds	Sq Ft	Beds	Sq Ft
BQ 215	**10**	**10**	**10**	**365**				
BQ 217	**29**	**29**	**1**	**900**				
			6	**500**				
			6	**400**				
			17	**250 - 399**				
CBQ 962	**127**	**97**			**127**	**136**		
BEQ 960	**147**	**75**	**147**	**180**				
BEQ 959	**98**	**92**	**98**	**180 - 360**				
PCS In/Out 909	**16**	**8**	**12**	**892**				

(4) In accordance with NAVFACINST 11010.44E, an inadequate facility cannot be made adequate for its present use through "economically justifiable means". For all the categories above where inadequate facilities are identified provide the following information:

a. FACILITY TYPE/CODE:
b. WHAT MAKES IT INADEQUATE?
c. WHAT USE IS BEING MADE OF THE FACILITY?
d. WHAT IS THE COST TO UPGRADE THE FACILITY TO SUBSTANDARD?
e. WHAT OTHER USE COULD BE MADE OF THE FACILITY AND AT WHAT COST?
f. CURRENT IMPROVEMENT PLANS AND PROGRAMMED FUNDING:
g. HAS THIS FACILITY CONDITION RESULTED IN C3 OR C4 DESIGNATION ON YOUR BASEREP?

(5) Provide data on the messing facilities assigned to your current plant account.

Facility Type, CCN and Bldg. #	Total Sq. Ft.	Adequate		Substandard		Inadequate		Avg # Noon Meals Served
		Seats	Sq Ft	Seats	Sq Ft	Seats	Sq Ft	
General Mess	**6396**	**162**	**2535**					**118**

(6) In accordance with NAVFACINST 11010.44E, an inadequate facility cannot be made adequate for its present use through "economically justifiable means". For all the categories above where inadequate facilities are identified provide the following information:

a. FACILITY TYPE/CODE:
b. WHAT MAKES IT INADEQUATE?
c. WHAT USE IS BEING MADE OF THE FACILITY?
d. WHAT IS THE COST TO UPGRADE THE FACILITY TO SUBSTANDARD?
e. WHAT OTHER USE COULD BE MADE OF THE FACILITY AND AT WHAT COST?
f. CURRENT IMPROVEMENT PLANS AND PROGRAMMED FUNDING:
g. HAS THIS FACILITY CONDITION RESULTED IN C3 OR C4 DESIGNATION ON YOUR BASEREP?

(7) Provide data on the messing facilities projected to be assigned to your plant account in FY 1997.

Facility Type, CCN and Bldg.	Total Sq. Ft.	Adequate		Substandard		Inadequate		Avg # Noon Meals Served
		Seats	Sq Ft	Seats	Sq Ft	Seats	Sq Ft	
General Mess Bldg 963	**6396**	**162**	**2535**					

(8) In accordance with NAVFACINST 11010.44E, an inadequate facility cannot be made adequate for its present use through "economically justifiable means". For all the categories above where inadequate facilities are identified provide the following information:

a. FACILITY TYPE/CODE:
b. WHAT MAKES IT INADEQUATE?
c. WHAT USE IS BEING MADE OF THE FACILITY?
d. WHAT IS THE COST TO UPGRADE THE FACILITY TO SUBSTANDARD?
e. WHAT OTHER USE COULD BE MADE OF THE FACILITY AND AT WHAT COST?
f. CURRENT IMPROVEMENT PLANS AND PROGRAMMED FUNDING:
g. HAS THIS FACILITY CONDITION RESULTED IN C3 OR C4 DESIGNATION ON YOUR BASEREP?

13. **MWR Facilities**. For on-base MWR facilities[10] available, complete the following table for each separate location. For off-base government owned or leased recreation facilities indicate distance from base. If there are any facilities not listed, include them at the bottom of the table.

[10]Spaces designed for a particular use. A single building might contain several facilities, each of which should be listed separately.

LOCATION N/A **DISTANCE** N/A

Facility	Unit of Measure	Total	Profitable (Y,N,N/A)
Auto Hobby	Indoor Bays	**4**	**Y**
	Outdoor Bays	**0**	**N/A**
Arts/Crafts	SF	**2354**	**N**
Wood Hobby	SF	**2160**	**Y**
Bowling	Lanes	**6**	**Y**
Enlisted Club	SF	**7623**	**N**
Officer's Club	SF	**0**	**N/A**
Library	SF	**2400**	**N/A**
Library	Books	**18862**	**N/A**
Theater	Seats	**300**	**Y**
ITT	SF	**352**	**Y**
Museum/Memorial	SF	**194**	**N/A**
Pool (indoor) *	Lanes	**6**	**N**
Pool (outdoor)	Lanes	**N/A**	**N/A**
Beach	LF	**0**	**N/A**
Swimming Ponds	Each	**0**	**N/A**
Tennis CT	Each	**7**	**N/A**

* **The pool has an inflatable dome which is removed for the summer months.**

Facility	Unit of Measure	Total	Profitable (Y,N,N/A)
Volleyball CT (outdoor)	Each	**0**	**N/A**
Basketball CT (outdoor)	Each	**2**	**N/A**
Racquetball CT	Each	**2**	**N/A**
Golf Course	Holes	**9**	**Y**
Driving Range	Tee Boxes	**4**	**Y**
Gymnasium	SF	**16717**	**Y**
Fitness Center	SF	**0**	**N/A**
Marina	Berths	**10**	**Y**
Stables	Stalls	**0**	**N/A**
Softball Fld	Each	**0**	**N/A**
Football Fld	Each	**2**	**N/A**
Soccer Fld	Each	**0**	**N/A**
Youth Center	SF	**1**	**Y**
Child Development Center	SF	**6580**	**Y**
Radio Control Track	Each	**1**	**N/A**
Community House	SF	**3584**	**Y**
Flying Club	Each	**1**	**N/A**

(a) Is your library part of a regional interlibrary loan program?

Yes.

14. **Base Family Support Facilities and Programs.**

a. Complete the following table on the availability of child care in a child care center on your base.

Age Category	Capacity (Children)	SF			Number on Wait List	Average Wait (Days)
		Adequate	Substandard	Inadequate		
0-6 Mos	**4**	**581 ***			**14 ***	**180 ***
6-12 Mos	**4**					
12-24 Mos	**10**	**586**			**4**	**90**
24-36 Mos	**14**	**588**			**2**	**60**
3-5 Yrs	**48**	**1874**			**0**	**N/A**

* **Age categories 0 - 6 months and 6 - 12 months are both in these figures.**

b. In accordance with NAVFACINST 11010.44E, an inadequate facility cannot be made adequate for its present use through "economically justifiable means." For all the categories above where inadequate facilities are identified provide the following information:

Facility type/code:
What makes it inadequate?
What use is being made of the facility?
What is the cost to upgrade the facility to substandard?
What other use could be made of the facility and at what cost?
Current improvement plans and programmed funding:
Has this facility condition resulted in C3 or C4 designation on your BASEREP?

c. If you have a waiting list, describe what programs or facilities other than those sponsored by your command are available to accommodate those on the list.

There are no state regulated centers currently available for infants - two years of age. There are state regulated centers for children who are 2 years or older and potty trained.

d. How many "certified home care providers" are registered at your base?

5

e. Are there other military child care facilities within 30 minutes of the base? State owner and capacity (i.e., 60 children, 0-5 yrs).

No.

f. Complete the following table for services available on your base. If you have any services not listed, include them at the bottom.

Service	Unit of Measure	Qty
Exchange	SF	**5776**
Gas Station	SF	**0**
Auto Repair	SF	**0**
Auto Parts Store	SF	**0**
Commissary	SF	**6232**
Mini-Mart	SF	**874**
Package Store	SF	**291**
Fast Food Restaurants	Each	**1**
Bank/Credit Union	Each	**1**
Family Service Center	SF	**1890**
Laundromat	SF	**272**

Service	Unit of Measure	Qty
Dry Cleaners	Each	**0**
ARC	PN	
Chapel	PN	**172**
FSC Classrm/Auditorium	PN	**12**

15. **Proximity of Closest Major Metropolitan Areas** (provide at least three):

City	Distance (Miles)
Washington, DC	**55 mi**
Richmond, VA	**65 mi**
Fredericksburg, VA	**35 mi**

16. **Standard Rate VHA Data for Cost of Living:**

Paygrade	With Dependents	Without Dependents
E1	**140.35**	**78.53**
E2	**140.35**	**88.26**
E3	**129.37**	**95.33**
E4	**131.59**	**91.84**
E5	**164.87**	**115.11**
E6	**191.17**	**130.13**
E7	**168.74**	**116.59**

Paygrade	With Dependents	Without Dependents
E8	**222.49**	**168.20**
E9	**206.44**	**156.71**
W1	**206.86**	**157.10**
W2	**183.57**	**143.98**
W3	**170.41**	**138.52**
W4	**157.99**	**140.08**
O1E	**139.10**	**103.18**
O2E	**151.61**	**151.61**
O3E	**138.60**	**117.26**
O1	**138.46**	**102.03**
O2	**115.48**	**90.26**
O3	**115.91**	**97.59**
O4	**137.10**	**119.22**
O5	**141.75**	**117.23**
O6	**112.35**	**92.99**
O7	**40.23**	**32.69**

17. **Off-base Housing Rental and Purchase**

(a) Fill in the following table for average rental costs in the area for the period 1 April 1993 through 31 March 1994.

Type Rental	Average Monthly Rent		Average Monthly Utilities Cost
	Annual High	Annual Low	
Efficiency	**420**	**only one**	**unavailable**
Apartment (1-2 Bedroom)	**432**	**figure**	"
Apartment (3+ Bedroom)	**550**	**available**	"
Single Family Home (3 Bedroom)	**713**		"
Single Family Home (4+ Bedroom)	**912**		"
Town House (2 Bedroom)	**608**		"
Town House (3+ Bedroom)	**682**		"
Condominium (2 Bedroom)	**628**		"
Condominium (3+ Bedroom)	**653**		"

(b) What was the rental occupancy rate in the community as of 31 March 1994?

Ths information was not available. The Board of Realtors does not keep statistics on occupancy.

Type Rental	Percent Occupancy Rate
Efficiency	
Apartment (1-2 Bedroom)	
Apartment (3+ Bedroom)	
Single Family Home (3 Bedroom)	
Single Family Home (4+ Bedroom)	
Town House (2 Bedroom)	
Town House (3+ Bedroom)	

Type Rental	Percent Occupancy Rate
Condominium (2 Bedroom)	
Condominium (3+ Bedroom)	

(c) What are the median costs for homes in the area?

Type of Home	Median Cost
Single Family Home (3 Bedroom)	**105,000**
Single Family Home (4+ Bedroom)	**148,118**
Town House (2 Bedroom)	**75,000**
Town House (3+ Bedroom)	**77,400**
Condominium (2 Bedroom)	**87,500**
Condominium (3+ Bedroom)	**72,200**

(d) For calendar year 1993, from the local MLS listings provide the number of 2, 3, and 4 bedroom homes available for purchase. Use only homes for which monthly payments would be within 90 to 110 percent of the E5 BAQ and VHA for your area.

Month	Number of Bedrooms		
	2	3	4+
January	**15**	**110**	**11**
February	**30**	**113**	**8**
March	**18**	**111**	**18**
April	**35**	**154**	**31**
May	**23**	**99**	**18**
June	**33**	**153**	**28**
July	**27**	**154**	**16**
August	**38**	**134**	**15**
September	**33**	**119**	**19**
October	**17**	**100**	**16**
November	**30**	**101**	**12**
December	**17**	**94**	**10**

(e) Describe the principle housing cost drivers in your local area.

1. **Proximity to the Washington, DC and Richmond areas - yet still rural.**
2. **Demand.**

18. For the top five sea intensive ratings in the principle warfare community your base supports, provide the following:

The Dahlgren Site only has Shore Billets attached to it.

Rating	Number Sea Billets in the Local Area	Number of Shore billets in the Local Area

19. Complete the following table for the average one-way commute for the five largest concentrations of military and civilian personnel living off-base.

Location	% Employees	Distance (mi)	Time(min)
King George, VA	**37.5%**	**1-15**	**5-15**
Stafford, VA	**16.1%**	**35-45**	**40-50**
Spotsylvania, VA	**12.6%**	**35-60**	**45-60**
Westmoreland County, VA	**11.3%**	**20-30**	**20-30**
Fredericksburg (city), VA	**7.1%**	**35-45**	**40-50**

20. Complete the tables below to indicate the civilian educational opportunities available to service members stationed at the installation (to include any outlying sites) and their dependents:

(a) List the local educational institutions which offer programs available to dependent children. Indicate the school type (e.g. DODDS, private, public, parochial, etc.), grade level (e.g. pre-school, primary, secondary, etc.), what students with special needs the institution is equipped to handle, cost of enrollment, and for high schools only, the average SAT score of the class that graduated in 1993, and the number of students in that class who enrolled in college in the fall of 1994.

KING GEORGE COUNTY

Institution	Type	Grade Level(s)	Special Education Available	Annual Enrollment Cost per Student	1993 Avg SAT/ACT Score	% HS Grad to Higher Educ	Source of Info
Dahlgren School	**DOD**	**PK-8**	**YES**	**$6,993**	**N/A**	**N/A**	**SCHOOL**
Potomac Elementary	**Public**	**PK-5**	*	**$4,794**	**N/A**	**N/A**	**SCHOOL BOARD**
King George Elementary	**Public**	**PK-5**	*	**$4,794**	**N/A**	**N/A**	
King George Middle School	**Public**	**6-8**	*	**$4,794**	**N/A**	**N/A**	
King George High School	**Public**	**9-12**	*	**$4,794**	**914**	**67%**	

***The School Division has programs or is involved on a regional bases with other School Divisions to provide programs for almost any student with special needs except for those students who require residential placement.**

STAFFORD COUNTY

Institution	Type	Grade Level(s)	Special Education Available	Annual Enrollment Cost per Student	1993 Avg SAT/ACT Score	% HS Grad to Higher Educ	Source of Info
Brooke Point *	**Public**	**9-11**	**Yes ****	**$4,694**	**-**	**-**	**SCHOOL BOARD**
North Stafford	**Public**	**9-12**	**Yes**	**$4,694**	**SAT 916**	**87 %**	
Stafford High	**Public**	**9-12**	**Yes**	**$4,694**	**SAT 926**	**72 %**	
Drew Middle	**Public**	**6-8**	**Yes**	**$4,694**	**N/A**	**N/A**	
Gayle Middle	**Public**	**6-8**	**Yes**	**$4,694**	**N/A**	**N/A**	
Stafford Middle	**Public**	**6-8**	**Yes**	**$4,694**	**N/A**	**N/A**	
A.G. Wright Middle	**Public**	**6-8**	**Yes**	**$4,694**	**N/A**	**N/A**	
Falmouth Elementary	**Public**	**K-5**	**Yes**	**$4,694**	**N/A**	**N/A**	
Ferry Farm Elementary	**Public**	**K-5**	**Yes**	**$4,694**	**N/A**	**N/A**	
Garrisonville Elementary	**Public**	**K-5**	**Yes**	**$4,694**	**N/A**	**N/A**	
Grafton Village Elementary	**Public**	**K-5**	**Yes**	**$4,694**	**N/A**	**N/A**	
Hampton Oaks Elementary	**Public**	**K-5**	**Yes**	**$4,694**	**N/A**	**N/A**	

Institution	Type	Grade Level(s)	Special Education Available	Annual Enrollment Cost per Student	1993 Avg SAT/ACT Score	% HS Grad to Higher Educ	Source of Info
Hartwood Elementary	**Public**	**K-5**	**Yes**	**$4,694**	**N/A**	**N/A**	
Moncure Elementary	**Public**	**K-5**	**Yes**	**$4,694**	**N/A**	**N/A**	
Park Ridge Elementary	**Public**	**K-5**	**Yes**	**$4,694**	**N/A**	**N/A**	
Rockhill Elementary	**Public**	**K-5**	**Yes**	**$4,694**	**N/A**	**N/A**	
Stafford Elementary	**Public**	**K-5**	**Yes**	**$4,694**	**N/A**	**N/A**	
Widewater Elementary	**Public**	**K-5**	**Yes**	**$4,694**	**N/A**	**N/A**	
Turning Point	**Public**	**9-12**	**Yes**	**$4,694**	**N/A**	**N/A**	
Head Start	**Public**	**Pre-Sch**	**Yes**	**$4,694**	**N/A**	**N/A**	

*** Brooke Point High School opened in the fall of 1993 and has not yet gathered the SAT/ACT and graduation statistics requested.**

**** Special Education programs are offered in all schools. Depending on the severity of the student(s) disability, they may be educated in another public school division, state or private educational institution. Stafford County Public Schools also provide services for special education students through a regional agreement.**

FREDERICKSBURG CITY

Institution	Type	Grade Level(s)	Special Education Available	Annual Enrollment Cost per Student	1993 Avg SAT/ACT Score	% HS Grad to Higher Educ	Source of Info
Hugh Mercer	**Public**	**K-3**	**Yes**	**$5,800**	**N/A**	**N/A**	**School Div**
Walker-Grant Middle	**Public**	**4-7**	**Yes**	**$5,800**	**N/A**	**N/A**	**School Div**
James Monroe High School	**Public**	**8-12**	**Yes**	**$5,800**	**906**	**90 %**	**School Div**

SPOTSYLVANIA COUNTY

Institution	Type	Grade Level(s)	Special Education Available	Annual Enrollment Cost per Student	1993 Avg SAT/ACT Score	% HS Grad to Higher Educ	Source of Info
Battlefield Elementary	**Public**	**K-5**	**Yes**	**$4,408**	**N/A**	**N/A**	**School Board**
Berkeley Elementary	**Public**	**K-5**	**Yes**	**$4,408**	**N/A**	**N/A**	**School Board**
Brock Road Elementary	**Public**	**K-5**	**Yes**	**$4,408**	**N/A**	**N/A**	**School Board**

Courtland Elementary	Public	K-5	Yes	$4,408	N/A	N/A	School Board
Chancellor Elementary	Public	K-5	Yes	$4,408	N/A	N/A	School Board
Lee Hill Elementary	Public	K-5	Yes	$4,408	N/A	N/A	School Board
Livingston Elementary	Public	K-5	Yes	$4,408	N/A	N/A	School Board
Robert E. Lee Elementary	Public	K-5	Yes	$4,408	N/A	N/A	School Board
Salem Elementary	Public	K-5	Yes	$4,408	N/A	N/A	School Board
Smith Station Elementary	Public	K-5	Yes	$4,408	N/A	N/A	School Board
Spotswood Elementary	Public	K-5	Yes	$4,408	N/A	N/A	School Board
Battlefield Middle	Public	6-8	Yes	$4,408	N/A	N/A	School Board
Chancellor Middle	Public	6-8	Yes	$4,408	N/A	N/A	School Board
John J. Wright Middle	Public	6-8	Yes	$4,408	N/A	N/A	School Board
Spotsylvania Middle	Public	6-8	Yes	$4,408	N/A	N/A	School Board
Chancellor High	Public	9-12	Yes	$4,408	438/ 480	76%	School Board
Courtland High	Public	9-12	Yes	$4,408	422/ 452	79%	School Board

Spotsylvania High	Public	9-12	Yes	$4,408	436/ 451	45%	School Board

WESTMORELAND COUNTY

Institution	Type	Grade Level(s)	Special Education Available	Annual Enrollment Cost per Student	1993 Avg SAT/ ACT Score	% HS Grad to Higher Educ	Source of Info
Washington & Lee	Public	9-12	Yes	$4,371	45	No response	School Board
A. T. Johnson	Public	6-8	Yes	$4,371	37	N/A	School Board
Cople Elementary	Public	K-5	Yes	$4,371	43	N/A	School Board
Washington District	Public	K-5	Yes	$4,371	41	N/A	School Board
Montross Elementary	Public	K-5	Yes	$4,371	40	N/A	School Board

*Scores represent Iowa Test of Basic Skills for grades 4, 8, 11.(percentile)

(b) List the educational institutions within 30 miles which offer programs off-base available to service members and their adult dependents. Indicate the extent of their programs by placing a "Yes" or "No" in all boxes as applies.

KING GEORGE

Institution	Type Classes	Program Type(s)				
		Adult High School	Vocational/ Technical	Undergraduate		Graduate
				Courses only	Degree Program	
Rappahannock Community College	**Day Yes**	**No**	**Yes**	**Yes**	**Yes**	**No**
	Night Yes	**No**	**Yes**	**Yes**	**Yes**	**No**
Mary Washington College	**Day Yes**	**No**	**No**	**Yes**	**Yes**	**Yes**
	Night Yes	**No**	**No**	**Yes**	**Yes**	**Yes**
Brooke Point High School Adult Ed	**Day No**	**No**	**No**			
	Night Yes	**Yes**	**Yes**			
North Stafford High Adult Ed	**Day No**	**No**	**No**			
	Night Yes	**Yes**	**Yes**			
Stafford Senior High Adult Ed	**Day No**	**No**	**No**			
	Night Yes	**Yes**	**Yes**			
Germanna Community College	**Day Yes**	**Yes**	**Yes**	**Yes**		
	Night Yes	**Yes**	**Yes**	**Yes**		
Strayer College	**Day Yes**	**Yes**	**Yes**	**Yes**		
	Night Yes	**Yes**	**Yes**	**Yes**		

Spotsylvania Vocational Center	**Day Yes**	**No**	**Yes**	**Yes**	**No**	**No**
	Night Yes	**Yes**	**Yes**	**Yes**	**No**	**No**
Washington and Lee	**Day No**		**No**			
	Night Yes	**Yes**	**No**			**GED**

(c) List the educational institutions which offer programs on-base available to service members and their adult dependents. Indicate the extent of their programs by placing a "Yes" or "No" in all boxes as applies.

Institution	Type Classes	Program Type(s)				
		Adult High School	Vocational/ Technical	Undergraduate		Graduate
				Courses only	Degree Program	
Virginia Polytechnic Institute & State University	**Day**	**No**	**No**	**No**	**No**	**Yes**
	Night	**No**	**No**	**No**	**No**	**Yes**
	Corres-pondence	**No**	**No**	**No**	**No**	**No**
George Mason University	**Day**	**No**	**No**	**No**	**No**	**No**
	Night	**No**	**No**	**No**	**No**	**Yes**
	Corres-pondence	**No**	**No**	**No**	**No**	**No**
National Technological University	**Day**	**No**	**No**	**No**	**No**	**No**
	Night	**No**	**No**	**No**	**No**	**No**
	***Corres-pondence**	**No**	**No**	**No**	**No**	**Yes**

Mind Extension University	**Day**	**No**	**No**	**No**	**No**	**No**
	Night	**No**	**No**	**No**	**No**	**No**
	***Corres-pondence**	**No**	**No**	**Yes**	**Yes**	**Yes**
Virginia Cooperative Graduate Engineering Program	**Day**	**No**	**No**	**No**	**No**	**No**
	Night	**No**	**No**	**No**	**No**	**No**
	***Corres-pondence**	**No**	**No**	**No**	**No**	**Yes**

*** Distance Learning via Satellite**

21. **Spousal Employment Opportunities.**

Provide the following data on spousal employment opportunities.

Skill Level	Number of Military Spouses Serviced by Family Service Center Spouse Employment Assistance			Local Community Unemployment Rate
	1991	1992	1993	
Professional		**21**	**56**	**6.2%**
Manufacturing		**20**	**40**	
Clerical	**8**	**66**	**251**	
Service	**30**	**52**	**165**	
Other	**12**	**28**	**76**	

22. **Medical/Dental.**

a. Do your active duty personnel have any difficulty with access to medical or dental care, in either the military or civilian health care system? Develop the why of your response.

No. The Dahlgren Site is served by the Branch Medical and Dental Clinics. They are staffed by two doctors and one dentist as well as a full complement of technicians, corpsmen, nurses, and dental assistants. Both the medical and dental facilities operate on a Monday through Friday normal working hours schedule. There is no after hours care available. Emergency care is provided through the local emergency rooms and volunteer rescue squads. There are two civilian hospitals within a 35 mile radius of the Dahlgren Site (Federicksburg, VA and LaPlata MD) as well as five mlitary facilities that are within 75 miles (Walter Reed Army Hospital, Bethesda, MD; Ft. Belvoir, VA; Quantico Marine Base, Quantico, VA; and Andrews Air Force Base, MD). There are several doctors, dentists, and orthodontists in the immediate Dahlgren area (not including the branch clinics) and a variety of specialists in the Fredericksburg, VA area.

b. Do your military dependents have any difficulty with access to medical or dental care, in either the military or civilian health care system? Develop the why of your response.

No. The Dahlgren Site is served by the Branch Medical and Dental Clinics. They are staffed by two doctors and one dentist as well as a full complement of technicians, corpsmen, nurses, and dental assistants. Both the medical and dental facilities operate on a Monday through Friday normal working hours schedule. There is no after hours care available. Emergency care is provided through the local emergency rooms and volunteer rescue squads. There are two civilian hospitals within a 35 mile radius of the Dahlgren Site (Fredericksburg, VA and LaPlata MD) as well as five mlitary facilities that are within 75 miles (Walter Reed Army Hospital, Bethesda, MD; Ft. Belvoir, VA; Quantico Marine Base, Quantico, VA; and Andrews Air Force Base, MD). There are several doctors, dentists, and orthodontists in the immediate Dahlgren area (not including the branch clinics) and a variety of specialists in the Fredericksburg, VA area.

REQUESTS FOR CLARIFICATION
From the Base Structure Analysis Team (BSAT)

Control #: 601
To: Jim Logan
Fax: (703)602-0541

Activity: NAVSEA
Voice: (703)602-5926

Date sent: 8 SEP 94

CLARIFICATION/CORRECTION REQUESTED for Data Call #5 Question #23
To clarify ambiguities in responses to the above question, please provide the CRIME RATES for your surrounding community or county/township/parish/city in these three categories: Violent Crime Rate
Property Crime Rate
Drug Crime Rate

Disregard previous format in question #23.
Specify the rate per 100,000 population.
Crime rates are expected to be obtainable from appropriate law enforcement offices.
Data is needed for the activities listed on page 2.

Clr + May
LT Christian May
(703) 681-0491

NOTE: This information is needed urgently. Request you respond with clarification comments (below) or corrected page(s) within 24 hours after receipt at the activity. FAX a preliminary response directly to the BSAT at (703) 756-2174. Then, send your official response, properly certified, through your chain of command for certification and further forwarding to the BSAT. Official documentation must be retained to support your response and be available for validation by the Naval Audit Service.

Reply: For CY 1993, the violent crime rate is 321 per 100,000 (comprised of totals from categories 14,15,16,20,22,23,24,& 25 Data Call #5, Question #23). The Property crime rate is 2,681 per 100,000 (comprised of totals from categories 1 - 13 & 21). The drug crime rate is not available from the Uniform Crime Reporting Agency which was the source of the data.

Name	Code	Commercial Phone #	Date
J.C. Overton, Capt USN	Commander, NSWCDD, Dahlgren VA	703-663-8101	9/9/94

Submission for Dahlgren Site UIC N00178

Revised pg

23. **Crime Rate**. Complete the table below to indicate the crime rate for your air station for the last three fiscal years. The source for case category definitions to be used in responding to this question are found in NCIS - Manual dated 23 February 1989, at Appendix A, entitled "Case Category Definitions." Note: the crimes reported in this table should include 1) all reported criminal activity which occurred on base regardless of whether the subject or the victim of that activity was assigned to or worked at the base; and 2) all reported criminal activity off base.

NSWCDD DAHLGREN SITE

Note: * **Crime rate is given at the total line for each category. Rates are incidents per 100,000 population. For the Dahlgren Site the population is approximately 3200; thus, rates become large for only a few incidents.** R

** **Where available, number of suspects involved are provided at this level for each category.**

Crime Definitions	FY 1991	FY 1992	FY 1993
1. Arson (6A)	**0**	**0**	**0**
Base Personnel - military	**N/A**	**N/A**	**N/A**
Base Personnel - civilian	**N/A**	**N/A**	**N/A**
Off Base Personnel - military	**N/A**	**N/A**	**N/A**
Off Base Personnel - civilian	**N/A**	**N/A**	**N/A**
2. Blackmarket (6C)	**0**	**0**	**0**
Base Personnel - military	**N/A**	**N/A**	**N/A**
Base Personnel - civilian	**N/A**	**N/A**	**N/A**
Off Base Personnel - military	**N/A**	**N/A**	**N/A**
Off Base Personnel - civilian	**N/A**	**N/A**	**N/A**
3. Counterfeiting (6G)	**0**	**0**	**0**
Base Personnel - military	**N/A**	**N/A**	**N/A**
Base Personnel - civilian	**N/A**	**N/A**	**N/A**
Off Base Personnel - military	**N/A**	**N/A**	**N/A**
Off Base Personnel - civilian	**N/A**	**N/A**	**N/A**

UIC N00178

JE 6/13/94

23. **Crime Rate**. Complete the table below to indicate the crime rate for your air station for the last three fiscal years. The source for case category definitions to be used in responding to this question are found in NCIS - Manual dated 23 February 1989, at Appendix A, entitled "Case Category Definitions." Note: the crimes reported in this table should include 1) all reported criminal activity which occurred on base regardless of whether the subject or the victim of that activity was assigned to or worked at the base; and 2) all reported criminal activity off base.

NSWCDD DAHLGREN SITE

Note: * Crime rate is given at the total line for each category.

**** Where available, number of suspects involved are provided at this level for each category.**

Crime Definitions	FY 1991	FY 1992	FY 1993
1. Arson (6A)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
2. Blackmarket (6C)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
3. Counterfeiting (6G)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
4. Postal (6L)	0	33.3	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	1	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
5. Customs (6M)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
6. Burglary (6N)	133.3	166.7	33.3
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	1	1	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
7. Larceny - Ordnance (6R)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
8. Larceny - Government (6S)	766.7	933.3	1133.3
Base Personnel - military	3	3	5

Crime Definitions	FY 1991	FY 1992	FY 1993
Base Personnel - civilian	9	11	9
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	2	N/A	1
9. Larceny - Personal (6T)	11,166.7	1,300.0	666.7
Base Personnel - military	3	N/A	1
Base Personnel - civilian	7	11	6
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
10. Wrongful Destruction (6U)	633.3	966.7	500.0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	4	5	1
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	1	N/A	N/A
11. Larceny - Vehicle (6V)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
12. Bomb Threat (7B)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
13. Extortion (7E)	33.3	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	1	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
14. Assault (7G)	266.7	233.3	266.7
Base Personnel - military	4	2	2
Base Personnel - civilian	4	5	4
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	1
15. Death (7H)/Murder	33.3	33.3	33.3
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	1	1	1
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
16. Kidnapping (7K)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
18. Narcotics (7N)	33.3	33.3	166.7
Base Personnel - military	N/A	N/A	3
Base Personnel - civilian	N/A	1	2
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	1	N/A	N/A
19. Perjury (7P)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
20. Robbery (7R)	100.0	0	0
Base Personnel - military	1	N/A	N/A
Base Personnel - civilian	1	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
21. Traffic Accident (7T)	2,766.7	2,366.7	1,366.7
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
22. Sex Abuse - Child (8B)	100.0	0	100.0
Base Personnel - military	3	N/A	2
Base Personnel - civilian	N/A	N/A	1

Crime Definitions	FY 1991	FY 1992	FY 1993
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
23. Indecent Assault (8D)	66.7	100.0	0
Base Personnel - military	1	2	N/A
Base Personnel - civilian	1	1	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
24. Rape (8F)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
25. Sodomy (8G)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A

NSWCDD DAHLGREN - KING GEORGE COUNTY

Crime Definitions	FY 1991	FY 1992	FY 1993
1. Arson (6A)	7.1	7.1	7.1
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
2. Blackmarket (6C)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
3. Counterfeiting (6G)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
4. Postal (6L)	0	0	0
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
5. Customs (6M)	0	0	0
Base Personnel - military	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
6. Burglary (6N)	271.4	400.0	371.4
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
7. Larceny - Ordnance (6R)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
8. Larceny - Government (6S)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
9. Larceny - Personal (6T)	521.4	1,100.0	1,150.0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
10. Wrongful Destruction (6U)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
11. Larceny - Vehicle(6V)Motor	114.3	85.7	35.7
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
12. Bomb Threat (7B)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
13. Extortion (7E)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
14. Assault (7G)Aggravated	114.3	85.7	92.6
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
15. Death (7H) Murder	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
16. Kidnapping (7K)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
18. Narcotics (7N)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
19. Perjury (7P)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
20. Robbery (7R)	21.4	14.3	21.4

Crime Definitions	FY 1991	FY 1992	FY 1993
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
21. Traffic Accident (7T)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
22. Sex Abuse - Child (8B)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
23. Indecent Assault (8D)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
24. Rape (8F)	14.3	28.6	14.3
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
Off Base Personnel - civilian	N/A	N/A	N/A
25. Sodomy (8G)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A

NSWCDD DAHLGREN SITE WESTMORELAND COUNTY

Crime Definitions	FY 1991	FY 1992	FY 1993
1. Arson (6A)	33.3	13.3	60.0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
2. Blackmarket (6C)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
3. Counterfeiting (6G)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
4. Postal (6L)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
5. Customs (6M)	0	0	0

Crime Definitions	FY 1991	FY 1992	FY 1993
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
6. Burglary (6N)	1,046.7	966.7	546.7
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
7. Larceny - Ordnance (6R)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
8. Larceny - Government (6S)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
9. Larceny - Personal (6T)	1,340.0	1,346.7	1,200.0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
Off Base Personnel - civilian	N/A	N/A	N/A
10. Wrongful Destruction (6U)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
11. Larceny - Vehicle(6V)Motor	73.3	200.0	100.0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
12. Bomb Threat (7B)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
13. Extortion (7E)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
14. Assault (7G) Aggravated	193.3	140	180

Crime Definitions	FY 1991	FY 1992	FY 1993
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
15. Death (7H) Murder	0	6.7	13.3
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
16. Kidnapping (7K)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
18. Narcotics (7N)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
19. Perjury (7P)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
Off Base Personnel - civilian	N/A	N/A	N/A
20. Robbery (7R)	20.0	26.7	26.7
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
21. Traffic Accident (7T)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
22. Sex Abuse - Child (8B)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
23. Indecent Assault (8D)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
24. Rape (8F)	46.7	40.0	20.0
Base Personnel - military	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
25. Sodomy (8G)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A

NSWCDD DAHLGREN SITE - SPOTSYLVANIA COUNTY

Crime Definitions	FY 1991	FY 1992	FY 1993
1. Arson (6A)	0	0	1.8
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
2. Blackmarket (6C)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
3. Counterfeiting (6G)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
4. Postal (6L)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
5. Customs (6M)	0	0	0

Crime Definitions	FY 1991	FY 1992	FY 1993
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
6. Burglary (6N)	408.8	364.9	308.8
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
7. Larceny - Ordnance (6R)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
8. Larceny - Government (6S)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
9. Larceny - Personal (6T)	2714.0	3098.2	2570.2
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
Off Base Personnel - civilian	N/A	N/A	N/A
10. Wrongful Destruction (6U)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
11. Larceny - Vehicle (6V)	231.6	301.8	184.2
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
12. Bomb Threat (7B)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
13. Extortion (7E)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
14. Assault (7G) Aggravated	35.1	64.9	40.4
Base Personnel - military	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
15. Death (7H) Murder	3.5	7.0	5.3
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
16. Kidnapping (7K)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
18. Narcotics (7N)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
19. Perjury (7P)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
20. Robbery (7R)	28.1	31.6	31.6
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
21. Traffic Accident (7T)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
22. Sex Abuse - Child (8B)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
23. Indecent Assault (8D)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
24. Rape (8F)	1.8	0	10.5
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
25. Sodomy (8G)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A

NSWCDD DAHLGREN SITE - FREDERICKSBURG CITY

Crime Definitions	FY 1991	FY 1992	FY 1993
1. Arson (6A)	26.3	63.2	63.2
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
2. Blackmarket (6C)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
3. Counterfeiting (6G)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
4. Postal (6L)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
5. Customs (6M)	0	0	0

Crime Definitions	FY 1991	FY 1992	FY 1993
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
6. Burglary (6N)	652.6	647.4	536.8
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
7. Larceny - Ordnance (6R)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
8. Larceny - Government (6S)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
9. Larceny - Personal (6T)	2715.8	2868.4	3347.4
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
Off Base Personnel - civilian	N/A	N/A	N/A
10. Wrongful Destruction (6U)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
11. Larceny - Vehicle (6V)	400.0	231.6	184.2
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
12. Bomb Threat (7B)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
13. Extortion (7E)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
14. Assault (7G)	468.4	468.4	331.6
Base Personnel - military	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
15. Death (7H) Murder	0	15.8	5.3
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
16. Kidnapping (7K)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
18. Narcotics (7N)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
19. Perjury (7P)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
20. Robbery (7R)	178.9	194.7	142.1
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
21. Traffic Accident (7T)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
22. Sex Abuse - Child (8B)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
23. Indecent Assault (8D)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
24. Rape (8F)	42.1	26.3	52.6
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
25. Sodomy (8G)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A

NSWCDD DAHLGREN SITE - STAFFORD COUNTY

Crime Definitions	FY 1991	FY 1992	FY 1993
1. Arson (6A)	39.3	16.4	19.7
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
2. Blackmarket (6C)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
3. Counterfeiting (6G)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Crime Definitions	FY 1991	FY 1992	FY 1993
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
4. Postal (6L)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
5. Customs (6M)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
6. Burglary (6N)	437.7	327.9	293.4
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
7. Larceny - Ordnance (6R)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
8. Larceny - Government (6S)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
9. Larceny - Personal (6T)	1985.2	2001.6	1990.2
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
10. Wrongful Destruction (6U)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
11. Larceny - Vehicle (6V)	229.5	142.6	150.8
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
12. Bomb Threat (7B)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
13. Extortion (7E)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
14. Assault (7G) Aggravated	144.3	114.8	91.8

Crime Definitions	FY 1991	FY 1992	FY 1993
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
15. Death (7H) Murders	3.3	3.3	3.3
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
16. Kidnapping (7K)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
18. Narcotics (7N)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
19. Perjury (7P)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
Off Base Personnel - civilian	N/A	N/A	N/A
20. Robbery (7R)	70.5	47.5	39.3
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
21. Traffic Accident (7T)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
22. Sex Abuse - Child (8B)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
23. Indecent Assault (8D)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
24. Rape (8F)	19.7	27.9	34.4
Base Personnel - military	N/A	N/A	N/A

Crime Definitions	FY 1991	FY 1992	FY 1993
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A
25. Sodomy (8G)	0	0	0
Base Personnel - military	N/A	N/A	N/A
Base Personnel - civilian	N/A	N/A	N/A
Off Base Personnel - military	N/A	N/A	N/A
Off Base Personnel - civilian	N/A	N/A	N/A

TAB A

TECHNICAL OPERATIONS

FUNCTIONAL SUPPORT AREA - LIFE CYCLE WORK AREA FORM

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Revised pg

Technical Center Site	**Dahlgren Site**
Functional Support Area	**1. Platform, 1.2 Aircraft**
Life Cycle Work Area	**6. Operational Systems Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ______**3.3**___WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)___**8643.9**_____ R

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**157.1**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**1003.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 1-R of 132
UIC: N00178
JR 4/3/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**1. Platform, 1.2 Aircraft**
Life Cycle Work Area	**6. Operational Systems Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ______**3.3**___WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)___**8613.9**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**487.2**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**1003.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**1. Platform, 1.3 Surface Ship**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**2.2**___WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**800.2**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)__**111.1**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**6.7**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 2-R of 132
UIC: N00178
PR 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**1. Platform, 1.3 Surface Ship**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**2.2**___ WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**800.2**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**221.5**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**6.7**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**1. Platform, 1.3 Surface Ship**
Life Cycle Work Area	**8. Acceptance Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**3.0**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**691.9**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**126.5**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**667.2**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**1. Platform, 1.3 Surface Ship**
Life Cycle Work Area	**13. Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**29.7**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3027.4**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**8542.2**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**509.5**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**1. Platform, 1.3 Surface Ship**
Life Cycle Work Area	**14. In-Service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**18.1**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3320.9**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**707.0**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**1801.7**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.1 Gun Systems**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**9.2**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1449.8**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**172.5**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**396.6**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 6-R of 132
UIC: N00178
JK 6/18/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.1 Gun Systems**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**9.2**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1449.8**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**541.7**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**396.6**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.1 Gun Systems**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**39.7**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**6519.6**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**876.6**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 7-R of 132
UIC: N00178
JZ 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.1 Gun Systems**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**39.7**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**6519.6**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**3415.9**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.1 Gun Systems**
Life Cycle Work Area	**4. Engineering and Manufacturing Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**26.5**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**4083.9**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)__**1387.1**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**221.1**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 8-R of 132
UIC: N00178
JL 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.1 Gun Systems**
Life Cycle Work Area	**4. Engineering and Manufacturing Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**26.5**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**4083.9**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**1518.0**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**221.1**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.1 Gun Systems**
Life Cycle Work Area	**5. RDT&E Management Support**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**2.7**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**640.2**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**3.5**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.1 Gun Systems**
Life Cycle Work Area	**6. Operational Systems Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**2.0**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**326.2**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**110.0**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**4905.9**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 10-R of 132
UIC: N00178
6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.1 Gun Systems**
Life Cycle Work Area	**6. Operational Systems Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**2.0**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**326.2**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**440.1**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**4905.9**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.1 Gun Systems**
Life Cycle Work Area	**7. Production**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**3.7**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**634.8**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)__**1.6**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**394.1**______

Note:
In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 11-R of 132
UIC: N00178
6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.1 Gun Systems**
Life Cycle Work Area	**7. Production**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**3.7**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**634.8**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**4.0**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**394.1**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.1 Gun Systems**
Life Cycle Work Area	**8. Acceptance Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**18.0**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3553.0**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)__**1798.2**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______

Note:
In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 12-R of 132
UIC: N00178
JR 4/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.1 Gun Systems**
Life Cycle Work Area	**8. Acceptance Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**18.0**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3553.0**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**2071.8**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.1 Gun Systems**
Life Cycle Work Area	**9. Modernization**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**10.6**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**2567.5**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)__**461.9**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**60.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 13-R of 132
UIC: N00178
JR 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.1 Gun Systems**
Life Cycle Work Area	**9. Modernization**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**10.6**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**2567.5**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**1034.7**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**60.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.1 Gun Systems**
Life Cycle Work Area	**13. Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**32.3**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**5022.8**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**29.6**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.1 Gun Systems**
Life Cycle Work Area	**13. Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**32.3**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**5022.8**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**37.1**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.1 Gun Systems**
Life Cycle Work Area	**15. Program Support**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**16.4**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1761.9**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**129.4**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_ **326.6**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.1 Gun Systems**
Life Cycle Work Area	**18. Simulation, Modeling and Analysis**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**17.1**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**2688.9**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**205.6**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**2412.5**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 16-R of 132
UIC: N00178
JZ 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.1 Gun Systems**
Life Cycle Work Area	**18. Simulation, Modeling and Analysis**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**17.1**_____ WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**2688.9**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**1130.1**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**2412.5**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.2 Guided Missiles**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**27.6**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. **$(K)__3900.0______**

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)__107.7______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. **$(K)_114.5______**

Note:
In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 17-R of 132
UIC: N00178
JR 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.2 Guided Missiles**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**27.6**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3900.0**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**203.1**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**114.5**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.2 Guided Missiles**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**30.3**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**6897.1**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)__**1765.3**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**240.0**______

Note:
In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 18-R of 132
UIC: N00178
JE 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.2 Guided Missiles**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**30.3**____ WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**6897.1**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**4406.4**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**240.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.2 Guided Missiles**
Life Cycle Work Area	**4. Engineering and Manufacturing Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**15.5**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**5028.9**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)_**319.6**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**127.2**____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 19-R of 132
UIC: N00178
JR 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.2 Guided Missiles**
Life Cycle Work Area	**4. Engineering and Manufacturing Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**15.5**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**5028.9**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**329.6**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**127.2**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.2 Guided Missiles**
Life Cycle Work Area	**7. Production**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**34.3**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**7427.8**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**2615.7**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**2453.4**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 20-R of 132
UIC: N00178
JE 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.2 Guided Missiles**
Life Cycle Work Area	**7. Production**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**34.3**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**7427.8**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**2836.9**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**2453.4**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.2 Guided Missiles**
Life Cycle Work Area	**8. Acceptance Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**18.4**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3136.0**____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)__**79.2**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 21-R of 132
UIC: N00178
JE 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.2 Guided Missiles**
Life Cycle Work Area	**8. Acceptance Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**18.4**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3136.0**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**2100.7**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.2 Guided Missiles**
Life Cycle Work Area	**9. Modernization**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**8.0**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**1069.5**_______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)_**13.0**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**______

Note:
In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 22-R of 132
UIC: N00178
JE 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.2 Guided Missiles**
Life Cycle Work Area	**9. Modernization**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**8.0**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**1069.5**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**64.8**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.2 Guided Missiles**
Life Cycle Work Area	**13. Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**17.7**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. **$(K)_3316.4**_______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. **$(K)_132.4**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. **$(K)_10.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 23-R of 132
UIC: N00178
JZ 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.2 Guided Missiles**
Life Cycle Work Area	**10. Program Support**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**17.7**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**3316.4**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**177.8**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**10.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.2 Guided Missiles**
Life Cycle Work Area	**18. Simulation, Modeling and Analysis**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**6.2**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**1317.7**_______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)__**173.8**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**80.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 24-R of 132
UIC: N00178

PR 4/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.2 Guided Missiles**
Life Cycle Work Area	**18. Simulation, Modeling and Analysis**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**6.2**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**1317.7**_______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**2213.8**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**80.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.3 Free Fall Weapons and Rockets**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**3.6**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**735.9**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**550.4**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**10066.3**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 25-R of 132
UIC: N00178
JB 4/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems,** **2.3 Free Fall Weapons and Rockets**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**3.6**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**735.9**_____

b. **Out-of-House Expenditures.** Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**3702.3**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**10066.3**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems,** **2.3 Free Fall Weapons and Rockets**
Life Cycle Work Area	**9. Modernization**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**2.0**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1233.6**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**115.4**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 26-R of 132
UIC: N00178
JZ 4/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems,** **2.3 Free Fall Weapons and Rockets**
Life Cycle Work Area	**9. Modernization**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**2.0**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1233.6**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**626.0**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.7 Explosives**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**8.2**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1688.8**____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)__**1674.1**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**60.0**_____

Note:
In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 27-R of 132
UIC: N00178
JR 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.7 Explosives**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**8.2**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1688.8**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**3838.5**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**60.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.7 Explosives**
Life Cycle Work Area	**9. Modernization**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**4.0**___WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1112.9**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**201.8**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**11176.3**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 28-R of 132
UIC: N00178

JR 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.7 Explosives**
Life Cycle Work Area	**9. Modernization**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**4.0**___WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1112.9**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**336.3**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**11176.3**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.8 Launchers**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**3.6**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**507.3**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)__**54.3**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 29-R of 132
UIC: N00178
JZ 4/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.8 Launchers**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**3.6**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**507.3**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**151.4**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.8 Launchers**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**3.3**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**816.8**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)___**117.6**____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______

Note:
In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 30-R of 132
UIC: N00178
JZ 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.8 Launchers**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**3.3**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**816.8**_______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)___**1175.8**____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.8 Launchers**
Life Cycle Work Area	**7. Production**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**23.0**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**4311.4**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**1810.1**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**240.6**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 31-R of 132
UIC: N00178
JT 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.8 Launchers**
Life Cycle Work Area	**7. Production**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**23.0**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**4311.4**______

b. **Out-of-House Expenditures.** Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**2748.7**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**240.6**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.8 Launchers**
Life Cycle Work Area	**9. Modernization**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**40.3**___WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. **$(K)_7500.1**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)__2649.9_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. **$(K)__2777.3**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 32-R of 132
UIC: N00178
JR 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.8 Launchers**
Life Cycle Work Area	**9. Modernization**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**40.3**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**7500.1**______

b. **Out-of-House Expenditures.** Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**4599.8**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**2777.3**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.8 Launchers**
Life Cycle Work Area	**13. Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**2.3**___WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**462.3**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**175.4**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 33-R of 132
UIC: N00178
JR 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.8 Launchers**
Life Cycle Work Area	**13. Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**2.3**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**462.3**______

b. **Out-of-House Expenditures.** Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**388.6**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.9 Fire Control**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**17.1**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**2733.8**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)__**946.4**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**695.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 34-R of 132
UIC: N00178
JR 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.9 Fire Control**
Life Cycle Work Area	**3. Advanced Development**

R

R

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**60.6**______WYs R

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**9243.1**______ R

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**2468.6**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**710.1**______ R

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 34A-R of 132
UIC: N00178

JR 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.9 Fire Control**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**17.1**____ WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**2733.8**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**978.6**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**695.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.9 Fire Control**
Life Cycle Work Area	**4. Engineering and Manufacturing Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**20.6**___WYs R

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**2959.2**_____ R

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**923.3**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**830.0**_____ R

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 35-R of 132
UIC: N00178
JR 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.9 Fire Control**
Life Cycle Work Area	**4. Engineering and Manufacturing Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**60.6**_______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**9243.1**_______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**2490.2**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**710.1**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.9 Fire Control**
Life Cycle Work Area	**6. Operational Systems Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**19.0**_____WYs R

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**2429.5**______ R

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**400.0**____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**_____ R

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 36-R of 132
UIC: N00178
JR 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.9 Fire Control**
Life Cycle Work Area	**6. Operational Systems Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**20.6**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**2959.2**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**959.8**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**830.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.9 Fire Control**
Life Cycle Work Area	**7. Production**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**31.4**_____WYs R

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. **$(K)_5401.4**______ R

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. **$(K)_1121.4**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. **$(K)_2250.0**_____ R

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 37-R of 132
UIC: N00178
JR 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.9 Fire Control**
Life Cycle Work Area	**8. Acceptance Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**31.4**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**5401.4**_______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**1121.4**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**2250.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.9 Fire Control**
Life Cycle Work Area	**9. Modernization**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**65.2**____WYs R

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. **$(K)__9733.7______** R

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. **$(K)__752.4______** R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. **$(K)__3012.5______** R

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 39-R of 132
UIC: N00178

JZ 4/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.9 Fire Control**
Life Cycle Work Area	**9. Modernization**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**6.7**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1228.1**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**625.4**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**90.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.9 Fire Control**
Life Cycle Work Area	**13. Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**4.3**___WYs R

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**715.6**_____ R

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**52.6**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**30.0**______ R

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 40-R of 132
UIC: N00178
JR 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.9 Fire Control**
Life Cycle Work Area	**13. Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**65.2**___WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**9733.7**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**752.4**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**3012.5**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

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Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.9 Fire Control**
Life Cycle Work Area	**14. In-service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**25.9**_______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3755.6**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)_**306.2**______ **R**

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**681.3**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.9 Fire Control**
Life Cycle Work Area	**14. In-service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**25.9**_______WYs R

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**3755.6**______ R

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**616.4**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**681.3**______ R

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 41-R of 132
UIC: N00178
JZ 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.9 Fire Control**
Life Cycle Work Area	**14. In-Service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**30.2**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**4471.2**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**669.0**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**711.3**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

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Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.11 Weapons Fuzing**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _______**9.4**__WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1208.1**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)__**12.1**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**_______

Note:
In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 42-R of 132
UIC: N00178
JR 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.11 Weapons Fuzing**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ______**9.4**__WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1208.1**_____

b. **Out-of-House Expenditures.** Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**121.4**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.11 Weapons Fuzing**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**16.8**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**2781.6**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**1022.4**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**2500.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.11 Weapons Fuzing**
Life Cycle Work Area	**10. Program Support**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**18.4**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**3860.9**_______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**315.1**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.13 Other Ordnance**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**23.7**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**4891.0**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)__**1145.0**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**298.3**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 45-R of 132
UIC: N00178
JE 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**2. Weapons Systems, 2.13 Other Ordnance**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**23.7**____ WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**4891.0**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**3510.1**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**298.3**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**3. Combat System Integration, 3.3 Surface**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**48.3**_____WYs R

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**7459.7**_____ R

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**3749.7**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**567.5**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 46-R of 132
UIC: N00178
JZ 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**3. Combat System Integration, 3.3 Surface**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**48.2**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**7390.5**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**3805.3**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**567.5**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**3. Combat System Integration, 3.3 Surface**
Life Cycle Work Area	**4. Engineering and Manufacturing Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**33.7**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**4922.6**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)__**356.7**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**150.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 47-R of 132
UIC: N00178
JR 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**3. Combat System Integration, 3.3 Surface**
Life Cycle Work Area	**4. Engineering and Manufacturing Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**33.7**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**4892.2**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**366.7**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**150.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**3. Combat System Integration, 3.3 Surface**
Life Cycle Work Area	**7. Production**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**24.6**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3764.5**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**145.8**____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**12155.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 48-R of 132
UIC: N00178
JE 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**3. Combat System Integration, 3.3 Surface**
Life Cycle Work Area	**7. Production**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**24.6**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3764.5**______

b. **Out-of-House Expenditures.** Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)___**968.4**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**12155.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**3. Combat System Integration, 3.3 Surface**
Life Cycle Work Area	**8. Acceptance Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**25.2**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3797.3**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**1996.3**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**155.7**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**3. Combat System Integration, 3.3 Surface**
Life Cycle Work Area	**10. Program Support**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**33.2**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**5558.9**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**3333.0**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**7428.6**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**3. Combat System Integration, 3.3 Surface**
Life Cycle Work Area	**13. Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**21.5**___WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**2819.9**_____ R

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**500.3**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**1408.2**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 51-R of 132
UIC: N00178
6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**3. Combat System Integration, 3.3 Surface**
Life Cycle Work Area	**13. Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**21.6**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**2889.1**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**613.3**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**1408.2**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**3. Combat System Integration, 3.3 Surface**
Life Cycle Work Area	**14. In-Service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**16.9**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**2255.5**_____ R

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)_**1810.1**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 52-R of 132
UIC: N00178
JR 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**3. Combat System Integration, 3.3 Surface**
Life Cycle Work Area	**14. In-Service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**16.9**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**2286.0**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**1810.1**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

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TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**3. Combat System Integration, 3.3 Surface**
Life Cycle Work Area	**18. Simulation, Modeling and Analysis**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**8.9**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1311.1**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**63.5**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**910.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**3. Combat System Integration, 3.4 Multiplatform**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**13.5**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**2110.5**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**1480.1**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**1135.1**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**3. Combat System Integration, 3.4 Multiplatform**
Life Cycle Work Area	**14. In-Service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**2.4**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**388.0**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**17.5**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**3. Combat System Integration, 3.4 Multiplatform**
Life Cycle Work Area	**18. Simulation, Modeling and Analysis**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**22.9**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3534.8**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**781.2**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**30.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**4. Special Operation Support, 4.1 Landing Force Equipment and Systems**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**3.4**___WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3105.0**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**45.0**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**166.3**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**4. Special Operations Support, 4.2 Coastal/Special Warfare Support**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**2.6**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**457.7**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)___**11.7**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**354.2**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**5. Sensors & Surveillance Systems, 5.2 Radar Systems**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**10.8**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1805.1**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)___**680.2**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**1144.7**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**5. Sensors & Surveillance Systems, 5.2 Radar Systems**
Life Cycle Work Area	**4. Engineering and Manufacturing Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**6.3**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)___**918.9**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)___**179.6**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**65.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**5. Sensors & Surveillance Systems, 5.2 Radar Systems**
Life Cycle Work Area	**7. Production**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**14.4**___WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**2158.0**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**0.0**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**424.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**5. Sensors & Surveillance Systems, 5.2 Radar Systems**
Life Cycle Work Area	**14. In-Service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**18.4**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. **$(K)__3226.0______**

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)_ 286.2______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. **$(K)_853.0______**

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 63-R of 132
UIC: N00178
JZ 4/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**5. Sensors & Surveillance Systems, 5.2 Radar Systems**
Life Cycle Work Area	**14. In-Service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**18.4**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3226.0**______

b. **Out-of-House Expenditures.** Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**304.5**_______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**853.0**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**5. Sensors & Surveillance Systems, 5.3 Special Sensors**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**6.1**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1230.7**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)__**77.6**____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**374.1**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 64-R of 132
UIC: N00178
JZ 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**5. Sensors & Surveillance Systems, 5.3 Special Sensors**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**6.1**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1230.7**______

b. **Out-of-House Expenditures.** Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**119.6**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**374.1**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**5. Sensors & Surveillance Systems, 5.3 Special Sensors**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**8.2**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1549.8**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**272.0**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**200.0**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 65-R of 132
UIC: N00178
JB 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**5. Sensors & Surveillance Systems, 5.3 Special Sensors**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**8.2**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1549.8**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**304.4**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**200.0**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

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TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**5. Sensors & Surveillance Systems, 5.3 Special Sensors**
Life Cycle Work Area	**6. Operational Systems Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**10.6**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1613.3**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**676.0**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**5. Sensors & Surveillance Systems, 5.3 Special Sensors**
Life Cycle Work Area	**7. Production**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**12.9**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**2584.1**_______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**692.3**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**5. Sensors & Surveillance Systems, 5.3 Special Sensors**
Life Cycle Work Area	**9. Modernization**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**2.0**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**305.4**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)___**0.1**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**5. Sensors & Surveillance Systems, 5.3 Special Sensors**
Life Cycle Work Area	**14. In-Service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**4.2**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**587.3**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**42.8**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**70.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**5. Sensors & Surveillance Systems, 5.4 Space Sensor/Surveillance Systems**
Life Cycle Work Area	**6. Operational Systems Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**6.2**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**811.2**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**0.0**_______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**5. Sensors & Surveillance Systems, 5.5 Ocean Surveillance**
Life Cycle Work Area	**18. Simulation, Modeling and Analysis**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**2.0**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**293.9**_______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**164.9**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**6. Navigation, 6.5 Satellite Navigation Systems**
Life Cycle Work Area	**6. Operational Systems Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**1.4**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**200.4**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**0.0**_______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**6. Navigation,** **6.5 Satellite Navigation Systems**
Life Cycle Work Area	**14. In-Service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**2.3**___WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**283.1**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)___**0.0**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**6. Navigation, 6.5 Satellite Navigation Systems**
Life Cycle Work Area	**15. Program Support**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**2.4**___WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**362.5**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**0.0**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**175.0**______

Note:
In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**7. Command, Control, Communications and Intelligence (C^3I), 7.3 Shipboard**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**2.6**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**604.2**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)___**367.0**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**75.5**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 75-R of 132
UIC: N00178
JR 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**7. Command, Control, Communications and Intelligence (C^3I), 7.3 Shipboard**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**2.6**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**604.2**______

b. **Out-of-House Expenditures.** Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)___**439.7**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**75.5**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised Pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**7. Command, Control, Communications and Intelligence (C^3I), 7.3 Shipboard**
Life Cycle Work Area	**4. Engineering and Manufacturing Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**6.7**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**923.1**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. R

$(K)__**36.5**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**116.9**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 76-R of 132
UIC: N00178
JZ 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**7. Command, Control, Communications and Intelligence (C^3I), 7.3 Shipboard**
Life Cycle Work Area	**4. Engineering and Manufacturing Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**6.7**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**923.1**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**91.3**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**116.9**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**7. Command, Control, Communications and Intelligence (C^3I), 7.3 Shipboard**
Life Cycle Work Area	**10. Program Support**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**5.8**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**940.5**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**91.9**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**2053.3**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**7. Command, Control, Communications and Intelligence (C^3I), 7.3 Shipboard**
Life Cycle Work Area	**14. In-Service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**13.2**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**4676.5**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**69.1**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**1294.8**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 78-R of 132
UIC: N00178
6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**7. Command, Control, Communications and Intelligence (C^3I), 7.3 Shipboard**
Life Cycle Work Area	**14. In-Service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**13.2**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**4676.5**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**98.5**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**1294.8**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**7. Command, Control, Communications and Intelligence (C^3I), 7.8 Intelligence Information Systems**
Life Cycle Work Area	**4. Engineering and Manufacturing Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**4.7**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**824.5**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)___**713.5**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**7. Command, Control, Communications and Intelligence (C^3I), 7.8 Intelligence Information Systems**
Life Cycle Work Area	**9. Modernization**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**14.0**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1887.5**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**1303.0**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**30.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoDorganizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**8. Defense Systems,** **8.1 Ballistic Missile Defense**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**24.0**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**4158.2**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)__**622.4**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**250.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 81-R of 132
UIC: N00178

JZ 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**8. Defense Systems,** **8.1 Ballistic Missile Defense**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**24.0**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**4158.2**_______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**896.6**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**250.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**8. Defense Systems,** **8.1 Ballistic Missile Defense**
Life Cycle Work Area	**18. Simulation, Modeling and Analysis**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**48.7**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**9021.7**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_ **1802.5**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 82-R of 132
UIC: N00178
JB 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**8. Defense Systems,** **8.1 Ballistic Missile Defense**
Life Cycle Work Area	**18. Simulation, Modeling and Analysis**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**48.7**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**9021.7**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**2231.5**_______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**8. Defense Systems, 8.2Countermeasures (CM)**
Life Cycle Work Area	**4. Engineering and Manufacturing Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**7.8**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)___**1490.7**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**297.8**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**8. Defense Systems, 8.2Countermeasures (CM)**
Life Cycle Work Area	**15. Program Support**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**2.5**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**523.8**______

b. **Out-of-House Expenditures.** Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**13.7**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**300.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**8. Defense Systems, 8.3 Electronic Warfare (EW) Systems**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**2.9**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**495.4**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**111.4**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**8. Defense Systems,** **8.3 Electronic Warfare (EW) Systems**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**4.7**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**627.0**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**98.0**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**_______

Note:
In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**8. Defense Systems, 8.3 Electronic Warfare (EW) Systems**
Life Cycle Work Area	**4. Engineering and Manufacturing Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**17.8**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**2934.2**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**1759.0**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**200.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**8. Defense Systems,** **8.3 Electronic Warfare (EW) Systems**
Life Cycle Work Area	**6. Operational Systems Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _____**15.2**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**2436.9**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**1272.5**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**8. Defense Systems,** **8.3 Electronic Warfare (EW) Systems**
Life Cycle Work Area	**7. Production**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**3.2**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**512.6**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**0.0**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**5168.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**8. Defense Systems,** **8.3 Electronic Warfare (EW) Systems**
Life Cycle Work Area	**8. Acceptance Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**43.4**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**6651.4**____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**3071.8**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**277.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**8. Defense Systems,** **8.3 Electronic Warfare (EW) Systems**
Life Cycle Work Area	**9. Modernization**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ______**10.8**___WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)___**1958.4**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**1066.2**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**80.0**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**8. Defense Systems,** **8.3 Electronic Warfare (EW) Systems**
Life Cycle Work Area	**14. In-Service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ____**28.8**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**5088.7**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**1891.0**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**186.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**9. Strategic Programs,** **9.1 Navy Strategic Systems**
Life Cycle Work Area	**4. Engineering and manufacturing development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**44.5**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**8281.7**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**1500.0**_______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**9. Strategic Programs,** **9.1 Navy Strategic Systems**
Life Cycle Work Area	**8. Acceptance Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**25.3**_______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**4241.9**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**942.7**_______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**549.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 94-R of 132
UIC: N00178
JE 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**9. Strategic Programs,** **9.1 Navy Strategic Systems**
Life Cycle Work Area	**8. Acceptance Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**25.3**_______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**4241.9**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**970.5**_______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**549.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**9. Strategic Programs,** **9.1 Navy Strategic Systems**
Life Cycle Work Area	**9. Modernization**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**18.4**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3173.7**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**168.8**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**171.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**9. Strategic Programs,** **9.1 Navy Strategic Systems**
Life Cycle Work Area	**10. Program Support**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**50.2**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**7325.6**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**1985.8**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**66.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**9. Strategic Programs,** **9.1 Navy Strategic Systems**
Life Cycle Work Area	**11. Maintenance** R

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**4.3**______WYs R

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**532.1**______ R

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**0.0**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______ R

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**9. Strategic Programs,** **9.1 Navy Strategic Systems**
Life Cycle Work Area	**14. In-Service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**26.5**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**5332.0**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**0.0**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**9. Strategic Programs,** **9.1 Navy Strategic Systems**
Life Cycle Work Area	**15. Program Report**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**101.2**_______WYs R

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**15,056.4**_____ R

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. **$(K)_1,299.3**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**170.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**9. Strategic Programs,** **9.1 Navy Strategic Systems**
Life Cycle Work Area	**15. Program Report**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**123.5**_______ WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**16,966.3**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)_**2787.1**______

R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**170.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 98-R of 132
UIC: N00178

JZ 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**9. Strategic Programs,** **9.1 Navy Strategic Systems**
Life Cycle Work Area	**15. Program Report**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**123.5**_______ WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**16,966.3**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**4274.9**_______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**170.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**9. Strategic Programs,** **9.1 Navy Strategic Systems**
Life Cycle Work Area	**19. Other**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**4.3**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**532.1**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**0.0**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

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TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**9. Strategic Programs,** **9.2 Nuclear Weapons and Effects**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**20.3**_______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3867.3**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**2459.8**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**9. Strategic Programs,** **9.2 Nuclear Weapons and Effects**
Life Cycle Work Area	**13. Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**6.3**_______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**1005.4**_______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**105.6**_______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.1 Personnel and Training**
Life Cycle Work Area	**14. In-Service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**1.5**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**256.4**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**0.0**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**272.9**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.1 Personnel and Training, 10.1.4 Weapons-Related Training Systems**
Life Cycle Work Area	**7. Production**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**7.3**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1132.2**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**0.0**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**394.3**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.1 Personnel and Training, 10.1.4 Weapons-Related Training Systems**
Life Cycle Work Area	**14. In-Service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**2.1**_______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**274.6**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**0.0**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support,** **10.2 Logistics Planning and Implementation**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**12.6**_______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**1611.2**_______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**9.3**_______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K) **125.5**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.3 Facilities Engineering**
Life Cycle Work Area	**8. Acceptance Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**10.6**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**2103.5**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**0.9**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**726.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.3 Facilities Engineering**
Life Cycle Work Area	**10. Program Support**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**15.3**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3640.8**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**417.9**_______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**10978.4**___

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.3 Facilities Engineering**
Life Cycle Work Area	**14. In-Service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**12.7**___WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3211.4**

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**316.6**___ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**2636.0**___

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 108-R of 132
UIC: N00178
6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.3 Facilities Engineering**
Life Cycle Work Area	**14. In-Service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**12.7**____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3211.4**

b. **Out-of-House Expenditures.** Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**684.9**___

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**2636.0**___

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.5 Environmental Description, Prediction, and Effects**
Life Cycle Work Area	**13. Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**8.3**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1784.7**____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**779.1**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.6 Crew Equipment and Life Support, 10.6.3 Surface Ship**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**8.0**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**1650.9**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**1416.0**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.6 Crew Equipment and Life Support, 10.6.3 Surface Ship**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**8.0**_______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**1611.3**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)_**881.7**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 111-R of 132
UIC: N00178
JZ 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.6 Crew Equipment and Life Support, 10.6.3 Surface Ship**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**8.0**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**1611.3**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**954.4**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**0.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.6 Crew Equipment and Life Support, 10.6.3 Surface Ship**
Life Cycle Work Area	**4. Engineering and Manufacturing Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**12.5**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**3000.7**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**1290.4**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**1340.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.6 Crew Equipment and Life Support, 10.6.3 Surface Ship**
Life Cycle Work Area	**7. Production**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**2.4**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**461.8**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**399.3**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**645.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.9 Activity Mission and Function Support**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**9.7**_______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**1255.2**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. R

$(K)_**12.1**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**18.4**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 114-R of 132
UIC: N00178
JZ 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.9 Activity Mission and Function Support**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**9.7**_______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**1255.2**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**121.4**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**18.4**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.9 Activity Mission and Function Support**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**268.8**______WYs R

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**44354.3**_______ R

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**2066.5**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**826.8**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.9 Activity Mission and Function Support**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**192.9**_____ WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**31953.4**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**1498.0**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**826.8**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.9 Activity Mission and Function Support**
Life Cycle Work Area	**4. Engineering and Manufacturing Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**2.5**_______WYs R

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**404.3**_____ R

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**159.1**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.9 Activity Mission and Function Support**
Life Cycle Work Area	**4. Engineering and Manufacturing Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**24.9**_______WYs R

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. **$(K)__2573.7**______ R

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. **$(K)_1667.2**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. **$(K)_0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.9 Activity Mission and Function Support**
Life Cycle Work Area	**4. Engineering and Manufacturing Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**30.4**_______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3362.6**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**3195.0**_______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.9 Activity Mission and Function Support**
Life Cycle Work Area	**7. Production**

R

R

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**5.5**_______WYs R

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**788.8**______ R

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. R
$(K)_**40.0**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**______ R

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 117-R of 132
UIC: N00178

JZ 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.9 Activity Mission and Function Support**
Life Cycle Work Area	**8. Acceptance Testing**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**4.5**_______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**636.9**_______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**0.0**_______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**2548.9**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

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JZ 6/13/94

Revised 10

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.9 Activity Mission and Function Support**
Life Cycle Work Area	**10. Program Support**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**40.3**________WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**6108.6**______ R

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**698.6**_______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**6429.5**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.9 Activity Mission and Function Support**
Life Cycle Work Area	**10. Program Support**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**40.3**_______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**6205.9**______ R

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**698.6**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**6429.5**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 120-R of 132
UIC: N00178

JE 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.9 Activity Mission and Function Support**
Life Cycle Work Area	**10. Program Support**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**40.3**_______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**6206.0**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**698.6**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**6429.5**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

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TAB A
Page 121-R of 132
UIC: N00178
JR 6/13/94

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.9 Activity Mission and Function Support**
Life Cycle Work Area	**14. In-Service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**21.0**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**3779.1**______ **R**

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_ **96.0**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**18414.8**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.9 Activity Mission and Function Support**
Life Cycle Work Area	**14. In-Service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**21.0**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**4020.9**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_ **96.0**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**18414.8**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

JZ 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support,** **10.9 Activity Mission and Function Support**
Life Cycle Work Area	**14. In-Service Engineering**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**21.0**_______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**4020.9**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**121.7**_______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**18414.8**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.9 Activity Mission and Function Support**
Life Cycle Work Area	**15. Program Support**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**13.0**_______WYs **R**

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**2725.1**______ **R**

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**40.6**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**418.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.9 Activity Mission and Function Support**
Life Cycle Work Area	**17. Training/operational Support** R

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**3.9**_______WYs R

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**598.9**______ R

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**259.9**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**_______ R

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 123A-R of 132
UIC: N00178

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.9 Activity Mission and Function Support**
Life Cycle Work Area	**15. Program Support**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**12.4**________WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**2404.9**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**40.6**_______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**418.0**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**10.General Mission Support, 10.9 Activity Mission and Function Support**
Life Cycle Work Area	**19. Other**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**202.4**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**40780.4**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**20375.4**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**13962.1**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

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Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**11. Generic Technology Base, 11.1 Computers**
Life Cycle Work Area	**1. Basic Research**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**2.3**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**378.7**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**21.6**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 125-R of 132
UIC: N00178
JE 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**11. Generic Technology Base, 11.1 Computers**
Life Cycle Work Area	**1. Basic Research**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**2.3**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**378.7**_____

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**25.3**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**0.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**11. Generic Technology Base, 11.1 Computers**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**10.0**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**1571.0**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**65.2**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**391.6**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**11. Generic Technology Base, 11.1 Computers**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**10.0**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**1571.0**______

b. **Out-of-House Expenditures.** Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**187.3**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**391.6**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised Pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**11. Generic Technology Base, 11.2 Software**
Life Cycle Work Area	**1. Basic Research**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**3.4**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**524.0**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding.
$(K)_**1.1**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**27.5**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 127-R of 132
UIC: N00178
JR 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**11. Generic Technology Base, 11.2 Software**
Life Cycle Work Area	**1. Basic Research**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**3.4**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)__**524.0**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**2.2**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**27.5**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**11. Generic Technology Base, 11.2 Software**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**10.0**_______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**1488.6**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**294.3**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**1068.7**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 128-R of 132
UIC: N00178
JZ 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**11. Generic Technology Base, 11.2 Software**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**10.0**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**1488.6**______

b. **Out-of-House Expenditures.** Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**361.7**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**1068.7**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**11. Generic Technology Base, 11.3 Communications Networking**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**12.3**_______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. **$(K)_1927.5**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. **$(K)_181.8**______ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. **$(K)__275.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB A
Page 129-R of 132
UIC: N00178
JZ 6/13/94

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**11. Generic Technology Base, 11.3 Communications Networking**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. _**12.3**_______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**1927.5**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**316.6**______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**275.0**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

Revised pg

]] # TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**11. Generic Technology Base, 11.5 Materials and Processes**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**2.6**_______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. **$(K)_435.0**_______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. **$(K)__85.9**_____ R

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. **$(K)_60.0**_______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**11. Generic Technology Base, 11.5 Materials and Processes**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**2.6**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**435.0**______

b. **Out-of-House Expenditures.** Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**87.9**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**60.0**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**11. Generic Technology Base, 11.8 Design Automation**
Life Cycle Work Area	**3. Advanced Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. __**7.9**______WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**1538.1**______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)__**22.9**_____

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)__**931.7**_____

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TECHNICAL FUNCTIONS
FUNCTIONAL SUPPORT AREA/LIFE CYCLE WORK AREA FORM

Technical Center Site	**Dahlgren Site**
Functional Support Area	**11. Generic Technology Base, 11.10 Other Technology Base Programs**
Life Cycle Work Area	**2. Exploratory Development**

Note: An example of a functional support area - life cycle work area is "1. Platform, 1.1 Undersea, - 10. Program Support".

1. **In-House Work Years.** Provide the number of in-house government employee (civilian and military) work years for FY1993 that were performed in this functional support area - life cycle work area. Workyears are to be consistent with those used in the preparation of inputs to the President's budget. ___**1.1**_____WYs

2. **Expenditures.**

a. **In-House Expenditures.** Provide the total in-house cost in FY1993 for this functional support area - life cycle work area. $(K)_**181.6**_______

b. **Out-of-House Expenditures**. Provide the total funds expended during FY1993 for this functional support area - life cycle work area. **Do not** include direct cite funding. $(K)_**0.0**_______

c. **Direct Cites.** Provide total direct cite funds expended on contract during FY1993 for this functional support area - life cycle work area. $(K)_**128.8**______

Note:

In-House Expenditures - Is comprised of the total obligation authority for direct labor, direct material, direct travel, direct equipment, direct computer support, other direct support services and all overhead.

Out-of-House Expenditures - Is comprised of total obligational authority for direct work (customer funded, mission oriented) performed or to be performed by other than the organizational entity. Out-of-house performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions and private individuals.

TAB B

SPECIAL FACILITIES AND EQUIPMENT

FACILITIES/EQUIPMENT CAPABILITY FORM

TAB B
INTRODUCTION
DAHLGREN SITE

Special Facilities and Equipment described here in TAB B, each play an integral role in providing essential Technical Capabilities which the Navy requires to perform its mission. Many facilities have multiple uses in the development, acquisitions support, and in-service upgrade of Fleet Systems. Individual facilities are usually not stand-alone in the context of system concept development, system engineering, and system integration, but are interconnected with other facilities to provide total system capability.

In addition, facilities and equipment are interconnected with human expertise and experience to provide Technical Capability. Section I of TAB B provides a description of the Technical Capabilities performed at this site and describe the interconnecting of individual facilities and equipment, and the interconnectivity of facilities and equipments with technical expertise and experience. Section II of TAB B provides information on the individual facilities and equipment.

The three matrices which follow graphically depict the applications of the site specific facilities and equipment to the Technical Capabilities of the Dahlgren Division.

Special Facilities \ Technical Capabilities	Surface and Strategic Warfare and Cost Analysis	Combat Systems Engineering	Joint Mission Planning Systems	RF and EO Sensors	Combat & Weapon Control Systems	Weapon Systems	Surface Ship Defense Systems	Cooperative Engagement Capability Systems	Theater Ballistic Missile Defense Systems	Gun Weapon Systems	Marine Corps Weaponry	Strategic and Space Systems	Electronic Warfare Systems	Mine Warfare Systems	Amphibious Warfare Systems	Special Warfare Systems	Diving and Life Support Systems	Electromagnetic Environmental Effects (E3)	Weapon Systems Safety	Chemical/Biological Warfare Defense Systems	Warheads	Weapons Materials	Defense against Nuclear Weapons Radiation Effects	Electrochemical Power Sources (Batteries)	Magnetic Silencing
DAHLGREN																									
1. SLBM Weapons Control Facility			X									X													
2. SLBM Strategic Systems Operational Support Facility			X									X													
3. Scientific and Engineering Computer Complex	X		X			X				X		X	X						X						
4. Program Assurance Facility (PAF)	X			X		X	X	X		X	X		X						X						
5. Cruise Missile/UAV Systems Development and Integration Facility	X		X			X													X						
6. AEGIS Computer Center (ACC)	X	X		X	X			X	X				X						X						
7. Computer Aided Engineering & Performance Assessment Facility	X					X	X			X	X								X		X				
8. Prototype Fabrication Facility						X				X	X		X						X		X				
9. Warhead Development Facility						X			X	X	X										X				
10. Search and Track Sensor Test Site (STSTS)				X			X	X		X	X		X												
11. Phalanx Instrumented Test Facility				X		X	X	X		X			X												
12. AN/SLQ-32(v)1 Program Generation Center, RF							X						X												
13. Anechoic Test Facility				X				X			X		X												
14. Weapons Systems Safety Ananlysis & Evaluation Facility (WSSAEF)						X	X	X		X	X		X						X						
15. EM Vulnerability Assessment Facility (EMVAF)				X		X	X	X		X								X	X						
16. Chem-Bio Engineering Complex											X									X					
17. Pulsed Power Technology Complex				X			X	X					X												
18. Chem-Bio Sciences Complex																				X					
19. Smart Muntions Development Lab.						X				X	X														
20. Systems Technology Facility Complex		X			X		X	X																	
21. Visusalization/Computation Statistics Lab.																									
22. Potomac River Test Range (PRTR)						X		X		X	X										X				

Special Facilities \ Technical Capabilities	Surface and Strategic Warfare and Cost Analysis	Combat Systems Engineering	Joint Mission Planning Systems	RF and EO Sensors	Combat & Weapon Control Systems	Weapon Systems	Surface Ship Defense Systems	Cooperative Engagement Capability Systems	Theater Ballistic Missile Defense Systems	Gun Weapon Systems	Marine Corps Weaponry	Strategic and Space Systems	Electronic Warfare Systems	Mine Warfare Systems	Amphibious Warfare Systems	Special Warfare Systems	Diving and Life Support Systems	Electromagnetic Environmental Effects (E3)	Weapon Systems Safety	Chemical/Biological Warfare Defense Systems	Warheads	Weapons Materials	Defense against Nuclear Weapons Radiation Effects	Electrochemical Power Sources (Batteries)	Magnetic Silencing
COASTAL SYSTEMS STATION																									
1. Mine Warfare Complex														X	X	X									
2. AMCM Complex														X											
3. Countermearsure Evaluator														X		X									
4. Computation & Analysis Facility														X											
5. Computer Software Engineering Lab.														X		X									
6. Mine Exploitation Complex														X	X	X									
7. MIW Fleet Tactics Support Module														X	X	X									
8. Sensor Development Comples Systems Lab.														X		X	X								
9. Mine and MCM Systems & Environmental Test Lab.														X											
10. Amphibious Warfare Engineering & Test Complex														X	X	X									
11. Diving/ Special Warfare Life Support Complex														X		X	X								
12. Hydrospace Lab.																X	X								
13. Underwater Equipment Lab.														X		X	X								
14. Deep Submrg. Test Facility																X	X								
15. Experimental Dive Facility																	X								
16. Ocean Simulation Facility														X			X								
17. NDSTC																X	X								
18. Special Warfare Research & Engineering Complex																X									
19. R&D Underwater CM Fabrication Facility														X	X	X	X								
20. Mechanical Test Lab.														X	X	X	X								
21. General Prurpose Berthing Wharf														X	X	X	X								

Special Facilities \ Technical Capabilities	Surface and Strategic Warfare and Cost Analysis	Combat Systems Engineering	Joint Mission Planning Systems	RF and EO Sensors	Combat & Weapon Control Systems	Weapon Systems	Surface Ship Defense Systems	Cooperative Engagement Capability Systems	Theater Ballistic Missile Defense Systems	Gun Weapon Systems	Marine Corps Weaponry	Strategic and Space Systems	Electronic Warfare Systems	Mine Warfare Systems	Amphibious Warfare Systems	Special Warfare Systems	Diving and Life Support Systems	Electromagnetic Environmental Effects (E3)	Weapon Systems Safety	Chemical/Biological Warfare Defense Systems	Warheads	Weapons Materials	Defense against Nuclear Weapons Radiation Effects	Electrochemical Power Sources (Batteries)	Magnetic Silencing
WHITE OAK																									
1.MBE Laboratory																						X			
2. Magnetic Silencing Complex														X											X
3. Nuclear Weapons Radiation Effects Complex						X																	X		
4. Advanced Weapons Materials Complex						X				X	X											X			
5. Electrochemistry RDT&E Complex						X				X	X			X								X			
6. Radiation Technology Complex										X				X								X	X		
7. Multi-Warfare Assessment & Research Facility (MARS)	X					X								X											
8. ASW Systems Development Facility	X	X			X			X																	
9. Information Sciences Facility Complex	X					X																			
10. Infrared Measurement & Modeling Program (IRAMMP)				X				X			X														
11. Hydroballistics Facility														X							X				
12. Energetic Research and Development Complex						X				X	X			X							X			X	
13. Fuze Development Laboratory						X				X				X							X				
14. Shock Laboratory						X				X	X			X					X						
15. Hypervelocity Wind Tunnel Complex									X	X		X													
16. Underwater Warhead Analysis Facility														X							X				

TAB B

SECTION I

DAHLGREN SITE

TECHNICAL CAPABILITIES

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

The Dahlgren site of the Naval Surface Warfare Center, Dahlgren Division (NSWCDD) is composed of an integrated set of special and unique complexes and facilities designed to perform the technical capabilities required to satisfy its assigned mission. These technical capabilities are discussed in Tab B Section I. Their associated Special Facilities/Equipment located at Dahlgren and at White Oak are discussed in Tab B Section II Dahlgren.

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren**
Facility/Equipment Nomenclature or Title	**Facilities for Technical Capability for Combat Systems Engineering**

1. State the primary purpose of the facility/equipment.

SUMMARY DESCRIPTION

The Dahlgren Division is the recognized expert in surface ship combat systems engineering. In applying this specialized expertise, the following facilities are utilized:

Aegis Computer Center
ASW Systems Development Facility
Systems Technology Facility Complex

These facilities are described in the Attachments.

The Division is in a leadership position with regard to the combat system definition of future surface combatants, and has demonstrated an engineering breadth, depth, and continuity of technical expertise in the support of today's combat systems. Due to this technical foundation in combat systems engineering, and the essential support of the engineering facilities, the Division is in a vital position today with its capability to support the full engineering spectrum of surface ship combat systems; able to perform the multiple roles and provide the technical capabilities required over the system's life cycle. Examples of this capability are the support of OPNAV/SYSCOMs in the concept development and design of future surface ship combat systems; providing the Navy's technical oversight of industry during the detailed design, engineering development, and production of combat system elements; certifying as war-ready and introducing into the fleet the integrated industry-produced combat system elements and their computer programs; developing an engineering strategy for modernizing surface ship combat systems; directing the overall engineering development of these modernizations and developing the associated computer programs; producing and certifying as war ready the computer program package for fleet modernization; and, as part of an integrated team, providing the essential engineering support for the operational phase of the combat system's life cycle.

This engineering perspective, tied inextricably to the engineering facilities, puts the Division in the unique position of providing the connectivity between the fleet and industry regarding operational needs, and for being the conduit for tailoring industry systems and technology to satisfy these fleet needs. It also gives the Navy an inherent capability to quickly and effectively change fleet systems to meet emerging threats, and to introduce system enhancements directly into a theater of war. Overall, from this broad foundation of combat systems engineering expertise, the Division is the focus of the Navy's smart buyer concept for surface ship combat systems through (1) providing the corporate memory and continuum of knowledge and understanding in combat system engineering; (2) matching emerging requirements with affordable available technological advances; (3) prototyping and evaluating promising concepts; (4) providing the honest-broker function among competing industry-produced systems; (5) acting as catalyst to make the systems work in a changing military/world threat environment; and (6) providing foresight to prevent technological surprise.

The facilities are a vital part of surface ship combat systems engineering RDT&E, acquisition support, and software support. The facilities are unique in that they are not duplicated elsewhere and provide a classified operating environment in which combat systems engineering can be conducted. In some cases, they replicate operational ship combat systems as close as is possible for a shore-based equipment configuration, with communication links to other facilities.

The facilities which support combat systems engineering are located at NSWCDD in Dahlgren, VA. and White Oak, MD. (the ASW Systems Development Facility at White Oak will soon be collocated at Dahlgren). Those at Dahlgren are linked via communication nets and provide the capability to integrate multiple weapon systems through unique suites of equipment and communication networks with other facilities. These facilities are in close proximity to the engineering personnel who use them, and are in close proximity to each other. The Aegis Computer Center (the network hub), TOMAHAWK Weapon System Development and Integration Laboratory, AN/SLQ-32 Electronic Warfare Development Laboratory, VLS and GUNS laboratory (Program Assurance Facility), and HiPer-D development facility (System Control Laboratory) are all connected via communication networks and permit efficient and effective communication between project personnel for assessing integration issues during the design phase of combat system development.

The Aegis Computer Center is also linked to several non-NSWCDD facilities, including the Aegis Combat Systems Center at Wallops Island, VA.; the Combat System Engineering Development Site in Moorestown, NJ.; and the Aegis shipyards in Bath, ME and Pascagoula, MS. This connectivity extends the useability of the Division facilities by opening up higher shipboard equipment fidelity for combat systems engineering purposes and provides the connectivity between R&D experiments and operational fleet units. This network of sites and ships gives the Division the capability to conceive ideas, develop concepts, prototype systems, design and test hardware/software, upgrade existing systems and provide for the realistic test environment for ultimate delivery of war-ready combat and weapon systems to the fleet. In addition to the connectivity to other facilities and test sites, the Aegis Computer Center is also linked to the Aegis Training Center (ATC) and located adjacent to the ATC. This collocation promotes interaction and communication between Aegis combat system engineers and ATC personnel, and ensures that training aspects of system operation are factored into the development of combat systems.

The Division currently has the facilities, personnel, and mechanisms in place to engineer and maintain totally integrated surface combat/weapon systems. The close proximity of NSWCDD with customers in Washington, DC and the Atlantic Fleet in Norfolk allows the Division to be highly responsive to operational and national crises.

MISSION

The surface ship combat systems engineering capability is vital to the Navy's mission, and that of the Dahlgren Division. In "From The Sea", the Navy mission stresses that today's forces, and those in the near future, must be prepared to operate in littoral environments, with emphasis on joint and combined operations, crises response, and strategic defense. To operate in such a manner requires highly capable combat systems to counter the expected threats. In turn, the Dahlgren Division's mission is to provide these combat systems for the surface Navy. Thus, this combat system engineering capability is the vital link to the Division standing up to its mission and, in turn, providing its combat systems product for the surface fleet. It is through the combat systems that the warfighting capability of the fleet can adapt to the rapidly changing global situation and to the extremely rapid evolution of technology. The combat systems engineering capability is dedicated to introducing technology into the fleet in a cost-effective manner, and to rapidly and effectively introduce combat system performance enhancements into the fleet to meet emerging threats. These roles have been demonstrated through the development of a technology roadmap, produced in the 21st Century Destroyer Study, to meet the threats of the future; and the rapid introduction of combat system performance enhancements to Aegis ships during the Desert Shield / Desert Storm conflict to counter specific new threats. Together, the combat system-level engineering expertise and the supporting facilities made this possible.

JOINTNESS

As the Navy mission clearly articulates, joint operations is the way of the future. Thus, all combat systems must be joint-operations capable and the combat systems engineering capability must, and does, address that orientation. Since the Aegis Combat System is the combat system for the surface Navy today and the near future, most work has been focused around the Aegis Combat System interoperability with other Navy/Marine Corps systems, as well as those of the Air Force and Army. Datalink connectivity, system interoperability, command and control architecture, joint terminology and training, etc, are all significant systems engineering questions that are continuously being addressed. Also, in the advanced combat system engineering context, joint-services interoperability is a prime consideration in the definition and concept design of future combat system architectures. A good example of this latter technical thrust is the FY 2003 Surface Combatant Study. This study is directed to the combat system definition of the next-generation surface combatant, and joint services interoperability is a prime design consideration. Examples of joint interoperability efforts that the Division is involved in with the Aegis Combat System are:

1) Joint Air Defense Operations / Joint Engagement Zone Joint Task Force (JADO/JEZ JTF) Study. This study is to determine whether a joint air defense / joint engagement zone between the services add any payoff to current air defense procedures. It addresses such things as joint service tactics and doctrine for air defense; identification of C3I requirements; standard operating procedures and employment doctrine; and the combat system capabilities that must be present to accommodate interoperability.
2) AEGIS/PATRIOT Compatibility Demonstration. This is a test to demonstrate the current interoperability between the Aegis Combat System and the PATRIOT missile battery, passing track positional and identification data between the systems to assess system gridlock and datalink connectivity.
3) WAR BREAKER. An Advanced Research Projects Agency program to develop and demonstrate technologies and systems to detect and prosecute time-critical fixed and mobile targets such as SCUD missile launchers. This work is accomplished through simulations in a joint service distributed simulation network and is used to analyze combat system capabilities through wargaming scenarios.

This combat systems capability is also supporting other joint efforts, such as the Tactical Ballistic Missile Defense Program, Cooperative Engagement Capability, and the Joint Tactical Interoperability Data System. Future joint service projects include planned tests between AEGIS and the Marine Corps' Tactical Air Operations Center and the Air Force's Airborne Warning And Control System E-3 SENTRY aircraft.

TECHNICAL FUNCTIONS

The methods and ideas of surface ship combat systems engineering encompass the entire warfighting ship combat system, and identify affordable technical paths toward improved warfighting capability in likely future conflicts. This over-arching expertise serves major combat systems roles such as that for AEGIS, where the Division is designated by the

AEGIS DRPM as technical advisor and combat system engineer for in-service systems. As such, the Division supports the identification of combat system requirements; develops system concepts and design alternatives to meet operational requirements; conducts system design tradeoff analyses; develops system specifications for prime contractor use; provides technical oversight during contractor development and production phases; supports the introduction of the combat systems into the fleet; ensures the war-ready certification of operational combat systems; and provides support and analyses of fleet testing and operations. The Division also provides continual support to the fleet by adapting the combat system to changing operational requirements and introduces these changes directly into a theater of war when required.

ADVANCED COMBAT SYSTEM ENGINEERING - The Division provides full support for the R&D engineering, integration and T&E of advanced capabilities into current and future combat systems. Major development efforts include the FY 2003 Surface Combatant Study, the 21st Century Destroyer Study, Tactical Ballistic Missile Defense, Cooperative Engagement Capability, Joint Tactical Interoperability Data System, High Performance Distributed System Experiment, WAR BREAKER technologies demonstration, and Combat System Architecture Experiments.

AEGIS MODERNIZATION - Current in-service combat systems benefit from advanced engineering designs, as well as new technologies and the latest fleet-ready combat systems. They present performance enhancements that are synthesized into cost-effective warfare systems to overcome operational deficiencies and to meet projected threats. It is the Division's unique responsibility to develop modernization strategies for the Aegis Combat System and to direct and implement the combat system engineering necessary to bring them to fruition. A goal in these combat system configurations is to maximize the configuration commonality across fleet assets to reduce life-cycle cost and maintenance requirements.

UPGRADE ENGINEERING - Operational deficiencies identified from missile and gun exercises, ship trials, lessons learned from deployments and military conflicts, etc, are corrected through near-term fixes, called Upgrades. These upgrades are a critical function to keeping the operational forces on-line and war ready, and are primarily achieved through computer program updates. As with equipment or systems, computer programs must be system engineered from a combat system perspective as well, and this is encompassed within this combat system engineering capability. In line with this, the Division, as charged by the AEGIS DRPM, is the Navy agent responsible for all operational Aegis Weapon System computer programs. Because of this capability, the Division has been tasked on several occasions to provide quick-reaction upgrades to meet the challenges of changing world threats. Examples of this were the Libyan and Persian Gulf crises, where upgraded programs were delivered to Aegis cruisers operating in these hostile areas.

MODELING AND ANALYSES - An integral part of combat system engineering is the analyses that supports the engineering assessments and trade-off studies associated with concept formulations, modernizations, and upgrades of combat systems. These analyses are supported by numerous digital models, varying in their level of fidelity, and are applied throughout all phases of the life cycle -- R&D (new technology assessments, prototyping, and advanced systems engineering); system integration, test and evaluation; acquisition support; and lifetime system engineering, including associated software. They also encompass all warfare areas -- AAW, ASW, STK, and ASUW.

The Division has established an unparalleled analyses capability relative to combat systems, and is a recognized expert by other Navy and joint-service organizations. Besides advanced engineering issues, these talents are applied to fleet exercises, missile firings, special fleet projects, the reconstruction of tactical events, and the analyses of joint interoperability issues. This analyses capability has supported investigations of world-crisis events involving Aegis ships (e.g., Iranian Airbus Incident and Desert Storm), and is the focus of all Aegis Combat System data collection events.

Combat System Certifications - As directed by the AEGIS DRPM, the Division is responsible for engineering and implementing certified war-ready combat system upgrades to operational AEGIS cruisers and destroyers. Following a thorough system definition and design process, the modified Combat System elements are subjected to a comprehensive system test and evaluation process which includes element level certification, and system level performance, integration testing, and certification. The test and evaluation process is conducted in the engineering facilities and high fidelity landbased test sites as well as onboard operational ships, and includes analysis based on documented system performance parameters to ensure that the combat system can perform required ship missions. The test program is designed to evaluate total combat system performance and to ensure that the computer programs can support continuous operations. The resultant product is a combat system that is certified to be war-ready. This capability has resulted in the fleet introduction and operational deployment of numerous combat system upgrades and enhancements to CG 47 Class cruisers and DDG 51 Class destroyers.

SURFACE SHIP ANTI-SUBMARINE WARFARE - The Division is responsible for the AN/SQQ-89 ASW system employed aboard DDG-51, CG-47, DD-963, and FFG-7 class ships. The effort addresses future ship classes and analyzes emerging technologies for application to the AN/SQQ-89 ASW system. This effort encompasses the broad range of the system life cycle from early system design to the engineering change proposal process for operational AN/SQQ-89 systems. The system engineering task concentrates on the integration of the surface ASW system with the existing ship combat system, to include the solution of architectural issues such as integrating and sharing of data, displays, and

computing assets. The Division, in this role, is the Surface Ship ASW ship combat system engineer and the System Integration Agent.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of the data call.

All facilities supporting surface ship combat systems engineering are considered to be Class 2 Moveable. See facility write-ups for details. If some or all of these facilities were moved, the synergism achieved through the connectivity of the facilities, as well as their collocation with the combat system engineers and trainers, would be lost; and the surface ship combat systems engineering capability that has been painstakingly developed at NSWCDD would be essentially impaired and ineffective. Additionally, the specialized and extensive technical expertise and experience residing in the hundreds of combat system engineers currently using these facilities may not be easy to move intact.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

See individual Special Facilities descriptions in Section II.

4. Provide the gross weight and cube of the facility/equipment.

See individual Special Facilities descriptions in Section II.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

See individual Special Facilities descriptions in Section II.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

See individual Special Facilities descriptions in Section II.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

See individual Special Facilities descriptions in Section II.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment

were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

a. Replication or Relocation

Since the combat systems engineering facilities are linked via communication networks, the facilities provide the capability to integrate multiple weapon systems through unique suites of equipment and communications networks, and to facilitate the conduct of experiments and tests. Most are in proximity to the engineering personnel, an arrangement that facilitates effective communication for interproject and design and integration issues. A link with the Aegis Training Center, collocated with the combat systems engineers, facilitates participation of fleet personnel in design and operational issues. Because of these factors, relocation of any of the facilities would degrade the effectiveness and usefulness of the rest significantly.

b. Impact

Without a combat system engineering capability, the surface Navy would quickly lose its capability to operate in a joint-service arena and to counter the threats of the future. Both of these operational requirements mandate a highly integrated and coordinated system of weapon, communication, and battle management capabilities, operating as a total system. This can only be achieved through a total-system engineering perspective, and only the combat systems engineering capability provides this perspective. Without this approach, the development of weapon systems, communication systems, and battle management systems would revert back to the old way of doing things -- development of standalone systems. It is already known that such systems cannot be effectively integrated into the highly complex form of coordination that is required to operate in future environments. These environments of littoral warfare, TBM defense, joint engagement zones, etc, requires the totally integrated approach to warfare that is currently provided by the Division.

Full-spectrum combat systems engineering requires that highly competent and experienced personnel be provided with specialized facilities which offer a classified operating environment in which combat systems engineering can be conducted. They are necessary for investigating advanced computer architectures; developing distributed processing techniques; formulating advanced concepts in doctrine processing; testing the applicability of COTS equipment and software in combat system environments; and exploring advanced combat system architectures for ship performance in current and future environments. The loss of these facilities would therefore deprive the Navy of the ability to address rapidly emerging technologies, concept development of next-generation combat systems, and the evaluation of promising technologies and advanced computing equipment for tactical employment. Thus, the leadership role in evaluating military applications of leading edge

technology and advanced concepts would be lost, resulting in a break in the continuum of knowledge and understanding of combat system engineering that is necessary to provide the Navy with the honest-broker function among competing industry-produced systems. The loss of these facilities would also have a major impact on the Navy's ability to get Aegis cruisers and destroyers to sea and to keep them war ready. Not only would computer program development, computer program test and evaluation, weapon and combat system certification, and fleet problem resolution be adversely impacted, but the ability to produce and install operational computer programs in operational fleet units would be lost.

For the Navy to lose the Division's combat system engineering capability, the fleet's technical interface to the SYSCOMs and industry would be lost, as well as the ability to get fleet operational needs translated into technical system requirements. Also, the Navy's technical leadership for the concept development of next-generation systems would be gone, as well as the capability to quickly and effectively change fleet systems to meet emerging threats. From the position of understanding the strategy, tactics, doctrine, and technical needs of the operational forces, and understanding the technology that industry is developing to support the fleet, the Division is the catalyst that brings the two together for the surface Navy. Without this, the Navy's position as a "smart buyer" would be lost.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

See individual Special Facilities descriptions in Section II.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

See individual Special Facilities descriptions in Section II.

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

The utilization of the facilities covers the full spectrum of tasks over the acquisition cycle. Over the past five fiscal years, the facilities were in operation on the average of approximately 144 hours per week. Of this, the combat systems engineering function utilized around 20% (30 hours per week) of this time (with other functions utilizing the remaining system time), with approximately 80% (450 work years) of the systems engineers using the facilities on a regular basis.

12. Provide the projected utilization data out to FY 1997.

The facility utilization out through FY 1997 is expected to be fairly constant, with a slight upturn in available system hours projected for FY 1996 and FY 1997.

13. What is the approximate number of personnel used to operate the facility/equipment?

In the context of the combat systems engineering capability, the personnel used to operate the facilities are the systems engineers which use the facilities in the performance of their tasks. Of the 560 work years in FY 1993, approximately 80% (450 work years) of the systems engineers require the use of the facilities on a regular basis. These engineers have extensive skill, knowledge, and practical experience in systems engineering using the following disciplines: systems engineering, electronic engineering, computer engineering, computer science, software engineering, mathematics, and physics. At a minimum, they have a high concentration of bachelor's degrees with a medium concentration of master's degrees, and a smaller percentage of doctorate degrees. These personnel not only understand and perform complex real-time digital systems engineering, design, development, testing, safety engineering, system architecture design, algorithm development, etc, but also have knowledge of and produce products to execute the surface Navy's mission in a joint-service environment. The knowledge and experience levels are as follows:

- System design engineers with extensive experience in combat system architectures, hierarchical control structures, computer and information systems, display technology, and integration test and system evaluation.

- Senior system engineers with 10 to 15 years experience in analyzing threats, developing requirements, creating design concepts, developing models and evaluating competing proposals.

- Analysts and engineers with tactical and operational experience in AAW, ASUW, STW, and Surface ASW with knowledge of current Navy doctrines, capabilities, and limitations. Engineers exhibiting a strong capability of developing future operational combat system requirements in each warfare area and an understanding of tactical databases and communication systems.

- Engineers and scientists with specialized expertise in complex real-time digital system definition and development, and real-time digital software design and development of operational combat systems for AAW, ASW, ASUW, and STW.

- Engineers and scientists with several years experience in modern CASE tools, software development methodologies, and CAD software development. Expertise in real-time executives and operating systems, various computer languages, database management and development, expert systems, and optimal estimation theory.

- Engineers and scientists with many years experience in advanced processors, networks, distributed computing technology, fiber-optics, and computing architectures.

14. What is the approximate number of personnel needed to maintain the equipment?

See individual Special Facilities descriptions in Section II.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See individual Special Facilities descriptions in Section II.

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Facilities for Technical Capability for Joint Mission Planning Systems**

1. State the primary purpose(s) of the facility/equipment.

This description covers the following special facilities:

a. Cruise Missile and Unmanned Aerial Vehicles (UAV) System Development and Integration Facility
b. Submarine Launched Ballistic Missile (SLBM) Strategic Systems Operational Support Facility
c. SLBM Weapons Control Facility
d. Scientific & Engineering Computer Complex (S&ECC)

The TOMAHAWK Cruise Missile and Submarine Launched Ballistic Missile (SLBM) are weapons of high national interest, criticality, and visibility. The missions for these essential deterrents are planned using highly specialized and often classified algorithms, models, simulations, data, and computer programs conceived, developed, and validated at NSWCDD and delivered by us to operational ships, submarines, Unified & Specified Commands, and the United Kingdom.

This description encompasses NSWCDD's capability and facilities for strategic and strike targeting and mission planning, as it applies to Navy and Joint Strike systems such as TOMAHAWK, TACAIR, and Unmanned Aerial Vehicles (UAV), and to Strategic Systems such as the Submarine Launched Ballistic Missile (SLBM).

The ability of the Navy and DOD to perform integrated, joint, and allied mission planning for its strike and strategic weapons such as TOMAHAWK, UAV's, and SLBM is critical to the successful execution of operations, as was shown, for example, in interoperability "lessons learned" during Desert Storm. The NSWCDD Joint Mission Planning Systems technical capability is dedicated to rapidly conceiving, developing, and supporting technologically advanced systems to achieve the vital function of joint mission planning.

Unlike individual contractor facilities, NSWCDD supports operational units with its unique, classified total TOMAHAWK Weapon System facility that can perform as an

operational planning center during national crises or covert operations. During peacetime it serves as an integration, test, and evaluation site for mission planning components, as well as for integration and evaluation of mission planning systems with weapon control systems for TOMAHAWK, UAV's, and AEGIS. This technical capability is a key part of the Dahlgren Division's ability to specify, develop, integrate, and evaluate the total surface ship combat system.

Navy requirements in strategic weapon systems have a high priority both within and outside the Navy and at the national level. NSWCDD is essential to the strategic targeting and mission planning of the SLBM systems. A Memorandum of Agreement between US Strategic Command (USSTRATCOM) and Navy Strategic Systems Programs directs that NSWCDD provide USSTRATCOM and National Command Centers with targeting and mission planning software and data for all SLBM systems. The NSWCDD SLBM facility is an integral, required part of the process for the retargeting of the SLBM systems by USSTRATCOM. Targeting data are tested in the facility and transferred among USSTRATCOM, NSWCDD, and the Carrier Task Forces (CTFs) with highly classified data links.

In the area of joint mission planning and strategic targeting NSWCDD is not only a producer of fleet products but also is the Navy's advisor, providing recommendations for program direction, and making technical recommendations and evaluations in all areas from concept and algorithm development through operational impact and life time support.

This in-depth understanding has developed over 40 years as sole laboratory for SLBM targeting, as the principle laboratory for the TOMAHAWK weapon system and, beginning FY93, as the sole laboratory for the shipboard Unmanned Aerial Vehicle (UAV) mission planning and control system.

Our overall role in each weapon system, of which the mission planning is one subsystem, is a full spectrum range of responsibilities for technology advancement, system analysis and engineering, technical advice, system specification, software design and development, system and nuclear safety engineering, system end-to-end validation and evaluation, installation and training, and life cycle system support.

NSWCDD develops and provides to the fleet TOMAHAWK mission planning and weapon control system software and SLBM targeting and fire control system software.

The facilities are used to conduct concept development, software development, and system integration and test, to accomplish full spectrum end-to-end development, integration, and life cycle support of all elements of the SLBM Weapon System, all elements of the

TOMAHAWK Weapon System, and all elements of the shipboard Unmanned Aerial Vehicle (UAV) system, as well as the development and integration of interfaces between these systems, and with the AEGIS Combat System.

The facilities are unique. They are not duplicated elsewhere, they represent the classified, operational environment and equipment as closely as possible ashore, and they also contain the latest technology for concept experimentation and system development. In addition, these facilities are alone in being the place where the entire weapon system can be integrated and tested, for both TOMAHAWK and SLBM. The TOMAHAWK system and UAV system can also be integrated with AEGIS and other surface ship weapon systems developed and tested at NSWCDD. Only at NSWCDD does the total ship combat system environment exist to perform research, development, and life cycle support on each weapon system and their subsystems independently, and more importantly, integrated and interoperable together. This physically interrelated ship environment, including the TOMAHAWK, UAV, Vertical Launching System, and AEGIS Combat System facilities, with their inter- and intra-connected classified data links, allows NSWCDD to support the ships weapons function as no one else can. The facilities are used daily, around-the-clock, and have all been re-built within the past three years to accommodate present and projected needs.

The SLBM facility represents a unique capability in support of Navy strategic systems and is integral in the targeting process from the analysis of capabilities and requirements for USSTRATCOM, to development of targeting algorithms used by USSTRATCOM, to the validation and delivery of targeting data to the fleet, USSTRATCOM, and National Command Centers.

Due to the operational equivalency of the Cruise Missile and UAV Facility, it is used for formal Navy Developmental Testing (DT), and by ships' crews for training. It also uniquely allows realistic experimentation and concept development of emerging technology for joint strike systems. The facility has been in daily use, at a rate greater than one shift per day, and growing and evolving, since 1980.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

FACILITY/EQUIPMENT IS FIXED: Even though all equipment and data links could be moved and re-established elsewhere, the specialized buildings, the 1,000+ personnel, and the 40 years of cumulative expertise and knowledge required to make the work in the facilities meaningful, could not be. In addition, the connectivity with other surface ship systems at Dahlgren Division would be lost, in addition to NSWCDD's ability to serve as back-up for certain operational shore sites. (See #8).

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

REPLACEMENT VALUE:

Building Costs:	**$ 15 M**	
Equipment Costs:	**$50 M**	**(TOM/UAV)**
	$150 M	**(SLBM)**
	$15 M	**(S&E Comp Cplx)**
Total:	**$215 M**	

Cost of Personnel to maintain: $ 4M

Cost of Personnel Using Facility to Accomplish Purpose: $120M **($30M TOMHK/UAV + $90M SLBM)**

4. Provide the gross weight and cube of the facility/equipment.

GROSS WEIGHT AND CUBE:
See individual Special Facilities descriptions in Section II.

5. Indicate any "Special" utility support required by this facility/equipment other than normal electrical power.

"SPECIAL" UTILITY SUPPORT:
See individual Special Facilities descriptions in Section II.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

SPECIAL BUDGET REQUIREMENTS:
See individual Special Facilities descriptions in Section II.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing)

ENVIRONMENTAL CONTROL REQUIREMENTS:
See individual Special Facilities descriptions in Section II

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

REPLICATION, RELOCATION, & IMPACTS: The close proximity of NSWCDD to the headquarters of the Atlantic theater in Norfolk has allowed NSWCDD to be highly responsive to operational and national crises (within hours, for example) particularly regarding the handling and transportation of Top Secret/SCI data and equipment, in resolving emergency system problems, and in being a back-up site for TOMAHAWK fleet operations.

If the Joint Mission Planning Systems capability and its accompanying facilities were eliminated, the impact would be the loss of unique NSWCDD functions on which the DOD, National Command Authority, and our allies rely, and a long severe breach in the continuity of the evolving development of these essential joint service and allied weapons. Some specific examples are:

- **Loss of missile targeting flexibility and responsiveness now available to the National Command Authority and DOD. NSWCDD's facility is a required piece of the SLBM targeting and rapid retargeting processes.**

- **Loss of specialized, classified, research, development and validation support to the SLBM systems of the United Kingdom.**

- **Loss of a back-up TOMAHAWK mission planning center to supplement or perform operational functions during times of national crisis or covert operations; particularly as a back-up to the Cruise Missile Support Activity at CINCLANT.**

- **Loss of NSWCDD unique knowledge, development, and life support of the TOMAHAWK Launch Control function.**

- **Loss of the Navy and DOD ability to evolve strike and strategic weapons to be more integrated and coordinated in their use; especially in the area of strike and mission planning, from national level down to unit level, both within each service and across all services.**

- **Loss of in-depth Top Secret total weapon system knowledge, expertise, experience, and facilities for both TOMAHAWK and SLBM, accumulated over 40 years, and used to develop fleet deliverables.**

- **Loss of government integration and validation of the total weapon system prior to the introduction of each upgrade into the fleet, for both SLBM and TOMAHAWK.**

- **Loss of timely technology advancement and enhancement to respond to the nation's change in how these weapons are used, particularly in how their missions are planned and targets are acquired.**

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

CONSTRUCTION & ESTABLISHMENT:

SLBM Facilities
The first facility was originally built in the mid 1960s and was expanded several times to allow additional test berths (and associated equipment) as the SLBM force grew in system types (i.e., POLARIS, POSEIDON, TRIDENT I and TRIDENT II). Space has also been added for an expanded media preparation facility and for a communication center. Weapons control equipment duplicating the operational environment has been in place and upgraded, since the beginning.

The building which houses the SLBM SSOS facility was completed in November 1990 and occupied in November 1991. It was designed specifically to meet the needs of SLBM strategic targeting and operational support. The Strategic Retargeting System (SRS) Operational Requirements Document directs NSWCDD to provide the capability in facilities and people to support the strategic targeting requirements of the SLBM Strategic Weapon System (SWS). This support includes testing and validation of all preplanned SLBM targeting data, and testing and transfer of all SLBM strategic targeting data and documentation among USSTRATCOM, NSWCDD and the CTFs to comply with the responsiveness requirements associated with changing strategic targeting.

A high performance CDC computer was installed in the S&ECC in 1988, and a high performance CRAY Y-MP2E supercomputer in 1992.

TOMAHAWK Facility
The facility was first established in 1980 with the installation of a single, Secret,

TOMAHAWK Weapon Control System equipment suite, and has evolved into the facility described above. As more equipment was brought to NSWCDD and facility space became inadequate, a MILCON was completed in the late 1980's to provide the majority of the present facility (as well as office space). In 1990 and 1991 the present Top Secret/SCI facilities were added.
The facility contains classified data links connected directly to ships and operational mission planning centers. These links are used by NSWCDD to provide data and software to the fleet in real-time to support their operational missions. The links also accommodate realistic TOMAHAWK Weapon System testing and validation before introduction of upgrades into the fleet.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

FUNCTIONAL SUPPORT AREAS:

2.2 Guided Missiles Weapon Systems
2.9 Weapon Systems Fire Control
3.3 Combat System Integration, Surface
3.4 Combat System Integration, Multiplatform
7.8 Intelligence Information Systems
9.1 Navy Strategic Systems

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

HISTORICAL UTILIZATION AVERAGE:
All four facilities listed are equipped for 3 shift, 24 hour per day operation, and at times are used at those maximum levels, generally depending on world crisis situations. The average utilization is listed below.

1989 - 1993: 106 HRS/WK

[(17 HRS/DAY x 6 DAYS/WK) + 4 HRS/WK EXTRA = 106 HRS/WK]

12. Provide the projected utilization data out to FY 1997.

PROJECTED UTILIZATION DATA OUT TO FY 1997:

1994 - 1997: 120 HRS/WK

[(20 HRS/DAY x 6 DAYS/WK) = 120 HRS/WK]

13. What is the approximate number of personnel used to operate the facility/equipment?

NUMBER PERSONNEL USE/OPERATE FACILITY: 1,098

TOMAHAWK/UAV:	**311**
SLBM:	**787**

The figures include both government and contractor users. The total includes the personnel in #14.

Scientists and engineers executing the Joint Mission Planning Systems technical capability have extensive knowledge, skill, and experience (based on 40 years of uninterrupted effort) in joint mission planning and targeting using the following disciplines: mathematics, physics, computer science, aerospace engineering, systems engineering, computer engineering, and electronic engineering; many have advanced degrees and are reknown experts, some are the only experts, particularly in strategic targeting and fire control. For example, NSWCDD is the only activity with expertise in the TOMAHAWK Launch Control function.

These personnel not only understand and perform complex real-time digital system engineering, design, development and testing; system and nuclear safety-engineering; geophysics; system architecture design; algorithm development; etc., but also, and more importantly, they produce and deliver products to execute the Navy, joint, and allied operational focus in TOMAHAWK, UAV, and SLBM systems. They understand missile targeting, mission planning, missile fire control, surface ship combat system integration, and the integration of surface ship weapons with those of submarines and aircraft to accomplish integrated and joint strikes. These Scientists and Engineers are experts because they design the systems, create them, and nurture them during fleet use. This intimate knowledge of complex digital systems is unique and cannot be duplicated.

14. What is the approximate number of personnel needed to maintain the equipment?

NUMBER PERSONNEL NEEDED TO MAINTAIN FACILITY & EQUIPMENT: 55

Fifty five personnel are required to maintain the facilities for this capability. The figure includes hardware technicians, security control personnel (for rooms and materials), and system administrators. These personnel have special skills and knowledge regarding Navy Standard Computers, unique computers and computer languages developed for

SLBM, and special security handling requirements of mission planning and targeting data, software, equipment, and documentation.

15. Provide one 8 1/2 X black and white photo of the facility/equipment

See indivisual Special Facilities descriptions in Section II.

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Facilities for Technical Capability RF AND EO SENSORS**

1. State the primary purpose(s) of the facility/equipment.

The Dahlgren Division is the recognized expert in RF AND EO sensors for surface ships, Special Operations and Marine Corps applications. This includes the full range of radars such as AN/SPY-1 through man portable sensors, and Elector-Optical sensors such as infrared search and track systems, thermal imaging trackers, television cameras, laser illuminators, rangefinders and weapons, and special purpose devices. The capability includes setting the requirements priorities for new RF and EO sensor systems and their components, as well as their specification, development, acquisition and support to the Fleet. Frequently, the Division is requested by OPNAV, SECNAV and OSD to perform analyses and provide recommendations that become Navy policy. The Division is not only in a leadership position with regard to definition and specification of RF and EO sensors for future Navy combat systems, but has demonstrated sufficient engineering breadth, depth and continuity to support the full spectrum of the life cycle of such sensors from a combat system engineering perspective. This requires the development and implementation of new technologies which are at the cutting edge. The Division is in a pivotal position today due to the dynamic global situation, highly increased sophistication, lethality and availability of anti-ship missiles and rapid evolution of enabling technologies. RF and EO sensors are needed to detect, track, control, engage and perform kill assessment for virtually all shipboard weapons used against surface and air targets. Many others are used for special operations and the Marine Corps. The Dahlgren Division is the leader in sensor technology to counter the low altitude, low observable anti-ship missile threat. Total performance of a combat system's RF and EO sensors has a profound impact on all of its elements. Therefore, this capability is critical to many other Division technical capabilities, specifically, TC#1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 20, and 21. These technical capabilities are listed in Table 1.

New warfighting strategies demand surface ship combat system changes, and technology must be affordably introduced into the fleet to meet emerging threats. Therefore, this capability includes the synergistic design and integration of RF and EO sensors to minimize combat system cost. The Division's RF and EO sensor capability is dedicated to

these ends and has demonstrated this commitment through its successful support and technical leadership of the AN/SPY-lB/D developments and their upgrades; EO and RF upgrades to PHALANX Block 1 Baseline 2C and Baseline 3, and through the rapid and effective development and introduction of special purpose radars and elector-optical devices to meet the Desert Shield/Desert Storm challenges as well as other recent conflicts. In support of the other phases of the acquisition process, the Division supports NAVSEA, SECNAV, PEO-TAD and ONR in the design, development, T&E, and production of new sensor suites for both AEGIS and non-AEGIS ships. Maintaining its leadership position by setting initial requirements, performing Cost and Operational Effectiveness Analyses (COEA), exploratory, advanced and engineering and manufacturing development, quick reaction prototype developments and direct worldwide support to the Fleet is key to the Navy being a "smart buyer" of today's weapon systems, and is a key factor in addressing today's affordability issues.

TC# 1	Surface and Strategic Warfare Analysis, Cost Analysis, Simulation and Modeling
TC# 2	Surface Ship Combat Systems Engineering
TC# 3	Joint Mission Planning Systems
TC# 5	Surface Ship Combat & Weapon Control Systems
TC# 6	Surface Ship Weapon Systems
TC# 7	Theater Air Defense Systems
TC# 8	Surface Ships Defense Systems
TC# 9	Cooperative Engagement Capability Systems
TC# 10	Tactical Ballistic Missile Defense Systems
TC# 11	Gun Weapon Systems
TC# 12	Marine Corps Weaponry
TC# 14	Electronic Warfare Systems
TC# 15	Mine Warfare Systems
TC# 16	Amphibious Warfare Systems
TC# 17	Special Warfare Systems
TC# 20	Weapons Systems Safety
TC# 21	Chemical/Biological Warfare Defense Systems

Table 1. Technical Capabilities Supported by the RF & EO Sensors R&D, T&E, Acquisition Support and Software Support Technical Capability

MISSION

The Division's technical capability of RF and EO Sensors R&D, T&E, Acquisition

Support and Software Support has a vital role in the current Naval mission as well as the future. RF and EO sensors will continue to provide the critical sense function for the combat system and provide the information required to track threats, point and control weapons and perform kill assessment. The Navy requirement for new EO surveillance and track sensors is growing rapidly, as is the need for new RF sensors that can cope with existing and projected threats and countermeasures while remaining affordable. This technical capability supports the overwhelming majority of the other technical capabilities of the Division. It is dedicated to establishing new RF and EO sensor requirements and development and incorporation of affordable new technologies into future sensor systems. This is accomplished through analysis, test and evaluation, guidance and tasking to industry and academia to leverage their capabilities and investments, in-house developments and joint efforts with other Centers and Services, and through continuous interaction with the Fleet to isolate existing system problems and their solutions. Littoral warfare entails a wide range of challenges to RF and EO sensor performance, and significant RDT&E is underway to improve sensor performance in near-land environments, including gathering and analysis of field data under benign and combat conditions, and implementation of new techniques to mitigate the negative effects of ducting, land clutter and dense RF environments. The capability is fully dedicated to the entire spectrum of support of the acquisition process as well as ensuring that operational systems receive the proper level of support to both hardware and software elements. For example the Division developed the AN/KAS-1 thermal imager. This development was carried from concept through exploratory, advanced, and engineering development, including training, DT/OT, first article acquisition and test, pilot production, installation of pilot production units on ships and training of the operators. Responsibility for full scale production and life cycle support was transferred to an in-service engineering agent (ISEA). However, the Division continued to provide expert technical assistance to the ISEA as required, resulting in a nearly 3 to 1 reduction in article cost, improved performance and availability. Modified versions were used for special operations, security systems and the Marine Corps and Army. During Desert Shield/Desert Storm, the Division provided expert assistance to the US Army to incorporate technologies from the AN/KAS-1 into tank sights, providing them a new capability to detect and identify chemical nerve agents. At the inception of the AN/KAS-1, there were no thermal imagers on surface ships. There are now more than 1200. Improved systems are in production and under development.

JOINTNESS/DUAL USE

This capability is committed to maximizing the dual use of new and existing RF and EO sensor systems, and to explore new methods to support Joint engagements. As examples, work is in progress to allow the AN/SPY-1 radars to support anti-ballistic missile engagements by land batteries, thereby becoming an integral part of theater air defense

over land. An exploratory development project is developing new technologies that will allow IR starring focal plane arrays to provide two orders of magnitude improvement over presently fielded IR systems. This investment is focused not only on enabling development of extremely capable shipboard sensors, but also allows the development of smaller and less costly sensors for ships, missiles and aircraft, and to improve array production yield, which is presently low. This has the promise to impact the use of focal plane arrays by all the services, as well as a wide range of commercial and scientific applications. The exploratory development of high power, high efficiency active RF array elements by the Division will have tri-service and commercial applications. In addition to conventional contracts to industry and universities, the technical capability has numerous no cost contracts which help focus industry IRAD programs to joint benefit.

TECHNICAL FUNCTIONS/CORE FUNCTIONS/GOODS & SERVICES

This capability is recognized as the initiator of, contributor to, and catalyst for future surface warfare and combat system RF and EO sensor system concepts. It is the primary driver for introduction of new sensor technologies into the Fleet through all aspects of the RDT&E acquisition process. This is possible only through close coordination with many other Division capability areas, industry, academia, international scientific committees, other government and NATO RDT&E organizations, evaluation of foreign weapons sensor systems, membership on all surface based radar and EO sensor committees of the Joint Directors of Laboratories along with constant interaction with Fleet and intelligence agencies. The technical capability has international experts in both RF and EO technologies and systems. The complex and interactive application of theory to such systems often requires 15-25 years of experience. The intrinsically governmental nature of these functions make it impossible to replicate the capability in industry, and the expertise, experience and facilities make its replication elsewhere in government impractical. It provides the basis to identify affordable RF and EO sensor technical solutions which will provide improved warfighting capability in likely future regional conflicts. As such, the Division develops combat system requirements, system concepts and design alternatives through system design tradeoff analyses. It develops system specifications for prime contractor use, provides engineering, consulting and oversight support during contractor development and production phases, supports introduction of the combat system into the fleet, and provides support and analysis of fleet testing and operations. The Division also provides continual support to the fleet by adapting RF and EO sensors to changing operational needs. This technical capability is critical to maintenance of Fleet readiness and responsiveness to new missions.

ADVANCED SENSOR SYSTEM ENGINEERING

Several Dahlgren Division departments provide full support for the requirements analysis, R&D, engineering, integration, T&E and software support of RF and EO sensors. Major development efforts include:

AN/SPY-1 A/B/D Software Support: Leader for the development of AN/SPY-1 B/D radars and the support of all SPY-1 software, supporting all AEGIS ships.
AN/SPY-1 Upgrade: Leader for the SPY-1 Upgrade Program, from inception through design. This upgrade is a major departure from earlier, less capable designs.
Tactical Ballistic Missile Defense: Modify and integrate the AEGIS SPY-1 radars to support Theater Air defense against tactical ballistic missiles, using ship-launched missiles as well as those launched by shore batteries.
Phalanx Close-in Weapon System: Technical lead for inception, definition, specification, development and testing of the EO surface mode for PHALANX Block 1 Baseline 2C (and beyond) and the new radar suite for PHALANX Block 1 Baseline 3.
Ship Self Defense Program: Define, specify, develop, test, and evaluate the EO and RF sensors for the Ship Self Defense Program, which is developing new self-defense capabilities for non-AEGIS ships.
Tartar NTU: Develop the fire control upgrades for the New Threat Upgrade for TARTAR ships, and provide direct Fleet support to improve sensor performance and identify and correct design problems.
ONR Surface Weapons Systems Technology Program: Provide the technical lead in the exploratory development of new EO and RF sensors, multi-sensor integration systems and advanced track filters to support ship self defense.
Elector-Thermal Gun BTI: Develop a fully automated EO sensor system that will acquire and precisely track inbound targets and multiple outbound supersonic 60 mm interceptors, producing a differential track accuracy of better than 100 microradians to support command guidance. Interface the dual band (Ku and W) TASD BTI track radar to the ETG fire control system with a differential track accuracy 10 times better than current track radars.
ARPA Active Module Program: Provide technical oversight of the development of competing advanced technology microwave active modules. Beyond identifying the most promising approaches to active array element design, the modules will be incorporated into the Cooperative Engagement Capability (CEC) system to build its active array communications antennas. A strong potential exists for a wide range of commercial and military applications.
Special Warfare Testing: Perform classified RF and EO measurements which have resulted in major changes in special warfare countermeasure systems, tactics and vulnerability assessments. This proved useful during Desert Shield/Desert Storm where tactics and systems for specific operations were developed and tested prior to actual execution.
Alert & Cue/Passive Sensors: Develop a new low cost AAW RF and EO sensor suite for

Marine Corps Armored vehicles.
Thermal Imaging Sensors Evaluation: Comparative performance field testing and evaluation of foreign and domestic thermal imaging systems for use on surface ships.
IRAMMP: A joint laboratory technology program to characterize infrared background clutter to establish requirements and specifications for new surface ship and aircraft IR systems.
TASD BTI: Balanced Technology Initiative to develop a dual band radar capable of providing an order of magnitude improvement in track accuracy to support hit to kill command guided weapons.
Periscope Detection: Develop a suite of RF and EO sensors to detect periscopes and other submarine masts.
Advanced Radar technology: Exploratory development of ultra wide band radars to detect mines in the surf zone, as needed to perform littoral and amphibious warfare.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The major facilities required by this technical capability need to be collocated. Some would require major demolition and new construction to replicate. It is not reasonably possible to relocate the Search and Track Sensor Test Site, since it requires immediate proximity to the PRTR. No other such location exists in CONUS. To obtain such a capability elsewhere would be extremely expensive, difficult and protracted from an environmental and legal standpoint.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

Performance of the R&D, T&E, Acquisition Support and Software Support described above requires not only a significant body of highly skilled scientists, engineers and technicians, but also a number of specialized and often unique facilities. The major facilities required to support this technical capability have significant monetary value and interconnectivity with other functional support areas. In some cases they effectively cannot be relocated, in others the cost would be high. Table 2 summarizes these factors.

FACILITIES	REPLACEMENT VALUE ($M)	INTERCONNECTIVITY W/FSAs See Appendix A for names.
AEGIS Computer Center (ACC)	Facility: 7.8 Equipment: 155.0	1.3,2.1,2.2,2.8,2.9,2.10,3.33.4,5.1,5.2,5.3, 5.4,5.5,6.3 6.4,6.5,7.3,7.5,7.8,8.2,8.3 10.3,10.6.3,10.9
Search and Track Sensor Test Site (STSTS)	Facility: 2.0 Equipment: 5.6	2.9,3.3,4.2,5.2,5.3,5.5,7.2 7.3,7.4,7.5,8.2,8.3,10.5

FACILITIES	REPLACEMENT VALUE ($M)	INTERCONNECTIVITY W/FSAs See Appendix A for names.
Phalanx Instrumented Test Facility	Facility: N/A Equipment 5.8	1.3,2.1,2.9,2.10,3.2 3.3,3.4,5.2,5.3
Anechoic Test Facility	Facility: 4.5 Equipment 1.0	1.2,1.3,1.4,4.1,5.3,7.4,7.8 8.3,11.4
Electromagnetic Vulnerability Assessment Facility	Facility: 20.6	1.0(All),2.0(All),3.0(All) 4.0(All),5.2,6.0(All),7.3 8.2,8.3,9.0(All)
Pulsed Power Technology Complex	Facility: 6.5	2.6,8.3,11.4,10.6.3,11.5 11.6,11.10
Program Assurance Facility (PAF)	Facility: 7.8 Equipment 155.0	1.3,2.1,2.8,2.9,2.10 3.3,3.4,5.1,5.2,7.3 10.1.1,10.9
Infrared Measurement and Modeling Program (IRAMMP) Facility	Facility: 4.5	1.2,1.3,2.1,2.2,2.9,3.2,3.3 4.2,5.3,5.5,6.3,7.2,7.3,8.2 9.1,10.5,11.10

Table 2. Special Facilities Replacement Values and Associated Functional Support Areas

The replacement value describes only the facilities, not the cost of moving or replacing people, nor does it include any costs for access, control, environmental factors or cost of real estate. No value is estimated on the impacts to Fleet safety and readiness. A detailed description of these facilities is provided in the attachments. For example, the Search and Track Sensor Test Site (STSTS) coupled with the Potomac River Test Range (PRTR) provides critical capabilities that could not be duplicated at any reasonable price, since a combination of environmental restrictions and real estate costs have prevented development of similar capabilities elsewhere. The STSTS coupled with the PRTR, provides an 80,000 yard land-free horizon, littoral environment, high capacity infrastructure and ground truth both at the STSTS and multiple locations downrange. It provides the only instrumented overwater facility where routine operations include inbound and outbound gun launched projectiles that emulate low altitude, low observable antiship cruise missiles, drones and aircraft that can be flown at any altitude and subsonic speed and surface craft. The STSTS is the only overwater facility developed for large scale multi-sensor system testing. It has dedicated multi-sensor integration development and test areas which provide computer rooms and state of the art controls and displays, mounting locations for multiple sensors and a secure staging room that allows testing of brassboard systems which must be protected from the weather. These capabilities have proven critical for quick reaction developments during Desert Shield/Desert Storm and to support special operations. Major assets include long and short range surveillance radars, CIWS Block 0 and Block 1, SLQ-32 V3 and V4, an AN/SPG-51D tracker/illuminator, precision elector-optical and optical tracking systems, fiber optic and

copper communication networks, and fully armored laboratories, allowing execution of otherwise hazardous evolutions. A major feature is its collocation with its primary users, allowing efficiency of operation and use. It has close proximity to air facilities at Patuxent River, Quantico and the Norfolk area, providing efficient availability of tactical aircraft. Loss of this facility would leave the Navy with no means to develop and test shipboard sensors and sensor systems in a littoral environment with the ground truth needed to support modern weapons. This facility is also frequently used by special operations groups, the Marine Corps, and occasionally by the Air Force. Loss of the ACC or EMVAF would result in immediate serious impacts on Fleet readiness and safety.

4. Provide the gross weight and cube of the facility/equipment.

The RF and EO Sensors Technical Capability is directly supported by 198 scientists, engineers and technicians along with their laboratories, office spaces facilities and equipment. The portions of the above facilities that could, in principle, be moved, gross approximately 860 tons. A larger portion could not be moved, but would require demolition and reconstruction.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

No special or unusual utilities are required by this technical capability, other than those described in the attachments.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

This technical capability requires an unusual amount of secure office and laboratory space, and some of the facilities, as described on the attachments, require special budget requirements for construction, infrastructure and real estate.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

As described in the attachments, a large portion of the special facilities require clean, raised floor computer and equipment development facilities with tight requirements for environmental controls.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment

were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The RF and EO sensors technical capability could be relocated only with great difficulty, and relocation would result in the permanent loss of portions of the capability. This consequence would result from loss of unique facilities that could not reasonably be relocated due to high cost, the lack of alternate locations where control of the air and surface in a littoral environment would allow necessary test evolutions, and/or the significant reductions in capability that would result from loss of frequent interaction with other Division technical capabilities which support or use the RF and EO sensors technical capability. In addition, the high level of skills and experience required for much of this technical capability would be very difficult and expensive to reconstitute. This technical capability is critical to the specification and acquisition of new RF and EO sensors and combat systems. Since these functions are inherently governmental in nature, they could not be reconstituted in industry.

RF and EO sensors provide the sense functions that are required to operate and fight surface ships. Although other sources of information are available, such as sonar and various sources of intelligence and offboard information, RF and EO sensors are, and will remain, the dominant, irreplaceable sensors that support surface ship ASUW, AAW, Strike and other operations, and provide critical capabilities in ASW and mine warfare. The role and scope of this technical capability has increased markedly over the last 5 years, and is projected to have a proportionately greater importance throughout the Rightsizing process and increased emphasis on dual use technologies.

This technical capability directly supports the operational Fleet's present requirements as well as those of the future. The loss of this capability, or any significant interruption of the support provided to the fleet would impact major combat system elements such as the AEGIS AN/SPY-1 radar, PHALANX CIWS and others. Quick reaction support to the Fleet has proved pivotal in previous conflicts as well as maintaining present readiness. This technical capability has also provided an important quick reaction capability (QRC) and QRC system surge capability during times of crisis.

Collocation of the ACC with the AEGIS Training Center, the STSTS, PRTR and the AEGIS engineering community is already optimal. Dislocation and disruption of the AEGIS radar development, software support and training process and the loss of hundreds of millions of dollars invested would provide no benefit. An identical capability would have to be developed at much greater cost.

The ability of the STSTS, along with the Potomac River Test Range, to replicate littoral environments, representative targets, downrange ground truth and an integrated infrastructure to support multi-sensor testing requires real estate, access and use rights that could not be met within CONUS, if at all. The unique and irreplaceable capability to develop and test multi-sensor systems in a controlled littoral environment would be lost, seriously damaging the Navy's future ability to counter anti-ship missiles.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The Division's RF and EO sensor technical capability was established in the early stages of both sensor technologies, and has continued to grow in relative and absolute importance to the operational Fleet as well as to the RDT&E, specification and acquisition of new sensors and sensor systems.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1. Platforms	1.3
2. Weapons Systems	2.1,2.2,2.6,2.9,2.10
3. Combat System Integration	3.3
4. Special Operations Support	4.1,4.2
5. Sensors and Surveillance Systems	5.2,5.3,5.5
6. Navigation	6.3
7. Command, Control, Communications and Intelligence	7.3
8. Defense Systems	8.2,8.3
10. General Mission Support	10.5
11. Generic Technology Base	11.4,11.5

Table 3. Functional Support Areas Supported by the RF and EO Sensors Technical Capability (See Appendix A for names)

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

The present level of effort directly supporting this technical capability is approximately 200 workyears per year. This level of effort has grown approximately 40% since 1989.

12. Provide the projected utilization data out to FY1997.

As a consequence of the Rightsizing process, a reduction of approximately 20% is projected by 1997.

13. What is the approximate number of personnel used to operate the facility/equipment?

Scientists and engineers (S&E) providing support to this technical capability have extensive skill and knowledge in the following disciplines: systems engineering, electronic engineering, physics, computer science, mathematicians, mechanical engineering and control systems. The S&E's have a high concentration of Bachelor's degrees, a moderate concentration of Masters degrees and a smaller percentage of Doctorate degrees. Typical knowledge and experience levels are:

> **1) Electronic engineers with 10-20 years experience with radar, elector-optical sensors design, development and integration, system engineering, RF and EO countermeasures and threat analysis.**
>
> **2) Physicists with 10-25 years experience with radar and elector-optical system analysis, design, performance prediction, environmental effects on sensor systems, and threat analysis.**
>
> **3) Computer Scientists with 5-20 years experience with computer architecture, real time software programming concepts and methodology, military (e.g., CMS-2 and ADA) and commercial languages (e.g., FORTRAN, C, PASCAL, MODSIM, MATLAB), modern CASE tools and advanced microprocessors and array processors technology.**
>
> **4) Mechanical Engineers with 10 to 20 years experience with the structural analysis and design of sensors, control systems, precision stabilization of shipboard systems and environmental effects on sensors.**

14. What is the approximate number of personnel needed to maintain the equipment?

Two hundred workyears per year are needed to support the present funded efforts of the technical capability. The level of effort required to operate major facilities is approximately 15 government employees and 15 contractors. Due to multiple users of these facilities, a level of effort of approximately 7 government employees directly support RF and EO operations at these facilities.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See Special Facilities descriptions in Section II

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Facilities for Technical Capability Combat & Weapon Control Systems**

1. State the primary purpose(s) of the facility/equipment.

The primary facilities used in support of Surface Ship Combat and Weapon Control Systems research and development, test and evaluation, acquisition support, and software support are listed below. A detailed description of each is attached.

AEGIS Computer Center (ACC)
ASW Systems Development Facility
System Technology Facility Complex
Program Assurance Facility (Vertical Launching System (VLS) portion)
Cruise Missile and UAV System Development and Integration Facility

Two factors combine to raise the total value to the Navy of these facilities beyond their individual worth:

o Their collocation, both physically and with respect to administrative support

o Combined expertise and experience brought by the NSWCDD workforce

The primary purpose of this technical capability is to provide surface ship combat and weapon control systems to the Navy and for joint services operations. The control system provides the critical resources coordination and direction functions that integrate the various sensor and weapon systems within a combat system and in newer systems autonomously fights the ship in accordance with pre-established doctrine. The control system also provides the interoperability required for joint service applications. Additionally, control system technology strongly influences the architecture and engineering of systems and their components through the conduct of control system research, development, and proof of concept experiments applicable to large-scale systems such as AEGIS. For these reasons, this technical capability is a vital element of our overall combat system engineering capability and responsibilities.

a. NSWCDD's Leadership Role

NSWCDD currently has a leadership role in every major surface ship combat and weapon control system in each warfare area (antiair warfare (AAW), antisubmarine warfare (ASW), strike warfare (STW), antisurface warfare (ASUW)), covering the full spectrum of life cycle support from research and development (R&D) to fleet support. Two highly visible programs of high national interest and criticality which this technical capability supports are the AEGIS Combat System and TOMAHAWK Weapon Control System.

b. Implications of the Capability

A vital part of this technical capability includes adapting and transitioning new technologies and advanced capabilities in computing systems and combat system architectures to meet the challenges and changing requirements resulting from moving from global war scenarios to regional, littoral conflicts, and the need for more highly integrated combat systems yet which provide greater flexibility, survivability, and user friendly attributes. Because of our broad, in-depth experience and full-spectrum responsibility, we are able to act as the Navy's "smart buyer" for control systems, bridging emerging fleet requirements with affordable, available new technologies. Because of our in-house government role with respect to the fleet and industry we can evaluate, develop, and focus new control technologies in areas most critical to the Navy. This is a key consideration with today's austere budgets.

An in-house technical capability of surface ship combat and weapon control systems is vital for the current Navy mission as well as for the future. Because of it the Navy can respond quickly and directly during national crises to solve problems or to introduce new system enhancements, as was the case for the AEGIS cruisers immediately prior to Desert Storm. It allows the direct fleet feedback and lessons learned from events like Desert Storm to be used in developing or focusing improvements or technologies in areas of maximum benefit and interest to the ultimate customer--the fleet.

The changing global situation with its anticipated future warfighting scenarios highlights two areas in which control systems play a key role. First, preparation for regional, littoral contingencies and conflicts requires combat systems to be more flexible than ever, and it is the combat system architecture and resident control system that are the most important features effecting this flexibility. In the functional combat system partitioning of detect, control, and engage, the control function is what shapes the focus of the mission and coordinates and directs the various sensors and weapons to fulfill the mission. The second area undergoing extensive change is the requirement for highly integrated joint service operations. Again, it is the control system function which provides the interoperability between systems and services. Therefore, this technical capability represents a critical part

of the Navy's and NSWCDD's ability to provide effective and affordable joint-capable control systems to meet the challenges and requirements of future joint battle forces.

Control systems for surface ship combat systems of the future must be architectually designed to be highly flexible, adaptable, and integratable into all of the major command and control systems in order to be responsive to the ever-changing warfighting scenarios. One area where this need became evident and was illustrated was in recent Desert Storm operations where AEGIS combatants were designated air sector controller for all joint forces aircraft in the northern Persian Gulf. Another was a need for shared information between AEGIS and PATRIOT systems. This technical capability therefore is critical to ensuring that the connectivity and interoperability requirements are satisfied in future systems. Current joint interoperability efforts in which this technical capability plays a role are Joint Air Defense Operations/Joint Engagement Zone Joint Task Force (JADO/JEZ JTF) study, AEGIS/PATRIOT compatibility demonstrations, and WARBREAKER. A description of these efforts is provided in TC2. Other joint efforts supported by this technical capability are Theater Ballistic Missile Defense program, Cooperative Engagement Capability, and the Joint Tactical Interoperability Data System.

Associated with jointness is the concept of dual use technology. An example is the HiPer-D effort which is a technology experiment examining distributed computing system architectures, networking, scalability, reusability, fault recovery, and distributed control with man-in-the-loop. This technology has widespread application in the commerical world such as in communications and medical and manufacturing industries.

c. Technical Functions/Control Systems Supported

(1) AEGIS Weapon System. NSWCDD is the AEGIS lead laboratory and the Lifetime Support Engineering Agent (LSEA). This responsibility includes serving as combat system engineer for modernization and Technical Direction Agent (TDA) for technology applications. We have overall AEGIS combat and weapon system engineering responsibilities of which a large and integral part is the control functions inherent in the system. These responsibilities encompass full spectrum support in all engineering areas, from battleforce requirements analysis and technology transfusion, to direct fleet support and engagement reconstruction and analysis.

As technology TDA, NSWCDD provides long-term, strategic project planning for the injection of state-of-the-art control technologies into the combat system, as well as the conduct of research, development, test, and evaluation (RDT&E) in a number of specific areas such as control system architectures, command and decision support, multi-sensor integration and tracking, weapon control, advanced combat identification systems, tactical graphics, and high-performance distributed control system demonstrations and technology evaluations.

In addition, as AEGIS lead laboratory and LSEA, we identify combat system requirements, develop system concepts and design alternatives to meet requirements, conduct system design trade-off analyses, develop system specifications for prime contractor use, provide engineering and consulting support during contractor development and production phases, support introduction of the combat system into the fleet, and provide support and analysis of fleet testing and operations. We also provide continuous support to the fleet by adapting the combat and weapon control system to changing operational needs.

(2) Antisubmarine Warfare Control System Mk 116. NSWCDD is the Surface Ship ASW Control System TDA and LSEA and, as such, works with the Program Executive Office (PEO)-Undersea Warfare to identify needed fleet capabilities. Solutions to these needs are developed, prototyped, tested, and introduced into operational software builds of ASW control systems. In this role, NSWCDD performs R&D combat control development studies for transition to advanced development and operational systems. Outputs from the R&D efforts are transitioned to a variety of control systems, such as spinoffs from the Mk 116 Mod 7 ASW to future systems such as TDSS (Tactical Decision Support System). Similarly, in the AAW area, current studies being conducted by NSWCDD relative to defining requirements for the 21st Century Destroyer and FY 2003 Combat System, as well as various technology assessments and advanced system engineering efforts, will lead to capability improvements in future combat systems.

This assignment is closely linked with the NSWC role as ship combat system engineer. The control system is the ASW interface to the rest of the ship combat system. Part of NSWCDD's thrust is to share data and displays with other warfare elements of the combat system to produce an integrated and coherent architecture for surface ship combat systems. To achieve this requires a total ship combat system engineering approach.

(3) TOMAHAWK Weapon Control System. As Principal Support Laboratory for the TOMAHAWK Weapon System (TWS), NSWCDD is responsible for system engineering and analysis, system end-to-end validation, combat system engineering, software design and development, and lifetime engineering for the TOMAHAWK Weapon Control System (TWCS) and mission planning system. Technology development is also carried out under Office of Naval Research sponsorship for sea-based mission planning systems.

NSWCDD is unique in its capability and facilities to perform R&D, T&E, and software support functions between the TWCS and other parts of the TWS, such as mission plan-

ning (TC3) and missile functions (TC6), and between TOMAHAWK and related weapon systems such as AEGIS (TC2 and 5), (ASWCS) (TC5), and also various C^4I systems.

(4) Vertical Launching System. NSWCDD serves as the TDA for all Vertical Launching System (VLS) hardware, firmware, and software systems and as the Computer Program Acquisition Engineering Agent (CPAEA) for VLS tactical, support, and simulation software. NSWCDD is responsible for providing system engineering support to the VLS effort from initial concept definition and evaluation, through production and operational support. This effort includes requirement and specification definition, monitoring the prime contractor efforts during the design and development stage, test and evaluation of engineering product releases, and acceptance of final product prior to production. NSWCDD directs and approves implementation of changes to the VLS systems, provides system integration, test site and ship site support, and limited production support. It provides nuclear and conventional safety testing and analysis on the VLS firmware and software systems and maintains configuration management libraries and data bases in support of all developmental and operational systems.

(5) Unmanned Aerial Vehicles (UAV) Control System. A mission needs statement for Department of Defense Joint Short Range (SR) UAV was approved in 1988 to provide UAV capability to meet joint service requirements. In 1991 a Vertical Take-Off and Landing (VTOL) UAV technology demonstration program was authorized to reduce technical risks associated with employing UAV systems aboard Navy ships. This demonstration includes air vehicles, automated recovery systems, data links, and combat system integration. The specific task described in this technical capability is the combat system integration of UAVs into surface ships, and particularly the prototyping of the control system for UAVs. This effort will demonstrate the technical feasibility of integrating UAVs with combat system elements and the interoperability and commonality for command and control of the land based UAV-SR air vehicle. This effort will be referred to as the UAV Ship Combat System Integration Program.

NSWCDD has been tasked to develop a prototype ship UAV demonstration system using a SR Hunter Block 0 UAV (referred to as PS UAV demo system). NSWCDD is integrating the UAV system into combat systems, developing a PS UAV demo test bed capable of simulation and hardware-in-the-loop testing, and developing a Prototype Ship Mission Planning and Control Station (PS-MPCS) in a standard Navy computer (TAC-3) using Ada.

(6) High Performance Distributed Computing Program (HiPer-D). The purpose of the HiPer-D program is to use Advanced Research Projects Agency (ARPA) technology to improve real-time performance and reduce cost while maintaining positive system control for mission-critical combat system applications. Supporting objectives include validated

scalability of computational capacity to meet growing mission requirements, dynamic fault tolerance for survivability and availability, flexible "hardware independent" design to accommodate future growth and technology capture, validated test and integration approaches, and demonstrated compatibility with Ada language requirements.

NSWCDD is implementing several major combat system functions in Ada that together comprise a Standard Missile 2 Air Engagement Control (AEC) capability similar to that of the AEGIS Weapon System. Functionality includes doctrine management and decision-making, weapons selections and scheduling optimization, positive control of system configuration and access, distributed display management, and real-time fault-tolerant designs for combat applications. A distributed design is being developed for optimum use of MACH, ISIS, and various ARPA high-performance computing hardware targets. The design will facilitate incorporation of track data and identification data from programs developed by others (to validate integration) and will provide a complete "detect-to-engage" sequence for performance evaluation using both nonintrusive and minimally invasive techniques. The program also includes a full design evaluation of distributed processing for combat systems.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

All facilities supporting this technical capability are considered to be Class 2 Moveable. See attached facilities write-ups for details. If some or all of these facilities were moved, the connectivity which exists between them through a fiber optic network allowing the conduct of combat system experimentation, concept exploration/proof of concept, and integrated test and evaluation, would be lost (see facilities write-up for details). Additionally, the specialized and extensive technical expertise and experience residing in the hundreds of engineers and scientists currently using these facilities to perform the functions associated with this technical capability may not be as easy to move.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

See individual Special Facilities descriptions in Section II.

4. Provide the gross weight and cube of the facility/equipment.

See individual Special Facilities descriptions in Section II.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

See individual Special Facilities descriptions in Section II.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

See individual Special Facilities descriptions in Section II.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

See individual Special Facilities descriptions in Section II.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

a. Replication or Relocation

Since they are linked via communication networks, the facilities supporting this technical capability provide the capability to integrate multiple elements of multiple weapon systems through unique suites of equipment and communications networks and to facilitate the conduct of experiments and tests. Most are in proximity to the facilities housing the engineering personnel, an arrangement that facilitates effective communication for interproject and integration issues. A link with the AEGIS Training Center, colocated in Dahlgren with NSWCDL, facilitates participation of fleet personnel in design and operational issues.

Because of all those factors, loss or relocation of just one of the facilities would negatively impact the effectiveness and usefulness of the rest significantly.

b. Loss Impact to the Navy

Providing the basis for major program decisions and technological improvements in the combat and weapons control systems area is an inherently government function. In the traditional combat system functional partitioning of detect, control, and engage, the control function is of particular importance since it represents the integration within a weapon system and, in fact, provides the integration across weapon systems to make up a

combat system. With the increased emphasis and requirement for future joint service coordination and cooperation, the combat command and control functions play the most critical of roles to ensure this capability.

NSWCDD possesses the broad corporate memory and strategic acquisition insight for the combat system. It is responsible for keeping the overall efforts focused on areas that are appropriate to change and off areas that possess no reasonable chance to be significantly altered. This allows the developments to proceed without wasting time on elements that do not matter in the overall perspective. NSWCDD performs the lead role of integrating the long-term views of the 2003 ship design issues with the near-term baseline development issues for AEGIS ships. Since only government personnel are allowed to participate in the 2003 discussions (due to competition-sensitive information disclosures), NSWCDD serves a critical function in this role.

In all control system initiatives, NSWCDD provides the requisite proprietary bridge for disclosure of technology opportunities that could not be disclosed except to a government agency. Technology vendors are very reluctant to reveal their product details to the "system houses" (prime contractors) due to fears of being preempted to the market place by the primes. NSWCDD is the non-threatening honest broker that can be "trusted" to not compete against the technology vendors. Thus the vendors disclose to NSWCDD their products and the ideas are integrated without divulging proprietary information.

c. Uniqueness of NSWCDD

Because of our current roles and expertise in AEGIS, TOMAHAWK, Surface ASW, VLS, and several other smaller related control system efforts, NSWCDD is uniquely positioned and qualified to make significant contributions relative to the changes that are coming in the control system area resulting from new technologies in computing systems and combat system architectures and advanced capabilities and the requirement for joint service operations. If this technical capability were lost from NSWCDD, it would severely impact the Navy's ability to effectively, efficiently, and objectively evaluate and implement new technologies, equipment, and systems. It would also have major impact on several other technical capabilities such as Combat System Engineering (TC2), Surface Ship Weapon Systems (TC6), Theater Air Defense Systems (TC7), Tactical Ballistic Missile Defense System (TC10), and Cooperative Engagement Capability System (TC9) to name a few of the most obvious capabilities that are related to, and dependent on, the control systems functions.

If the ASW work were lost, NSWCDD would lose the ability to interface ASW systems with the rest of the ship combat system. The ASW Control System is the part of the ASW system that provides tactical input to the ship combat control system regarding contact

position and launches ASW weapons. The control system is also the part of the ASW system that receives contact information from other warfare areas and integrates that information with the sonar data and any other available ASW data to maintain the ASW tactical picture.

In the case of TOMAHAWK, NSWCDD is now responding to new, immediately needed requirements for increased cruise missile responsiveness and system flexibility in order to provide even better strike support during future regional conflicts throughout the world. Enhanced evolutions of the TOMAHAWK Weapon Control System and Mission Planning System are being developed and validated by NSWCDD to meet the new requirements. No other activity has the capability or facility to perform R&D, T&E, and software support across the entire TOMAHAWK system, nor between it and systems such as AEGIS and ASWCS. It has taken 15 years for NSWCDD to develop this unique, in-depth, total system and software knowledge, and its loss would result in a greatly diminished support for the present TOMAHAWK weapon and for its future development.

NSWCDD has the existing facilities, personnel, and expertise to accomplish the UAV Program, and there is significant leveraging of other ongoing efforts to ensure synergy in developing mission plans for TOMAHAWK and UAVs, integration of UAVs into future AEGIS combat systems, integration of UAVs into future surface combatants, and synergy between information management and computer system technologies and the use of UAVs. If this effort is performed by another activity, all facilities and combat system expertise would require duplication by the new performer.

NSWCDD has the unique corporate flexibility to view alternative technology solutions without being constrained by corporate management's concern for profit. Since a profit motive might cause corporate management to focus exclusively on upgrades to the current product lines of prime contractors it may not be in the best interest of the Navy.

d. Integrated Systems

Finally, if the technology base were lost in this technical capability, development activities would not be linked to operational systems and technology transitions would not occur into future combat systems. Furthermore, if NSWCDD were to lose the technology base work in any one of the warfare control areas (AAW, ASW, STW), our ability to interface that control system with the rest of the ship combat system would be lost and a total surface ship combat system for future surface ships would not become a reality. Consequently this technical capability, together with TC2, is essential for NSWCDD and the Navy to realize a total integrated surface combat/weapon system for its combatants.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

See individual Special Facilities descriptions in Section II.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

See individual Special Facilities descriptions in Section II.

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

In FY 93, approximately 80% of the personnel associated with this technical capability depend on and use the various facilities (see para. 13 below). This results in a utilization average that varies from approximately 80 hours per week for the System Technology Facility Complexes to 106 hours per week for the Cruise Missile and UAV System Development and Integration Facility to 144 hours per week (6 days, 24 hours/day) for the AEGIS Computer Center.

12. Provide the projected utilization data out to FY1997.

The utilization is projected to be relatively constant through FY 97, although the Cruise Missile and UAV System Development and Integration Facility is expected to increase from 106 hours per week to 120 hours per week and the System Technology Facility Complexes anticipates modest increases.

13. What is the approximate number of personnel used to operate the facility/equipment?

In the context of this technical capability, the personnel used to operate the facilities are the Scientists and Engineers (S&Es) which use the facilities in the performance of their tasks. Of the 441 in-house work-years and 399 contract work-years supporting this control system technical capability in FY 93, approximately 80% of the personnel require the use of the various facilities on a regular basis, or approximately 700 people. These individuals represent S&Es having extensive skill and knowledge in the following disciplines: system engineering, electronic engineering, computer engineering, computer science, mathematics, and physics. At a minimum, the S&Es have a high concentration of bachelor's degrees with a medium concentration of master's degrees and a smaller percentage of doctorate degrees. The knowledge and experience levels are as follows:

- **System design engineers with extensive experience in control system architectures,**

hierarchical control structures, computer and information systems, display technology, and integration test and system evaluation

- Senior system engineers with 10 to 15 years experience in analyzing threats, developing requirements, creating design concepts, developing models, and evaluating competing proposals

- Analysts and engineers with tactical and operational experience in AAW, STW, and Surface ASW with knowledge of current Navy doctrines, capabilities, and limitations. Engineers exhibiting a strong capability of developing future operational control requirements in each warfare area and an understanding of tactical databases and communication systems

-Engineers and scientists with specialized expertise in complex real-time digital system definition and development and real-time digital software design and development of operational control systems for AAW, ASW, ASUW, and STW

- Engineers and scientists with several years of experience in modern CASE tools, software development methodologies, and CAD software development. Expertise in real-time executives and operating systems, various languages, database management and development, expert systems, and optimal estimation theory

- Engineers and scientists with many years experience in advanced processors, networks, distributed computing technology, fiber-optics, and computing architectures

14. What is the approximate number of personnel needed to maintain the equipment?

See individual Special Facilities descriptions in Section II.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See individual Special Facilities descriptions in Section II.

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Facilities for Technical Capability Weapon Systems**

1. State the primary purpose(s) of the facility/equipment.

As a critical part of its mission the Dahlgren Division provides R&D, T&E, Acquisition Support and some In-Service Engineering Support for virtually every weapon system aboard Navy surface ships. These weapon systems include surface launched missiles and missile launchers, guns, gun ammunition and ship launched decoys. Our contributions cover a very broad spectrum, from technology development all the way to ship board integration. These contributions depend heavily on a wide range of facilities. These facilities include the Scientific and Engineering Computer Complex, Program Assurance Facility, Cruise Missile/UAV System Development and Integration Facility, Computer Aided Engineering and Performance Assessment Facility, Prototype Fabrication Facility, Warhead Development Facility, PHALANX Instrumented Test Facility, Weapons Systems Safety Analysis and Evaluation Facility, Electromagnetic Vulnerability Assessment Facility, Smart Munitions Development Laboratory, Nuclear Weapons Radiation Effects complex, Advanced Weapons Materials Complex, Electrochemistry R&D Complex, Multi-Warfare assessment and Research Facility, Information Sciences Facility Complex, Energetic Research and Development Facility, Fuze Development Lab, Wind Tunnel and Potomac River Test Range. A detailed description of each of these facilities is attached.

Our Science and Technology programs not only develop new weapons concepts, many of which have found their way into the fleet, but we also develop the necessary supporting technologies required by industry and ourselves in the development, product improvement and performance assessment of weapon systems for the fleet. As an integral part of this process we continually evaluate Navy needs and future trends to ensure that the Navy has the right weapons for the task at hand. Our weapons development involvement is primarily in requirements definition, technical direction, performance assessment, environmental assessments (i.e. electromagnetic radiation, shipboard vibration, etc.) and systems safety. In areas which are uniquely DOD and have no commercial application, such as warhead development, we are responsible for the entire design and development process.

Although all of these functions are critical to the Navy, perhaps our most important contribution is to provide the systems engineering and integration required to transform a multiplicity of weapon system components into an effective combat system. This process drives the optimal mix of weapons, i.e. missiles, guns, or decoys, as well as the flow down of requirements necessary to define the weapon systems specifications for new weapon systems, for product improvements, and ship board modifications. This process requires a broad mix of facilities and technical specialists in the many diverse system elements. The Dahlgren Division is unique in its ability to bring all of the necessary expertise and facilities together to ensure that this critical process is completed. The importance of this unique capability was recognized by COMNAVSEA, COMNAVAIR, AND ASN with the formal assignment of NSWC as the lead Center for surface ship combat systems, weapon systems and missile system engineering and integration.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

Although most of the facilities are moveable, some are not, particularly the Potomac River Test Range. See the attached facility descriptions for further details.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

See individual Special Facilities descriptions in Section II.

4. Provide the gross weight and cube of the facility/equipment.

See individual Special Facilities descriptions in Section II.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

See individual Special Facilities descriptions in Section II.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

See individual Special Facilities descriptions in Section II.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

See individual Special Facilities descriptions in Section II.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The Dahlgren Division is unique in that at this single facility we bring together the weapon and combat systems expertise necessary to ensure that the Surface Navy has effective combat systems capable of defending themselves and their crew while projecting power ashore. Combined with the uniqueness of the water range and other facilities, the Dahlgren Division provides the Navy with a capability that does not exist elsewhere and would be virtually impossible to duplicate. These facilities and expertise were developed through hands on experience provided by many years of cold war and hundreds of millions of dollars invested in weapons and combat systems research and development. If we eliminate or disperse this capability the vulnerability of our surface ships will increase. If we eliminate it and try to duplicate it later, the same level of investment in time and dollars will most likely be required.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The Dahlgren Division has been involved in weapons R&D and T&E since it first opened in 1918. Additional facilities have been added as the need arose. For specific details on each facility see the attached facility descriptions.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1. Platforms
- **1.3 Surface Ships**

2. Weapons Systems
- **2.1 Gun Systems**
- **2.2 Guided Missiles**
- **2.7 Explosives**
- **2.8 Launchers**
- **2.10 Weapons Data Links**
- **2.11 Weapons Fuzing**
- **2.12 Weapons Propulsion**

2.13 Other Ordnance
3. Combat System Integration
3.3 Surface
8. Defense Systems
8.1 Ballistic Missile Defense

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

These facilities are utilized by a broad range of scientists, engineers and technicians performing a very broad range of functions. Specialties include System Engineers, Mechanical, Electrical, Chemical and Aerospace Engineers, Physicists, Operations Research Analysts, Mathematicians, and Computer and Material Scientists. In all the Dahlgren Division has approximately 310 workyears per year in support of Surface Ship Weapon Systems, excluding the Weapons Control Functions.

12. Provide the projected utilization data out to FY1997.

Although the overall Navy budget is drawing down, the Navy's investment in Ballistic Missile Defense, Naval Surface Fire Support and Ship Self Defense are increasing. Considering these investment increases, offset by the shift in emphasis toward the private sector, we can expect a reasonably constant or slight increase in facilities utilization, perhaps 310 to 320 workyears per year.

13. What is the approximate number of personnel used to operate the facility/equipment?

Specific details are provided in the individual Special Facilities descriptions in Section II.

14. What is the approximate number of personnel needed to maintain the equipment?

See individual Special Facilities descriptions in Section II.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See individual Special Facilities descriptions in Section II.

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Facilities for Technical Capability for Surface Ship Defense Systems**

1. State the primary purpose(s) of the facility/equipment.

SUMMARY DESCRIPTION

Surface ship defense is the "enabling" capability which allows the fleet to carry out its offensive and peacetime presence responsibilities by providing anti-air warfare defense against the cruise missile threat and anti-surface warfare defense against terrorist and suicide-mission threats. The Dahlgren Division, the recognized in-house Navy center of expertise in surface warfare, is providing warfare analysis, basic and exploratory research, requirements specification, verification and validation testing, certification of performance, risk reduction engineering, and the system engineering leadership to bring together the numerous manufacturing firms into a cohesive team focused on surface ship defense.

In executing these efforts this technical capability takes advantage of the following special facilities which are described in greater detail in the attachments:

- **Program Assurance Facility**
- **Search and Track Sensor Site (STSTS)**
- **Phalanx Instrumented Test Facility**
- **AN/SLQ-32(V) Program Generation Facility**
- **Electromagnetic Vulnerability Assessment Facility (EMVAF)**
- **Systems Technology Facility Complex**
- **Computer Aided Engineering & Performance Assessment Facility**
- **Weapons Systems Safety Analysis & Evaluation Facility**
- **Pulsed Power Technology Complex**

In addition, the Ship Defense Systems Engineering Center at Wallops Island, Virginia provides a unique facility supporting all ship self defense system baselines and equipments in a fully integrated laboratory environment which is adjacent to the Virginia Capes Operating Area. The Engineering Center is 33,000 square feet with a mast structure mounting radars, electro-optic sensors, and electronic warfare receivers and jammers. The

Engineering Center is connected to the AEGIS Combat Systems Center, also at Wallops Island, allowing joint operational testing and connected via LINK II radio circuits to operational ships and aircraft in the operating area.

MISSION

The demise of the Soviet Union and the rapid worldwide proliferation of advanced technology weapons to Third World countries have resulted in a rapid shift away from an emphasis on open-ocean global warfare to regional or limited conflicts involving Third World nations in littoral waters; the recent Persian Gulf War is a clear example.

To operate effectively in this environment, the required robust and integral self defense capability must provide both a final anti-air warfare layer of defense when operating in joint expeditionary operations and an autonomous capability. Although a frigate, destroyer, or aircraft carrier may be "under the umbrella" of an AEGIS STANDARD missile envelope, an integral final layer of defense is needed to counter the sea-skimming missile threat. The declining force structure as well as the littoral warfare environment results more often in situations where ships operate independently or as small expeditionary forces (e.g., in amphibious landing operations, blockade or barrier operations, or search and rescue operations).

JOINTNESS/DUAL USE

By congressional direction, the surface ship defense program is presently considering concepts for providing ship self defense to the Strategic Sealift force. Ship self defense systems for Maritime Prepositioned Ships and commercial oil tankers is being planned.

The Dahlgren Division also provides consultation and technical guidance to the U. S. Coast Guard on ship defense systems.

TECHNICAL FUNCTIONS/CORE FUNCTIONS/GOODS & SERVICES

To satisfy surface ship defense mission requirements, existing system elements must be upgraded and new critical developments must be initiated. The Dahlgren Division team conducts top-level trade-off analysis to assist the customer in determining the strategic direction the Navy acquisition community should proceed technically. Specific functions are:

DETECTION SYSTEMS

The Dahlgren Division has changed the Navy's emphasis within the detection system from radar frequency bands to multispectral sensors incorporating electro-optic (infrared scanning and thermal imaging) and wideband radar systems (TASD). Dahlgren Division scientists conducted a research program which altered the fundamental understanding of atmospheric propagation as it pertains to low-flying cruise missile detection. That knowledge is being applied today by the PEO(TAD) Ship Self Defense program to develop the next generation multisensor detection systems and used to evaluate U. S. and foreign sensors for suitability; e.g., the Thermal Imaging Sensor System. The Search and Track Sensor Site located adjacent to and utilizing the Potomac River Test Range is central to development efforts allowing side-by-side testing of various sensors, tactical and non-development items, on a controlled, over-the-water range which replicates the extreme threat environment posed by low-flying cruise missiles.

CONTROL SYSTEMS

The Dahlgren Division provides system engineering leadership in analyzing and specifying advanced tactical computer systems required by complex rules of engagement and target identification requirements. Advanced system architectures, e.g., distributed, single-board computer plants connected by fiber-optic networks, have been prototyped and evaluated to determine risks and performance limits. The Dahlgren Division has applied this commercial-of-the-shelf technology in the New Threat Upgrade Fire Control Radar Data Processor and the Ship Self Defense System demonstrated on the USS Whidbey Island, LSD-41, in June 1993. The Dahlgren Division conducts verification and validation of the computer programs for New Threat Upgrade, Ship Self Defense System Mark 1, Vertical Launch System, and SLQ-32 Electronic Warfare System. The Dahlgren Division directs capability improvements to the tactical software for these programs insuring systems performance is adequate to defeat future threats.

ENGAGE SYSTEMS

The Dahlgren Division leads the Navy's team in concept formulation, performance analysis and exploratory research in integrating electronic warfare into hardkill (missile and gun) defense systems. The cruise missile threat exhibits high speed, low detectability and maneuver characteristics which stress the surface ship's ability to defend itself. The scientists and engineers at the Dahlgren Division are incorporating new electronic warfare techniques derived by a threat exploitation program at the Naval Research Laboratory into the SLQ-32 system which, when fully coordinated with hardkill systems, will enhance the total ship defense capability. The Dahlgren Division is the technical director of the next

generation Advanced Integrated Electronic Warfare System (AIEWS) formulating concepts, requirements and acquisition documentation.

The Dahlgren Division provides technical direction to the U. S. Navy and foreign navies for the Vertical Launch System to insure new missiles are fully integrated, can be safely launched, and are compatible and safe in a shipboard environment.

The Dahlgren Division provides Navy technical direction to the PHALANX Close-In Weapon System and is responsible for the establishment of requirements and industry compliance of adding electro-optic sensors to provide an anti-surface capability. Technical direction is also provided to foreign users.

The Dahlgren Division provides overall system assessment and smart-buyer capability to the Navy's STANDARD missile program. It directs such improvements as dual-mode guidance using infrared seekers, warhead improvements to improve lethality, and greater kinematic capability to defend against high flying and theater ballistic missiles.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

See individual Special Facilities descriptions in Section II.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

See individual Special Facilities descriptions in Section II..

4. Provide the gross weight and cube of the facility/equipment.

See individual Special Facilities descriptions in Section II.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

See individual Special Facilities descriptions in Section II.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

See individual Special Facilities descriptions in Section II.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

See individual Special Facilities descriptions in Section II.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The combination of experienced scientists and engineers and the availability of special supporting facilities provides an effective and efficient development environment which runs the gamut from advanced concept development (i.e., Systems Technology Facility Complex, Pulsed Power Technology Complex), system engineering support disciplines (i.e., Electromagnetic Vulnerability Assessment Facility, Computer Aided Engineering & Performance Assessment Facility, Weapon Systems Safety Analysis & Evaluation Facility), individual system element development (i.e., PHALANX Instrumented Test Facility, AN/SLQ-32(V) Program Generation Facility, Program Assurance Facility), and finally integrated system testing (i.e., Search and Track Sensor Site, Program Assurance Facility, Ship Self Defense Systems Engineering Center).

The ship defense technical capabilities for the Dahlgren Division are centralized at Dahlgren, Virginia with the exception of the Ship Self Defense Systems Engineering Center located on Wallops Island, Virginia. The central location of scientists and engineers and their supporting facilities at Dahlgren, allows close team work with numerous other Dahlgren technical capabilities and with other key activities.

Considering the spectrum of detect-control-engage functions, the ship self-defense capability is intimately linked to and is supported by other Dahlgren technical capabilities including RF & EO Sensors (DDTC#4), Weapons Systems (DDTC#6), Electronic Warfare Systems (DDTC#14), Weapon System Safety (DDTC#20), Gun Weapon Systems (DDTC#11), Combat & Weapon Control Systems (DDTC#5), Combat Systems Engineering (DDTC#2), Cooperative Engagement Systems (DDTC#9), and Electromagnetic Environmental Effects (DDTC# 19).

Other key activities in the immediate vicinity which contribute to the ship defense capability include:

PEO(TAD) - customer - 1.25 hrs distant
Naval Research Lab - electronic warfare experts - 1 hr
Applied Physics Lab - concept formulation - 1.5 hrs

Norfolk Naval Base - user - 2.5 hrs
Pentagon - resource sponsor - 1.25 hrs
Wallops Island - test site - 4 hrs
NSWC/Indian Head - explosive research - 1 hr

The closeness of the Washington D.C. area obviously provides easy access to principal customer decision makers and lowers costs when attending meetings with industry, all of which maintain office complexes near Navy Headquarters.

LOSS IMPACT

Ship defense is the principle capability needed by our surface Navy ships to permit them to conduct littoral warfare operations in the future. NSWCDD has the technical depth, operational understanding, experience and vision to develop and exploit new technologies in sensors, computing systems and software, missile and gun systems, electronic warfare and the systems engineering discipline to field new systems quickly and cost effectively. NSWCDD has an integrated team of scientists and engineers in the technology, engineering, integration, and test areas who are closely coupled with their required research, development and test facilities which cannot be matched in other government or industry facilities. NSWCDD provides continuous support to the fleet, and is poised with the people, equipment and facilities to respond quickly in time of emergency, advising crews in optimizing sense-control-engage warfighting capabilities and adapting ship systems to evolving missions and the anticipated threat they are likely to face.

The Dahlgren Division is unique; no other government agency or industrial firm has the scope, depth, and facility investment which exists today --- ready to support the Fleet.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

Information on the establishment of supporting facilities is provided in attached facilities write-ups.

The total system approach to ship defense was institutionalized in 1991 with establishment of a Congressionally directed program. Previously, the programs and capabilities which comprise the overall ship defense effort were managed and developed as individual system elements vice an integrated system.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

The basic Functional Support areas for this technical capability are:

1.3 Surface Ship
2.1 Gun Systems
2.2 Guided Missiles
2.8 Launchers
2.9 Fire Control
2.10 Weapons Data Links
3.3 Surface
5.2 Radar Systems
5.3 Special Sensors
7.3 Shipboard
7.8 Intelligence Information Systems
8.2 Countermeasures (CM)
8.3 Electronic Warfare (EW) Systems
10.1.3 Surface Ship-Related Training Systems

The attached facilities write-ups include Functional Support areas keyed to specific facilities.

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

See individual Special Facilities descriptions in Section II.

12. Provide the projected utilization data out to FY1997.

See individual Special Facilities descriptions in Section II..

13. What is the approximate number of personnel used to operate the facility/equipment?

EXPERTISE

Scientist and engineers providing support to this technical capability have extensive skill and knowledge in the following disciplines; systems engineering, electronic engineering, mathematics, mechanical engineering, computer science, and physics. At a minimum, the scientists & engineers have a high concentration of Bachelor's degrees with a medium concentration of Master's degrees and a smaller percentage of Doctorate degrees. The knowledge and experience levels are:

1) System Engineers with greater than 15 years experience with surface ship combat systems and weapon systems including an in-depth knowledge of ship weapons system and components (e.g., launchers, missiles, radars, computers, etc.), and the functionality of these systems as they relate in an integrated surface ship combat system environment. Dahlgren Division engineers are the surface Navy's leaders in system safety and provide technical advice to the Weapon System Explosive Safety Review Board (WSESRB).

2) Electronic Engineers with 5-25 years experience with knowledge of electronic system, component, integrated circuit and logic design including specific knowledge of how these components are integrated into surface ship combat and weapon systems. Included is the knowledge and experience with advanced processors, local area networks, fiber optics, computer design and architecture.

3) Mechanical Engineers with 5-15 years experience with knowledge of shipboard structures, survivability of ship components, blast dynamics, gas management and thermal transfer, and human factors engineering including specific knowledge of how systems are integrated into surface ships.

4) Computer Scientists and Mathematicians with 5-20 years experience with computer architecture, real time software programming concepts and methodology, military (e.g., CMS-2 and ADA) and commercial languages (e.g., FORTRAN, C, PASCAL), modern computer assisted software engineering tools and advanced micro-processors technology.

5) Physicists with 5-25 years experience with radar and optical atmospheric propagation effects, knowledge of missile/gun projectile flight kinematics, knowledge of target killing mechanisms - both kinetic and blast induced.

14. What is the approximate number of personnel needed to maintain the equipment.

See individual Special Facilities descriptions in Section II.

15. Provide one 8 1/2" x 11" black and white photo of the facility/equipment.

See individual Special Facilities descriptions in Section II.

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Facilities for Technical Capability Cooperative Engagement Capability Systems**

1. State the primary purpose(s) of the facility/equipment.

Cooperative Engagement Capability at NSWCDD is primarily a combination of two program efforts. The major technological and program focus is the Cooperative Engagement Capability (CEC) program. The Shipboard Gridlock System (SGS) program makes up the remainder of our effort. Most of this paper will reflect CEC since it is the predominate effort and drives our future involvement in this technical capability.

CEC is a critical technology and capability for Theater Air Defense. In a Littoral Warfare scenario, CEC enhances the theater survivability for Tactical Ballistic Missile Defense (TBMD), Area Anti-Air Warfare (AAW) defense, and Ship Self Defense (SSD). CEC enables key sensors and anti-air defense systems to contribute to and share a common fire control quality air picture. In otherwords, an AEGIS cruiser would have an accurate realtime picture that is a composite of the many battleforce shipboard sensors (SPY1, SPS48, SPS49, SPG51), airborne sensors (E2C, AWACS), and possibly Patriot site sensors. This allows optimal engagement of the threats. For the first time, new more effective engagement concepts like launch on remote data, remote launch, and forward pass are possible.

CEC is currently a high visibility program in its Demonstration and Validation (6.3) phase. CEC is achieved by the installation of CEC units on surface combatants, selected aircraft (E2C, AWACS) and selected land units (Patriot, Hawk). CEC is a joint program under Navy management. Program management resides in the Program Executive Office for Theater Air Defense, PEO(TAD). Current defined plans for Navy units include four ship classes (CG-47, LHD, CV, DD 993) for the current DEMONSTRATION/ VALIDATION and the production prototype phases and development of a miniaturized unit for the E2C. This design will eventually be the basis for surface production and is now called the Common Equipment Set. Current production plans also include the DDG-51 and DD-963 class ships that push the total air and surface production to 195 units. The goal for the miniaturized unit is to weigh less than 1,000 pounds. The current surface unit weighs

approximately 8,000 pounds. Therefore, this design will require significant insertion of advanced active aperture array antenna and digital processing technologies. Plans for the Army and Air Force units have not been finalized at this time.

As the CEC program matures, NSWCDD will be involved in all phases from determining requirements, evaluating technology, conducting experiments, developing prototypes, evaluating and supporting design agents, designing enhancements, to responding to the fleet. Functionally, we will be performing science, technology, and development efforts, acting as "Smart Buyer" for the PEO by injecting technical integrity into the acquisition process, establishing and assuring continued system integrity for the fleet and joint users, and through our fleet connectivity, provide rapid response to problems and identify future requirements.

The Shipboard Gridlock System (SGS) contribution to Cooperative Engagement Capability is through the fusion of offboard Link 11 track data with onboard local track data to provide a coherent and consistent tactical track picture. SGS processes both air and surface tracks. Our role in SGS is a cradle-to-grave role where we set requirements, system engineer, build prototypes, develop software, certify, and support and train the fleet. The Special Facility used for most of this effort is the System Technology Facility Complexes where SGS resides in the System Control Laboratory (SCL).

As stated previously, CEC is a joint program. It not only involves Naval sea and air (E2C) communities, but with the incorporation of Patriot and AWACS, brings in the Army and Air Force.

To meet the future requirements, CEC must draw upon technology advances from both government and industry. For example, the active aperture array antenna is a direct result of ARPA funded efforts. The digital processing technology required is phased with that currently being developed by industry for their commercial and government customers.

Considering the diverse and complex multitude of implementations, NSWCDD can establish and assure continued overall CEC technical integrity through our expertise in systems analysis, systems engineering and integration, Independent Validation and Verification (IV&V), software development and support (SSA), system safety , and electromagnetic environmental effects (E^3) . Combining these functional areas of expertise with our experience and expertise in shipboard sensors, combat and weapon control, and electronic and hardkill engagement systems, allows us to act as a "smart buyer" for initial CEC system designs and then certify these systems for both testing and deployment in the fleet. Our certification, an inherent government function, benchmarks system performance, both capabilities and limitations, and assures system safety. All of this is accomplished through our scientific and engineering talent, unique laboratory and test

facilities, and our open relationships with academia, contractors, other government activities, and especially the Fleet. This continuum of capability together with our unique knowledge and experience with special intelligence allows us to combine Fleet operational needs with our expertise with emerging active aperture array, signal processing, and software technologies to continually upgrade CEC systems, enabling them to strengthen and broaden their utility and address future requirements. The upgrades of CEC, or any other similar system, are crucial to NSWCDD performance of core capabilities. Upgrading systems gives our scientific and engineering workforce the necessary hands-on experience to enable them to accomplish system engineering functions such as setting requirements, systems integration, test and evaluation and act as a "smart buyer."

NSWCDD's CEC software roles are the Independent Verification and Validation (IV&V) and the Software Support Activity (SSA). To accomplish the IV&V role, we are involved in the setting of systems and software requirements, Preliminary Design Review and Critical Design Reviews of the Design Agents software, and then the independent testing of the CEC software as a system, as integrated into both surface ship combat systems and air platform avionics, and as a theater or battle group system. Our testing is conducted at the design agents site, in our own unique laboratory, at land based test sites at Wallops Island and Dam Neck, Virginia and on board ships. The IV&V and certification process concludes when we give our presentation at the Mission Control Panel prior to a Development Test (DT) stating the softwares performance and its inherent system safety. This is our unique role, assuring technical integrity of the acquisition process and assuring system integrity as it is deployed. The SSA role is the natural follow-on to IV&V. Upon completion of IV&V and certification, NSWCDD maintains strict configuration control of the baseline and its unique deliveries to the various platforms and then supports the fleet in both a testing environment and deployed. Our support can be as minor as a patch to fix a trouble report or substantial in developing enhancements and upgrades due to emerging system requirements resulting from a national crisis.

NSWCDD's role in system safety is two fold. We need to assure the CEC system itself is safe and assure that the integration of CEC into the various ships and combat systems does not reduce their current safety features. Our efforts include reviews and approval of design agent safety programs, conduct of independent hazard analyses on both CEC and applicable combat systems, and participation in the IV&V to inject critical safety related evaluations. Here again, we are responsible for assuring system integrity.

The CEC system includes a RF communications network. Therefore, E^3 is a major concern and also a unique capability of NSWCDD. Our tasks in the CEC E^3 role include the analysis and test of CEC susceptibility to other shipboard and airborne emitters and CEC effects on itself and other shipboard and airborne systems. On the CEC program, E^3 is a critical part of the systems engineering process since we are involved in the

requirements setting and design analysis vice the historical last minute test and fix role. This is another role related to assuring system integrity and interacting with the fleet.

The success of CEC is not totally dependent on the CEC systems themselves. CEC must be fully integrated into the battleforce and combatants. Cooperative efforts of the NSWCDD CEC team with other Dahlgren Division Technical Capabilities allow this to be successfully accomplished. CEC cooperative efforts require talent and facilities associated with Combat Systems Engineering , RF and EO Sensors, Combat and Weapon Control, Theater Air Defense, Surface Ship Defense Systems, and Tactical Ballistic Missile Defense. Specifically, we play a major role in the integration of CEC into the AEGIS Class Ships (CG-47, DDG-51) and the DD 993 class ships. Our responsibilities are from the requirements setting, through design, to system integration and software certification. Again, we have roles that assure system integrity and involve close ties to the fleet. In performing these integration functions, CEC utilizes Special Facilities such as the AEGIS Computer Center (ACC), and the Search and Track Sensor Test Site (STSTS).

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

See individual Special Facilities descriptions in Section II.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

A dedicated CEC Laboratory is required to accomplish our roles. It is now located in Building 194 and in September 1994 will be moved to the new Ship Defense Integration Facility (P225). When fully completed, the Laboratory will contain CEC and SGS equipment, simulation equipment, interface capability to AEGIS (ACC), New Threat Upgrade (STSTS), and Ship Defense Systems at NSWCDD, and links to AEGIS Combat Systems Center (ACSC) and the Ship Defense Building at Wallops Island and the Land Based Test Site (LBTS) at Dam Neck. In other words, we will have a unique facility that can function as an independent CEC unit, function with a simulated and a real combat system, and function as a node with other CEC units at LBTSs and ships in the VACAPES. The facility will also be in an environment to explore and evaluate future enhancements that will deal with new onboard and offboard sensors. The facilities at the two major developers do not have these unique capabilities nor are geographically compatible. The replacement value of the CEC Laboratory is approximately $5.0M not including the CEC and SGS systems themselves. Additional information on the ACC, STSTS, and the SCL is attached.

4. Provide the gross weight and cube of the facility/equipment.

See individual Special Facilities descriptions in Section II.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

See individual Special Facilities descriptions in Section II.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

See individual Special Facilities descriptions in Section II.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

See individual Special Facilities descriptions in Section II.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

CEC facilities belong at NSWCDD Dahlgren Laboratory. It is the only location where CEC can be continually integrated with new sensors, AEGIS, NTU, and Ship Self Defense systems. Its geographic location allows it to participate through links and in the future when an airborne platform is available out of PAX River, with other cooperating units at Wallops Island and Dam Neck, and Naval combatants operating in the VACAPES.

The combination of our talent, laboratories, on-site ship systems, and geographic location, truly make NSWCDD the only activity to do a thorough job in system engineering, IV&V, software, Safety, E^3, and Combat System integration for CEC. We are unique and "independent." Shifting some of these roles back to one of the design agents will not only jeopardize the "independence" and thoroughness of the IV&V but also focus the software support on changes and profit vice the appropriate fleet support. CEC is a force multiplier in this new joint and littoral era. We must push for a timely insertion into the fleet. NSWCDD is the only activity to assure CEC is useful, of high quality, and safe and then to sustain system integrity as it grows and matures. See the attached writeups for additional information on the ACC, STSTS, and the SCL.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

See individual Special Facilities descriptions in Section II.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

See individual Special Facilities descriptions in Section II.

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

See individual Special Facilities descriptions in Section II.

12. Provide the projected utilization data out to FY1997.

The existing CEC Laboratory in B194 is being used and the new CEC Laboratory in the Ship Defense Integration Facility (P225) will be used at least 100% of the time based on 8 hours a day Monday to Friday. During IV&V, final certification, and emergency fleet problem investigations, utilization may surge to 130% to 150%. See attached writeups for utilization of the other facilities.

13. What is the approximate number of personnel used to operate the facility/equipment?

In order for NSWCDD to successfully accomplish these CEC roles, about 42 engineers and scientists are needed with far more training and experience then is received in academia. Considerable experience in naval combat systems, sensors and weapons systems technologies is a must. A good example of this is the requirement of our engineers to not only know the sensor accuracy and time latency requirements for CEC but to understand the "why" as it relates to initializing and controlling a missile by a ships combat and weapon control system. CEC is the first system to ever assemble a "realtime" fire control quality air picture from sensors on multiple platforms and then enable a platform to engage the threat on this composite picture rather than his own sensors. For our system engineers to contribute to our roles, ten to fifteen years of experience is needed. This extensive experience is also needed to accomplish our important roles in system safety, E^3, and combat system integration. Our software personnel require considerable experience in real time programming, in the C and ADA languages, and in the regimented software development, documentation, and control process. Leadership in the software area requires at least ten years software experience with a few years of involvement with combat and weapon systems and the fleet. In all these disciplines, experience is a combination the understanding of specific technologies and "hands-on" involvement with

them. You can not be a "smart buyer" of a realtime software development effort, if you have never developed any software.

14. What is the approximate number of personnel needed to maintain the equipment?

See individual Special Facilities descriptions in Section II.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See individual Special Facilities descriptions in Section II.

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Technical Capability for Tactical Ballistic Missile Systems**

1. State the primary purpose(s) of the facility/equipment.

Facilities required for Theater Ballistic Missile Defense Systems include:

Aegis Computer Center (ACC) - This facility supports the R&D, development, production and certification of computer programs for delivery to the fleet. It is also supporting the reduction and analysis of data collected during TBMD tests, live firings and intelligence collection operations. This facility also provides high speed data links which allow TBMD developers to link directly to key systems at other TBMD related sites such as the CSEDS site at Moorestown, New Jersey, the AEGIS Combat Systems Center at Wallops Island, Virginia, and many other sites world-wide.

Warhead Development Facility - Develop new warhead types and concepts for TBMD interceptors. Quantify warhead performance and provide this information to related efforts in the TBMD system development process.

Hypervelocity Wind Tunnel Complex - Examine new missile/kinetic kill vehicle designs in realistic flight regimes. These efforts have already begun for Army TBMD interceptors and will grow in importance as the Navy designs, tests and fields new TBMD interceptors.

In addition to these facilities, the location of NSWCDD brings TBMD personnel in close working contact with related facilities and commands such as the AEGIS Training Command where operational commanders and crews will be able to interact with new concepts arising from TBMD and Naval Space Command which provides direct insight into national surveillance and warning assets which are vital to TBMD systems and their performance.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined is paragraph 6, page 12 of this data call.

Some equipments supporting this technical capability are considered to be Class 2 moveable. The Hypervelocity Wind Tunnel Complex is fixed. See facilities descriptions in Section II for details. If some or all of these facilities were moved, the connectivity which exists between them would be lost. This connectivity allows the conduct of combat system experimentation, concept exploration/proof of concept and integrated test and evaluation.

Additionally, there are currently approximately 20-30 scientists and engineers currently using these facilities directly for TBMD work. However, there are literally hundreds of scientists and engineers working on systems which are directly related or supportive to TBMD programs. The specialized and extensive technical expertise and experience residing with the hundreds of engineers and scientists currently using these facilities to perform the functions associated with this technical capability may not be as easy to move.

3. Provide the replacement value of the facility/equipment. Report the facility equipment cost separate from any building and utilities that may be integral to the facility/equipment.

See individual Special Facilities in Section II.

4. Provide the gross weight and cube of the facility/equipment

See individual Special Facilities in Section II.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

See individual Special Facilities in Section II.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

See individual Special Facilities in Section II.

7. State any environmental control requirements for the facility/equipment (i.e. temperature, humidity, air scrubbing).

See individual Special Facilities in Section II.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

Since the facilities (in particular the ACC) are linked via internal and external communication networks, the facilities supporting this technical capability provide the ability to integrate multiple elements of multiple weapon systems through unique suites of equipment and communications networks. These facilities are in close proximity to the facilities housing the engineering personnel which facilitates effective communication and execution of tasks. The link to the AEGIS Training Center co-located in Dahlgren with NSWCDD, facilitates participation of fleet personnel in design and operational issues.

If these facilities and their links to related facilities world-wide were lost, the Navy's ability to develop and field a TBMD capability would be severely impacted. The Navy would have to replace these facilities to carry on the TBMD development process and the "down-time" incurred would push the fielding of this system well into the next century.

9. Indicate how and when the facility/equipment was transported or constructed at the site.

See individual Special Facilities in Section II.

10. List the functional support areas (previously provide in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

See individual Special Facilities in Section II.

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

See individual Special Facilities in Section II.

12. Provide the projected utilization data out to FY 1997.

See individual Special Facilities in Section II.

13. What is the approximate number of personnel used to operate the facility/equipment?

See individual Special Facilities in Section II.

14. What is the approximate number of personnel used to maintain the equipment?

See individual Special Facilities in Section II.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See individual Special Facilities in Section II.

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Facilities for Technical Capability for Gun Weapon Systems**

1. State the primary purpose(s) of the facility/equipment.

FACILITIES

Facilities at both the Dahlgren and White Oak sites are used in the performance of the Gun Weapon Systems R&D, T&E, Acquisition and Software Support technical capability. These include the following 17 Special Facilities and Equipment Facility capabilities:

a. Scientific and Engineering Computer Complex,
b. Program Assurance Facility,
c. Computer Aided Engineering and Performance Assessment Facility,
d. Prototype Fabrication Facility,
e. Warhead Development Facility.
f. Search and Track Sensor Test Site,
g. PHALANX Instrumented Test Facility,
h. Weapons Systems Safety Analysis and Evaluation Facility,
i. Electromagnetic Vulnerability and Assessment Facility,
j. SMART Munitions Development Laboratory,
k. Advanced Weapons Materials Complex,
l. Electrochemistry RDT&E Complex,
m. Radiation Technology Complex,
n. Energetic Research and Development Facility,
o. Fuze Development Laboratory,
p. Shock Laboratory, and
q. Wind Tunnel.

Details and descriptions of these facilities are presented in the attached TABS.

In addition to the above facilities, the Potomac River Test Range including the Explosive Experimental Area is extensively utilized and is vital to the conduct of the Gun Weapon System (GWS) Technical Capability.

SUMMARY DESCRIPTION

The Dahlgren Division (DD) conducts full spectrum RDT&E for all gun and GWS related programs for the Surface Navy and for many Marine Corps programs. This includes force level prioritization of Navy needs; development, integration, and support of gun, fire control, sensors and ammunition designs; and the establishment/evaluation of performance thresholds necessary to meet operational requirements. DD is the principal partner in system design decisions and in the hands-on design, development, and change of GWSs, particularly where system performance is an issue or is being modified; such change may occur at any point within the life cycle of the system. This involves continuous evaluation of Navy needs for new systems and/or upgrade of existing systems. These evaluations match technology to Navy needs in a cost effective way through a top-down, systems engineering approach which includes early military assessment of the tactical utility of the weapon.

GWSs and Dahlgren have been uniquely linked for 75 years because of the Potomac River Range which remains the only over-water, instrumented gunnery range in the U.S. GWSs are evolving from a set of loosely linked, discrete components used to attack large, slow moving targets to a highly integrated system capable of performing complex, multiple missions against sophisticated land, sea, and air targets in the littorals. This evolution is made possible by emerging technology and the full spectrum work at DD. Dahlgren is unique in its ability to bring to bear the broad mix of systems engineers, systems analysts, and technical specialists with the skills and experience necessary to design a GWS which is integrated into a combat system and operates within a layered defense doctrine at both the ship and force levels.

MISSION

The priorities of the Navy and Marine Corps have shifted. The Navy has a new focus on regional challenges and opportunities with a greater emphasis on joint and combined operations in the littorals. Warfare in the littorals is confining and congested where surface ships must defend against attacks from land, sea and air threats and must project power landward to support joint operations. These have been familiar missions for Naval guns since WW-II although Naval Gunfire Support (NGFS) of amphibious operations has been range limited to 20 nautical miles or less. GWSs are inherently flexible and can be employed in Naval Surface Fire Support (NSFS), Anti-Surface Warfare (ASuW) and Anti-Air Warfare (AAW). In addition, GWSs can be used in many political situations without appearance of escalating hostilities. Such situations have been repeated several times in recent hostilities in the Persian Gulf and Mediterranean regions.

The proliferation of advanced technology to potential third world adversaries combined with the shift in emphasis for the Naval Forces requires that efforts be redoubled to improve capability in these traditional gunnery missions. Challenges for GWS improvements include:

- Striking and defending against the small, fast patrol boat,

- AAW defense against anti-ship missiles, and

- Providing fire support for amphibious assault concepts that effectively exploit the range and speed of Navy air-cushioned landing craft and Marine assault helicopters.

Historically, GWSs have been conceived and engineered as stand-alone, highly flexible systems. Although they remain highly flexible, they are no longer conceived and engineered as components or stand-alone systems but instead have become highly integrated components of larger combat systems. In addition, GWSs are no longer "low technology" as they must counter low flying, supersonic, cruise missiles; high speed, maneuvering surface craft; and inland targets which require long stand-off ranges. All such missions must be conducted in a sophisticated electromagnetic environment. The proliferation of advanced technology to third world countries has virtually eliminated the idea of a low technology conflict. Reaction time has been cut to seconds requiring an automated detect, track and engage sequence with high rates of fire and/or precision guided ordnance.

These requirements translate to the need for development of new propulsion systems to achieve longer range, larger warheads to kill area targets, precision guided projectiles to kill maneuverable point targets, and advanced, open architecture, fire control to provide mission planning and coordination capability in multi-force operations. Since GWSs do not stand alone and receive targeting information from sensors which are shared with other weapons systems, these developments must be done in a total combat system context. DD is the principal partner in translating these top level requirements to an integrated, optimum system design that is cost-effective over the life of the system.

JOINTNESS/DUAL USE

This GWS Technical Capability supports several joint efforts. The U.S. Army is the single manager for gun ammunition and several ammunition components, e.g., fuzes, are common to both services. In addition, accuracy and effectiveness analysis methodologies are common across all services and are developed and maintained through several joint working groups (with extensive participation by DD personnel) under the Joint Technical Coordinating Group for Munitions Effectiveness (JTCG/ME). In addition, emerging technologies such as Electro-Thermal-Chemical (ETC) and Liquid Propellant (LP) propulsion are joint efforts with frequent, data exchange meetings involving DD personnel. In some cases, Memorandums of Agreement (MOAs) are being developed for this joint work.

Jointness is not limited to other U.S. services. Several allied navies own GWS components purchased from the U.S. and in a few cases the U.S.N. owns foreign developed systems, e.g., 76mm OTO MELARO gun. This leads to many data exchange agreements, MOAs for joint tests, etc., including use of the Potomac River Test Range at Dahlgren for conduct of foreign weapons evaluations for our allies and as input to foreign weapons procurement decisions.

TECHNICAL FUNCTIONS/CORE FUNCTIONS/GOODS AND SERVICES

DD's role can be characterized as "Face-to-Technology." As such, DD assures the timeliness, quality and affordability of developed systems. DD's knowledge of future requirements in a total system context; of science and technology; of warfare and combat system analysis; of the development of complex, highly integrated systems; of the sources and control of acquisition risk; etc., makes DD the principal partner in system design decisions and in the design, development, and change of GWSs, particularly where system performance is an issue or is being modified. At a minimum, the DD prioritizes force level Navy needs, establishes performance thresholds to meet operational requirements, and evaluates candidate systems against these thresholds; these minimum functions are inherently governmental and necessary to make the Navy a smart buyer.

Examples of DD's proven record as a full spectrum laboratory capable of bringing to bear the technology, technical leadership, integration capability, and unique facilities abound. Perhaps the most well known example is the development and integration of the 5"/54 MK 34 GWS aboard DDG-51 Class destroyers into the AEGIS Combat System.

DD also plays a vital role in responding to emergencies where knowledge of the total system is required to diagnose a particular problem and/or recommend a course of action to improve performance. Four examples are provided: (1) on-site determination of 16"/50 GWS performance problems in Lebanon and subsequent demonstration of corrective action to SECNAV and the GAO, (2) land based reconstruction of explosive events aboard USS IOWA to isolate causes of the incident (this proved to be a unique capability which could not have been performed at any other site because of the unique combination of expertise and facilities), (3) isolation and correction of PHALANX tracking problems under high sea state conditions, and (4) force level analysis to determine tanker escort survivability risks to missile boat attacks during "tanker war" hostilities.

MAJOR DEVELOPMENT EFFORTS UNDERWAY AT THIS TIME INCLUDE THE FOLLOWING:

Warships Program. DD is in the process of assuming technical leadership of this technology program at the request of the Naval Sea Systems Command. The goal is to develop the advanced GWS for the 21st century destroyer. The program is in the early stages and has three separate development areas: (1) a defensive munition for short range AAW and ASuW, (2) an offensive munition for long range NSFS, Strike and Suppression, and (3) development of a gun system to enhance munitions performance.

ETC Gun System. This demonstration program will determine the applicability of ETC technology for use as a propulsion system for the next generation naval gun.

NSFS Cost and Effectiveness Analysis (COEA) and Follow-On Development. This COEA (led by the Center for Naval Analysis (CNA) with major DD participation) concluded that a new major caliber GWSs (probably 155mm) is needed to replace capability lost by Battleship retirement and to meet expanding Navy requirements for NSFS. Technical leadership for this major development will be provided by DD.

Cast Ductile Iron Manufacturing Technology Program. DD is the technical direction agent for this program which is developing a process to manufacture U.S. Navy munitions using cast ductile iron.

Multi-Function Fuze Program. DD is the technical direction agent for this advanced development program which will combine several fuze functions into one fuze in order to lower costs, increase effectiveness, and reduce logistics problems.

Firebox. This program is demonstrating the utility of advanced composite materials for use in a novel multi-barrel concept for ship self-defense.

MK 34 GWS. An advanced state-of-the-art gun computing system (MK 16) was developed, linked to other GWS components, and integrated with the AEGIS Combat System for use in DDG-51 class destroyers.

PHALANX Close-In Weapon System (CIWS). DD is the lead laboratory for this system which provides self-defense for all Surface ships. Although this system was developed many years ago, it is still vital to Surface ship survivability and the DD provides technical leadership for continued performance improvements.

Ammunition and Fuze Design Agent. DD provides technical leadership for modifying existing ammunition and fuze designs which may be required to improve safety and/or to lower production costs.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

See individual Special Facilities in Section II.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

See individual Special Facilities in Section II.

4. Provide the gross weight and cube of the facility/equipment.

See individual Special Facilities in Section II.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

See individual Special Facilities in Section II.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

See individual Special Facilities in Section II.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

See individual Special Facilities in Section II.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

In an era of declining budgets and draw downs, the value added for continued GWS improvements is unparalleled. The reason for this is that: (1) the current investment in GWSs is substantial, (2) large performance increases for small investments are possible, and (3) GWSs are the weapons of choice in many current scenarios. As a consequence, the current Navy investment strategy includes continued RDT&E and product improvement of

GWSs. DD's continued role in GWS RDT&E will enhance this investment strategy significantly. DD is unique in that at this single facility, the vast array of capability and equipment needed to conduct this work exists. In some cases (e.g., Potomac River Test Range, Electromagnetic Vulnerability Facilities, PHALANX Instrumental Test Range) the facilities are not relocatable. The others would be extremely difficult to reproduce especially in today's political and economic environment. The Navy's current thrust in NSFS and Advanced Gun Systems Technology would be severely impacted if this capability is not maintained. NSWC has been in the Gun Weapon System Business since its inception.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

See individual Special Facilities in Section II.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

a. PLATFORMS

1.3 Surface Ships, and
1.5 Ground Vehicles.

b. WEAPONS SYSTEMS

2.1 Gun Systems
2.9 Fire Control
2.11 Weapons Fuzing

c. SPECIAL OPERATIONS SUPPORT

4.2 Coastal/Special Warfare Support

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

Using workyears as a unit of measure, the average historical workload for the fiscal years 89-93 is about 150.

12. Provide the projected utilization data out to FY1997.

Although the overall Navy budget is drawing down, the Navy budget in Advanced Gun Systems Technology and NSFS has increased beginning in FY 93 and 94, respectively. Thus, projected utilization is expected to remain stable in-house coupled with a corresponding increase in contractor support at least through the FYDP.

13. What is the approximate number of personnel used to operate the facility/equipment?

Currently, this technical capability supports 158 workyears (33 in S&T, 114 in Acquisition Engineering and 11 in Maintenance). The work requires an extremely broad range of scientists, engineers, and technicians. Because of the uniqueness of weapons systems research, much of this expertise can only be developed through hands-on experience. It is misleading to identify "gunnery" expertise in isolation from other weapon and combat system expertise because of the inter-relatedness of business for a top-down, systems engineering approach to GWS work. To operate the 17 special facilities and equipment listed above for this technical capability, over 340 engineering technicians and support personnel are dedicated and highly qualified.

14. What is the approximate number of personnel needed to maintain the equipment.

See individual Special Facilities in Section II.

15. Provide one 8 1/2" x 11" black and white photo of the facility/equipment.

See individual Special Facilities in Section II.

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Facilities for Technical Capability Marine Corps Weaponry**

1. State the primary purpose(s) of the facility/equipment.

Facilities at both the Dahlgren and White Oak sites are used in the performance of the Marine Corps Weaponry, R&D, T&E, and Software Support Technical Capability. These include the following 14 specific facilities and equipment.

- **Program Assurance Facility (PAF)**
- **Computer Aided Engineering and Performance Assessment Facility**
- **Prototype Fabrication Facility**
- **Warhead Development Facility**
- **Search and Track Sensor Site (STSTS)**
- **Anechoic Test Facility**
- **Weapons Systems Safety Analysis and Evaluation Facility(WSSAEF)**
- **Chem-Bio Engineering Complex**
- **Smart Munitions Development Laboratory**
- **Advanced Weapons Material Complex**
- **Electro Chemistry RDT&E Complex**
- **Infrared Measurement and Modeling Program**
- **Energetic Research and Development Facility**
- **Shock Lab**

Details and descriptions of these facilities are presented in the attached tabs. Additionally, this technical capability extensively utilizes the Potomac River Test Range (PRTR) including the explosive experimental area.

SUMMARY DESCRIPTION

The Dahlgren Division provides the technology base and conducts RDT&E to develop and

demonstrate weaponry technologies to meet the Marine Corps unique and joint responsibilities for expeditionary missions, amphibious warfare, and subsequent operations ashore. This responsibility includes the design and development of the best weapons systems solutions for self defense and power projection to the USMC maneuver elements in Expeditionary Warfare by developing and maintaining technologies that nullify operational deficiencies, act as force multipliers, and enhance unit and individual survivability. This strong technical capability in weapons systems is maintained so that emerging technology can be rapidly applied to USMC requirements, and is supported by a state-of-the art engineering environment that expedites the engineering development process from concept synthesis through design analysis, detailed engineering design, and prototype fabrication.

MISSION

NSWCDD has the vital role of a full systems laboratory capable of bringing to bear the technology, technical leadership, systems integration, and unique facilities in support of Marine Expeditionary forces and respond to emergency situations in support of deployed forces. NSWCDD acts as technical advisor to MARCORSYSCOM in the area of emerging technologies, tactical targeting sensors, and mine detection and clearing. Specific responses in Desert Storm include the rapid deployment and development of an infrared IFF system to prevent fratricide of ground personnel and deployment of advanced light weapons systems for small craft/vehicle defense.

JOINTNESS AND DUAL USE

NSWCDD S&T efforts support joint USMC/US ARMY mission goals and objectives. These efforts include support from universities (PA State, University of PA, WA, TN) and Livermore National Laboratory. Current efforts in sensor technology have dual use in the areas of law enforcement, data fusion, and medical scanning techniques.

TECHNICAL FUNCTIONS/CORE FUNCTIONS/GOODS & SERVICES

The Navy and Marine Corps Strategie "....From the Sea", Marine Air-Ground Task Force Master Plan 1992-2002, Marine Corps Long-Range Plan 2000-2020, FMF-1 Warfighting Manual, USMC Mission Area Analysis, and Project Reliance identify the needs and requirements to provide advanced weaponry systems, intelligent sensor and fire control systems, and mine detection/clearance in support of expeditionary force operations in littoral or coastal regions. NSWCDD has the broad experience base best suited to support the USMC Amphibious/ Expeditionary requirements not provided for in joint US Army/USMC mission goals/objectives. NSWCDD's role in providing systems integration and testing in unique environmentally safe operational ranges is inherently governmental. This technical capability provides a single integrated area for testing and evaluation of high risk R&D efforts;

identification and evaluation of industry's enabling technologies applicable to USMC requirements; and subsequently to transfer maximum information to industry to lower development, design, and performance risk. It is also inherently governmental that the support that NSWCDD provides to the USMC requires an experience level developed over time that allows this organization to be efficient and competent and gives NSWCDD a refined understanding of Marine Corps operational needs and the options to support these needs. This is a continuous support process of a total warfighting concept that cannot be divided or broken out into piecemeal components. It is this accumulated experience that has allowed NSWCDD to develop and maintain the judgmental expertise to be "Smart Buyers" in support of the Marine Corps with Marine Corps sponsorship, NSWCDD directs and conducts programs in the following areas.

(a) Weaponry Technology. The focus of this area is the development of technologies that focus on increasing the lethality and operational effectiveness of combat elements of the MAGTF. This includes new technology for mounted mortars, improving target designation and volumetric lethality against area targets, and advanced high performance gun ammunition for multiple platform use.

(b) Tactical Targeting Sensors. The focus of this area is the development of innovative sensor technologies that enhance the engagement performance of direct and indirect fire weapons for the conduct of maneuver warfare. Earliest possible Automatic Target Acquisition (ATR), increased first round hit probability, and successful Identification of Friend or Foe (IFF) are salient goals.

(c) Mine Detection Technology. The focus of this area is to develop and demonstrate technology to provide real time, day/night detection and surveillance capability in order to remotely detect current and future mine threats on the battlefield. This capability will provide a unit commander the information required to make timely decisions on assault/maneuver routes and effective deployment of countermeasures, thus, significantly enhancing ground combat unit mobility.

(d) Land Mine Countermeasures Technology. The focus of this area is to develop and demonstrate technology for rapid neutralization of mines, mine fields, booby traps, and other obstacles in the surface zone and ashore to include advance threat wide area mines. These efforts include optimization of advanced distributed explosive technologies to attack a wide range of sophisticated and hardened mines by means of generating extremely high pressure and impulse levels coupled with destructive projectiles and other advanced kill mechanisms to attack the main charge regardless of fuze type.

(e) Chemical/Biological Defense Technology. This area focuses on the development and demonstration of concepts and technologies for biological and chemical defense of Marine

Forces with emphasis on protective materials and concepts, decontaminants, protection for amphibious vehicles, and detection and identification of threat agents. As these efforts are in support of expeditionary operations, NSWCDD's RDT&E efforts place a premium on mobility, lethality of weapons, responsiveness of command and control, and lightweight individual equipment. Countermine capabilities are essential to the survival of the force during expeditionary operations.

NSWCDD has the vital role of a full systems laboratory capable of bringing to bear the technology, technical leadership, systems integration, and unique facilities to respond to emergency situations in support of deployed Marine Expeditionary forces is a matter of record. Specific responses in Desert Storm include the rapid deployment and development of an infrared IFF system to prevent fratricide of ground personnel and deployment of advanced light weapons systems for small craft/vehicle defense. NSWCDD acts as technical advisor to MARCORSYSCOM in the area of emerging technologies, tactical targeting sensors, and mine detection and clearing.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

See individual Special Facilities descriptions in Section II.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

See individual Special Facilities descriptions in Section II.

4. Provide the gross weight and cube of the facility/equipment.

See individual Special Facilities descriptions in Section II.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

See individual Special Facilities descriptions in Section II.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

See individual Special Facilities descriptions in Section II.

See individual Special Facilities descriptions in Section II.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

See individual Special Facilities descriptions in Section II.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

In the current era of force reduction, the Marine Corps is dependent on high risk emerging technologies for use as "Force Multipliers" and quick responses to the needs of rapidly mobilized and deployed expeditionary forces. The loss of the facilities and environment that currently support this technical capability would be detrimental to stated current and future Marine Corps operational requirements and mission objectives.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

See individual Special Facilities descriptions in Section II.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

See individual Special Facilities descriptions in Section II.

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

In-house work is provided by a multi-discipline interacting group of scientists, engineers, and technicians with unique capabilities developed to support Marine Corps mission requirements.

12. Provide the projected utilization data out of FY 1997.

Projected utilization is expected to remain stable, or increase slightly, through FY 1997.

13. What is the approximate number of personnel used to operate the facility/equipment?

In-house work is provided by a multi-discipline interacting group of scientists, engineers, and technicians with unique capabilities developed to support Marine Corps mission requirements,

including, but not limited to:

(a) computer scientists and electrical engineers with recognized expertise in wavelet transformation, artificial intelligence, systems integration, and information fusion,

(b) electrical engineers with unique expertise in acoustic sensor design,

(c) mechanical engineers with expertise in gun deliverable sensor systems,

(d) engineers and scientists involved in weapons systems development, and area in which NSWCDD has been involved for 75 years,

(e) mechanical engineers and physical scientists with unique expertise in materials for weapons development, and

(f) engineers and scientists with unique experience in mine and countermine warfare.

These personnel are in addition to those noted in the attached facility write ups.

14. What is the approximate number of personnel needed to maintain the equipment?

See individual Special Facilities descriptions in Section II.

15. Provide on 8 1/2 x 11 black and white photo of the facility/equipment.

See individual Special Facilities descriptions in Section II.

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Facilities for Technical Capability for Strategic and Space Systems**

1. State the primary purpose(s) of the facility/equipment.

Navy requirements in strategic weapons systems and space systems are of a high priority both within and outside of the Navy and at a national level. The Submarine Launched Ballistic Missile (SLBM) is increasing in importance within the strategic systems triad. Indeed, as the total number of nuclear weapons continues to be reduced through treaty and other agreements, it will become the dominant and, perhaps, the sole nuclear deterrent in the nation's arsenal. It is an invulnerable, flexible, and highly accurate system that will continue to be a deterrent to global and regional nuclear war throughout its service life. In addition, the accuracy and targeting requirements of SLBM along with other high priority DON and DOD requirements demand precise geodetic and target information that can be provided only through the exploitation of navigation, geodetic, and intelligence satellite systems. Studies of future strategic systems requirements show that deterrence of a nuclear strike will continue to be needed. However, to meet the challenges of the future world environment, the scope of the strategic mission has been modified to include space control, strategic defense, and theater support. This requires the use of both nuclear and conventional warheads deployed on a full range of naval platforms as well as theater defense. NSWCDD strategic and space system efforts are directed at support of the SLBM acquisition process, especially in areas related to weapons control, targeting and re-entry systems. This is accomplished by participation in the determination of requirements, development of operational weapons control and targeting software, research and development directed towards re-entry systems, materials and all aspects of systems engineering and software development, and evaluation of the resulting system using analytic methods and through support of subsystem and system level testing. Further, NSWCDD provides essential support to the SLBM system through its handling and evaluation of strategic targeting data and the interface with the targeting community.

The NSWCDD strategic systems mission encompasses technology advancement, systems engineering, software development, and operational support for Navy strategic systems and for space systems that are critical to Navy and national objectives. The current Navy strategic weapons system focus is on the SLBM system, especially in the areas of weapons control, targeting, and reentry systems, and addresses all U.S. and United Kingdom SLBM systems. A

Memorandum of Agreement (MOA) between USSTRATCOM and Navy Strategic Systems Programs directs that NSWCDD provide USSTRATCOM with strategic targeting and mission planning software and data for all SLBM systems. NSWCDD also provides SLBM mission planning software and data to the National Command Centers. The SLBM Retargeting System Operational Requirements Document (ORD) directs NSWCDD to provide the capability in facilities and people to support the strategic targeting requirements of the SLBM SWS. This support includes testing and validation of all day-to-day SLBM targeting data and testing and transfer of all SLBM strategic targeting data and documentation among USSTRATCOM, NSWCDD and the CTFs to comply with the responsiveness requirements associated with changing strategic targeting.

More specifically, the Division provides a full range of operational support, including the development and maintenance of all operational SLBM weapons control computer programs, data, and documentation, support for the planning and analysis of all flight tests, and the assessment of systems effectiveness and accuracy. NSWCDD develops and maintains SLBM targeting models used by USSTRATCOM and others as part of their efforts to target all strategic systems, provides studies and models to analyze the employment of current and future systems, and provides all targeting data and documentation to the SLBM fleet. SLBM support at NSWCDD specifically includes research in areas associated with weapons control, targeting, and re-entry: geoballistics, guidance theory, experimental aerodynamics, materials, environmental (i.e., gravity and weather) characterization, operations research applied to strategic systems targeting, systems engineering, and all areas of computer science and software development, such as languages, operating systems, compilers, and quality assurance.

Support also includes advanced and engineering development in the area of strategic reentry systems, planning and evaluation of SLBM flight tests, support in the area of materials for reentry and spacecraft use, and experimental aerodynamics for weapons development and other national priorities. Of particular importance are the expertise and facilities supporting ground tests for aerodynamic and aero-thermal testing. These facilities support the needs of the Navy and other services and agencies. The Division also has responsibilities in missile propellants, materials technology, and in the assessment of the effects of nuclear environments on reentry body performance.

The primary space system focus is the support of Navy and national needs, especially in the areas of orbit determination, mission analysis, and geodetic applications. This is exemplified by the development, testing, and analysis of applications of the Global Positioning System to a variety of weapon system uses. Other roles include the support of concept definition and systems analysis of future strategic systems, the development of warfare analysis tools, computer systems, and leadership in aerodynamic and space vehicle design, analysis, and test.

Strategic and Space Systems utilizes the following facilities in the performance of the assigned mission: (1) the SLBM Weapons Control Facility, (2) the SLBM Strategic Systems Operational Support Facility, (3) the Scientific and Engineering (S&E) Computer Complex, and (4) the

Hypervelocity Wind Tunnel Complex. These facilities are described in detail in Tab B Section II.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

See individual Special Facilities descriptions in Section II.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

The Division has a variety of facilities which support Strategic and Space Systems: the SLBM Weapons Control Facility, the Strategic Systems Operational Support Facility, the Hypervelocity Wind Tunnel Complex, and the Scientific and Engineering Computer Complex. The replacement value of these facilities is addressed in the attached write-ups. The strategic systems program at the Dahlgren Division has developed or acquired a variety of special and, in some cases, unique equipment. This includes weapons control test berths (comprising SSBN hardware and commercial or specialized support equipment) for all classes of U.S. and U.K. SLBM systems. These laboratories are used for software development and operational support. In some cases (such as UK POLARIS), the capability is unique to this site. In others (such as TRIDENT I), the capability will soon be available only at this site. The Hypervelocity Wind Tunnel Complex provides a combination of Mach numbers, Reynolds numbers, data quality, large test area and run times that are unmatched by any facility anywhere in the world. Other specialized equipment includes weapons control auxiliary equipment and SLBM media production systems, and classified (SECRET/TOP SECRET SIOP/ESI) data links to support SLBM targeting. There are also specialized software development systems, distributed computer networks, and computer systems. The collocation of these facilities is key to the efficient performance of the Strategic and Space Systems mission as is the infrastructure which has been developed over the last four decades for the interconnection of the facilities and their connection to the technical work space associated with this mission.

Integral to the performance of the Strategic and Space Systems mission are the expertise and experience of the staff and the synergism which results from the collocation of this function with the organizations which perform in other NSWCDD mission areas. It is impossible to place a replacement value on these vital elements.

4. Provide the gross weight and cube of the facility/equipment.

See individual Special Facilities descriptions in Section II..

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

See individual Special Facilities descriptions in Section II.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

See individual Special Facilities descriptions in Section II.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

See individual Special Facilities descriptions in Section II.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The replication and relocation of the specific facilities are discussed in the attached write-ups. This, however, is only part of the concern if replication or relocation of the technical capability to perform the Strategic and Space Systems mission is considered. The ability to perform this mission depends on other, less tangible factors: the experience and expertise of the staff, the collocation of the required facilities, and the infrastructure which has been developed for the interconnection of the facilities and their connection to the technical work space. The collocation of the strategic system weapons control and targeting facilities at NSWCDD, for example, has greatly enhanced the ability of SLBM systems to meet current operational requirements and to anticipate future needs. The synergism between this and other NSWCDD mission capabilities has benefited both over the years. Many of the computer software development capabilities in the division have their origins in the strategic systems area. Weapons control development for Tomahawk benefited from earlier efforts supporting strategic systems. NSWCDD expertise in computing, geodesy, and materials, for example, have been of great benefit to the strategic systems effort at the division and has increased over time through this association.

The close proximity of NSWCDD to its customer in Washington, DC and to the headquarters of the Atlantic theater in Norfolk, one of the primary users of the SLBM system, has allowed NSWCDD to be highly responsive to operational needs. The presence of an NSWCDD representative at USSTRATCOM has allowed timely support of targeting needs. The

availability of technical expertise and facilities supporting both functions at the same site has also added to the cost effectiveness of the process.

NSWCDD performs a unique role in the support of the Submarine Launched Ballistic Missile (SLBM) strategic weapon system. This includes the development of tactical fire control and targeting software and the development and wind tunnel testing of re-entry systems. Tactical fire control software for all US and UK SLBM systems have been developed by NSWCDD. An MOA between USSTRATCOM and Navy Strategic Systems Programs directs that NSWCDD provide USSTRATCOM with strategic targeting and mission planning software and data for all SLBM systems. NSWCDD also provides SLBM mission planning software and data to the National Command Centers. Further, the Strategic Retargeting System Operational Requirements Document directs NSWCDD to provide the capability in facilities and people to support the strategic targeting requirements of the SLBM SWS. This support includes testing and validation of all preplanned SLBM targeting data and testing and transfer of all SLBM strategic targeting data and documentation among USSTRATCOM, NSWCDD and the CTFs to comply with the responsiveness requirements associated with changing strategic targeting.

The capabilities at NSWCDD provide the Navy and the nation with the full spectrum of research, testing and operational support related to strategic systems. The experience base needed to apply the required technical knowledge to the unique environmental and system requirements of a highly accurate, long range missile system deployed on a submarine at sea exists only at NSWCDD. The facilities and personnel experience would be nearly impossible and prohibitively expensive to reproduce if the capabilities were lost. In the short term, the development and maintenance of weapons control software would suffer and the targeting flexibility and responsiveness now available to the National Command Centers and the Navy would be unavailable. It should be emphasized that the Division provides direct operational support to the SLBM force and to U.S. Strategic Command. Continuation of this support is required and must be provided continually through any period of relocation or replication. Further, the loss of the analysis capability would impede the development of long term requirements and employment plans. The reentry body engineering and advanced development capability provides the Navy with an in-house expertise not otherwise available to it. The development of advanced reentry systems would suffer from the loss of this expertise and technology database. The facilities available for ground testing are virtually irreplaceable. Their loss would leave a gap in national aerodynamic ground testing that would be virtually impossible to fill.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

NSWCDD has performed a strategic and space systems mission for nearly four decades--throughout the life of the SLBM program. The mission developed at NSWCDD because of the availability of computing resources, wind tunnel facilities, and experience in ballistics. The

development of the included facilities is described in the attached write-ups. The capability to perform this mission has developed and expanded in the intervening years. A body of specialized expertise in SLBM weapons control and targeting software and reentry systems analysis, design, and testing is the result of the years of support of the SLBM program. This continuity of effort has resulted in the development of an experienced staff (more than 25 per cent have at least 15 years program experience) with specialized and strategic weapon system specific and operationally relevant knowledge. This includes expertise in software development for real time systems, strategic systems targeting, development of mathematical algorithms, geophysical data and related algorithms, operational support, materials R&D, effectiveness analyses, propellant R&D, and the full range of testing -- flight, wind tunnel, and environmental -- and the development of related hardware, software, and methodology. In addition, the Division is the DOD leader in the accurate computation of satellite orbits and the development of mathematical models of the Earth's gravity field.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

The strategic and Space Systems capability at NSWCDD supports Functional Support Area 9.1--Navy Strategic Systems.

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

Strategic and Space Systems support at NSWCDD has spanned nearly four decades. It reached a peak (in terms of direct work years) during the development of the latest SLBM system--the TRIDENT II. Over the last five years, the direct work years associated with support of this capability have progressed from a high of nearly 500 in FY91 down to approximately 450 in FY93. The utilization of the facilities associated with this capability are detailed in the attached write-ups.

12. Provide the projected utilization data out to FY1997.

Strategic and Space Systems capability will be required into the foreseeable future. Utilization, in terms of direct work years, is expected to be stable at approximately 400 beyond FY97. The projected utilization of the facilities associated with this capability are detailed in the attached write-ups.

13. What is the approximate number of personnel used to operate the facility/equipment?

Nearly 400 NSWCDD personnel support Strategic and Space Systems. They have specialized expertise in SLBM weapons control and targeting software and reentry systems analysis,

design, and testing resulting from more than 35 years of support of the SLBM program. This continuity of effort has resulted in the development of an experienced staff (more than 25 per cent have at least 15 years program experience) with specialized and strategic weapon system specific and operationally relevant knowledge. This includes expertise in software development for real time systems, strategic systems targeting, development of mathematical algorithms, geophysical data and related algorithms, operational support, materials R&D, effectiveness analyses, propellant R&D, and the full range of testing -- flight, wind tunnel, and environmental -- and the development of related hardware, software, and methodology. In addition, the Division is the DOD leader in the accurate computation of satellite orbits and the development of mathematical models of the Earth's gravity field.

Personnel supporting Strategic Systems are predominantly mathematicians, computer scientists, physicists, aerospace engineers, and engineering technicians. Nearly 80 per cent of the work force has degrees in one or more of these technical fields and more than 25 per cent of the work force has advanced degrees. The computer scientists have extensive and specialized experience in the development of real-time software for SLBM systems. This includes knowledge of the SLBM weapon system and, in particular, in the application of computer technology to solving the unique SLBM weapons control problem. Physicists and mathematicians specialize in a variety of areas required to support all areas of weapon system development. These include, for example, the development of high fidelity weapon system and trajectory computer simulations, and in inertial navigation and guidance, geodesy, statistics and filtering. Engineers and technicians associated with the hypervelocity wind tunnel facility also have extensive experience in the planning of ground tests, conceptualization and development of instrumentation, and data reduction and analysis.

14. What is the approximate number of personnel needed to maintain the equipment?

See individual Special Facilities descriptions in Section II.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See individual Special Facilities descriptions in Section II.

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Facilities for Technical Capability for Electronic Warfare Systems**

1. State the primary purpose(s) of the facility/equipment.

The Dahlgren Division is the recognized expert in the systems engineering of electronic warfare systems and their integration into the combat system. We are also a technical leader in the development of systems used in the collection of the intelligence information which feeds the threat definition process. The work of this Technical Capability (TC) includes: analysis and assessment of system capability against changed or new threats; development of requirements for new systems and upgrades to fielded systems; development of source selection plans and contract proposal evaluation for major procurement; development of prototype or limited production items; validation and verification of industry produced systems; engineering support to formal test and evaluation programs; development, maintenance and upgrade of Electronic Warfare System computer programs; development of fleet EW training systems and devices for embedded training and training ranges; development of threat libraries and direct service to the fleet through development of tactics and problem resolution. The Division has successfully demonstrated its capability in these areas through the current work in defining an Advanced Integrated Electronic Warfare System (AIEWS) for the FY 2003 Combat System; through its on-going upgrade of the AN/SLQ-32 shipboard electronic countermeasures set, through its work in defining the contribution of the "NULKA" off-board active electronic countermeasures system to the survivability of ships in a littoral environment; and through its contribution to the success of Desert Shield/Desert Storm in the rapid development of new threat libraries, system upgrades and special intelligence collection devices. This support is an essential ingredient in the success of the Navy in making smart decisions in a time of rapidly changing geopolitical situation coupled with declining budgets.

Electronic Warfare is increasingly seen as a cost effective contributor to the effectiveness of fighting forces. EW provides situational awareness monitoring of the electromagnetic spectrum for early indications of enemy intent. EW also provides electronic countermeasures to protect the ship against RF, IR or EO homing missiles or targeting systems. Electronic Warfare is becoming more important in the littoral warfare environment where low flying ASM's create a challenge for detection and engagement systems. Our Electronic Warfare

technical capability is dedicated to the continued improvement of the fleets warfighting capability through the introduction of new technologies and the improvement of its current capabilities.

The facilities listed below described in this document are an essential to our success in execution of the electronic warfare technical capability. These facilities are used for Electronic Warfare System development and support; Integration into the Combat System and with other sensors and weapons systems; Design, fabrication and test of prototypes and system components; and Electromagnetic environmental testing.

The Electronic Warfare Technical Capability uses a wide range of facilities in the accomplishment of its mission. They are:

- **Scientific and Engineering Computer Complex**
- **Program Assurance Facility (PAF)**
- **AEGIS Computer Center (ACC)**
- **Prototype Fabrication Facility**
- **Search and Track Sensor Test Site (STSTS)**
- **PHALANX Instrumented Test Facility**
- **AN/SLQ-32 Program Generation Center, RF**
- **Anechoic Test Facility**
- **Electromagnetic Vulnerability Assessment Facility (EMVAF)**
- **Pulsed Power Technology Complex**

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

See individual Special Facilities descriptions in Section II.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

The replacement cost of each support facility is included in the attached write-ups. The total cost of replacing these facilities would include the cost of replacing literally hundreds of people who are skilled in the full range of system development activities.

4. Provide the gross weight and cube of the facility/equipment.

See individual Special Facilities descriptions in Section II.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

See individual Special Facilities descriptions in Section II.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

See individual Special Facilities descriptions in Section II.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

See individual Special Facilities descriptions in Section II.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The key factor in location for the Electronic Warfare TC is collocation with other systems programs and facilities which are required for effective integration into the combat system. These include combat system, ship defense, search and track system, the electromagnetic compatibility and vulnerability programs and their facilities. Use of the River Range and Wallops Island for flying of airborne simulators against EW systems is important, not only because of the open water environments but because of the multi-system test environments provided.

With the exception of the Anechoic Test Facility, the equipments and facilities directly associated with the Electronic Warfare TC can be moved and/or replicated at another location. However, the total environment, including supporting facilities listed above and colocation with Technical Capabilities in Combat Systems, Ship Defense and Electromagnetic Effects could not be duplicated.

Complete loss of this function by the Navy would remove a critical link in the support infrastructure for electronic warfare. Readiness of Fleet EW systems would be directly and negatively affected. For example, fielded systems could not be upgraded with new ECM techniques for emergent threats. And the loss of the "smart buyer" function would significantly increase the risk to fielding of capable new systems required for the 21st century.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

See individual Special Facilities descriptions in Section II.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

See individual Special Facilities descriptions in Section II.

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

See individual Special Facilities descriptions in Section II.

12. Provide the projected utilization data out to FY1997.

See individual Special Facilities descriptions in Section II.

13. What is the approximate number of personnel used to operate the facility/equipment?

Electronic warfare systems are highly complex, requiring extensive and in-depth experience for successful development and support. Recent Air Force experience with the Airborne Self Protection Jammer is an example of the complexity and high risk nature of this work. The Navy's experience with the AN/SLQ-32 has also been fraught with problems in developing a system which meets the user's needs. Through a combination of expertise at NSWCDD, Prime Contractors, the Crane Division and NRL, the Navy has made significant strides in recent years in making the AN/SLQ-32 an effective system. The expertise provided by this TC has been an essential ingredient in that success. Now it is time for this expertise to be applied to the Advanced Integrated Electronic Warfare System which replaces the AN/SLQ-32 in the FY 2003 Combat System and to the operational deployment and evolution of NULKA. The expertise must continue to be applied to fleet support of the AN/SLQ-32 which is installed on almost 300 Ships and will provide engineering capabilities in the related fields of intelligence gathering and cryptology.

An eclectic mix of knowledge, skills, and abilities are required in this complex field. Scientists and Engineers with backgrounds in combat systems, electronics, complex signals processing, machine language and higher order language computer programs, miniature circuit design, fleet operational requirements, networks, displays, analysis and simulation, and formal test and evaluation are among those required.

While actual operation of the listed facilities does not require significant numbers, the approximate number of people whose work involves, directly or indirectly, the use of the facilities is as follows:

	0-1yr	1-5yr	5-10yr	10-20yr	20+yr
Systems Engineers			2	9	13
Electronic Eng		4	10	12	10
ME					
CS/Math			7	9	5
Physicists				1	2
Other	1	6	7	10	23

14. What is the approximate number of personnel needed to maintain the equipment.

See individual Special Facilities descriptions in Section II.

15. Provide one 8 1/2" x 11" black and white photo of the facility/equipment.

See individual Special Facilities descriptions in Section II.

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Facilities for Technical Capability Electromagnetic Environmental Effects**

1. State the primary purpose(s) of the facility/equipment.

NSWCDD is the Navy's lead laboratory for electromagnetic environmental effects (E^3) research, development, test, and evaluation (RDT&E) to assure operational effectiveness of Naval systems exposed to stressing electromagnetic (EM) environments (EMEs). Technical Capability (TC) develops and applies analytical and experimental techniques, facilities, and instrumentation required in the assessment of susceptibility of electronic components, circuits, and systems to EM effects. Furthermore, NSWCDD investigates specific and generic susceptibility problems; and develops, evaluates, and recommends procedural and hardware changes, as appropriate, to harden Naval equipment to these effects. In this capacity, the NSWCDD engineering technical products and services enhance the combat readiness of all Navy surface, subsurface, and air platforms.

The mission supported by the E^3 technical capability is to apply front-end engineering throughout the acquisition process to ensure electromagnetic compatibility (EMC) of a Navy system with its intended operational EME; perform full-scale verification tests to determine the degree to which Navy and other Department of Defense (DoD) systems have achieved EMC; and certify that all ordnance (Navy and Joint Service) can safely operate in the tactical shipboard EME. Additionally, NSWCDD maintains the rapid surge and mobilization capability (personnel and equipment) to provide technical assistance to solve shipboard and in-country tactical EM problems that require immediate "battle front" solutions. This process includes, but is not limited to hazards of electromagnetic radiation to ordnance (HERO), electromagnetic vulnerability (EMV), electromagnetic pulse (EMP), EMC, radiation hazard (RADHAZ), and lightning.

NSWCDD is the only DoD activity with a full spectrum of facilities and technical expertise to design shipboard configurations to avoid E^3 problems and to test all service (i.e., Joint) aircraft, missiles, radar, system components, and ordnance for proper safety and operations. This unique capability improves programs during both development and while in operational service. We coordinate with industry, maintain close interaction with the Fleet, and maintain unique development and test facilities sought by all services. In the recent past, our technical

expertise and facilities have supported the EMC efforts of the Air Force (B2 Bomber, MH-53J, and MH-60G Special Operations Helicopter), the Army (MH-47E and MH-60K Special Operations Helicopter), as well as NASA (power-by-wire, fly-by-light research efforts), and General Aviation Aircraft (MD-11, 747, and 707).

NSWCDD continues to be the only agency (government or private sector) authorized to certify DoD aircraft and weapons systems for compliance with Navy HERO safety requirements.

Since 1986, NSWCDD has been the premier government agency for evaluation, certification of safety-of-flight, and correction of EMV deficiencies for DoD aircraft assigned to Joint Shipboard Operations.

NSWCDD is providing E^3 support for the commercial-off-the-shelf (COTS) equipment upgrade of the TOMAHAWK Weapon Control System and the Navy's TAC-3/4 console.

The Armament Munitions Oversight Panel's Final Reliance Study Report for Air-to-Air/Air-to-Surface Weapons Testing, dated 8 August 1991, assigned NSWCDD lead responsibility for EM effects testing of all air-to-air and air-to-surface weapons. In the Reliance Study Report for Surface-to-Air Testing, dated 9 April 1991, the Navy, as manager for sea-based system testing, was directed to ensure that adequate resources, facilities, and expertise be maintained. The recommendation was made in both reports to focus future test investments at NSWCDD.

The following technical/core functions are supported by the E^3 TC.

Ship EMC. During DESERT SHIELD/DESERT STORM the requirement for maintaining EMC was dramatically demonstrated. Since 1968, through support of the Shipboard Electromagnetic Compatibility Improvement Program (SEMCIP), NSWCDD has been the lead Navy laboratory providing the requisite EMC engineering to insure the ability of multiple electronic systems to operate on ship platforms. This TC provides "front end" E^3 system analysis, equipment acquisition decisions, recommends EMC program priorities, operational frequency management criteria, supports inspections and surveys (INSURVs), and resolution of mission impacting shipboard EMC problems. NSWCDD is solely responsible for the EMC data base, standard EMC test procedures, and the development of maintenance requirement cards (MRC) to ensure that EMC is maintained once it is achieved. NSWCDD is responsible for ship EMC and RADHAZ certification. Additionally, NSWCDD supported the Taiwanese ship construction (PFG-2 Class) foreign military sales (FMS).

Combat System Frequency Management Program (CSFMP). NSWCDD developed the Navy's CSFMP and has been updating and maintaining the program since its inception over 20 years ago. The program is a "living" program that requires constant revision to meet ever changing Navy frequency management requirements. At present, NSWCDD is expanding and enhancing the program to provide a dynamic capability to the fleet. This technical capability affects every surface platform. Under CSFMP, we provide training to the AEGIS Training Center and Battle Force workups.

HERO/EMV. NSWCDD has been the lead technical agent for the Navy HERO Program since 1958. The Navy HERO and EMV Assessment Programs were established by NSWCDD and we continue to develop the technologies to prevent, detect, evaluate, and correct HERO and EMV deficiencies for surface, submarine, and aviation systems and equipment; surface, subsurface, and air launched weapon systems; and platform interfaces. NSWCDD conducts all technical evaluations of weapons to determine if EM emissions will create unsafe or unreliable ordnance. NSWCDD personnel provide technical support to the various Program Managers in the acquisition process to ensure that the weapon system design is technically sound and meets established HERO safety standards. The division also provides rapid response to crises by evaluating HERO related operational scenarios.

Joint Service Operations. Shipboard aviation operations are inherently different and far more dangerous than land-based operations. If an aircraft mishap occurs, there is a real possibility of a major conflagration because of the explosive characteristics of fuel and ordnance. NSWCDD's efforts in Joint Service Aviation Operations HERO and EMV assessment provide the Navy the capability to address ordnance safety and aircraft safety-of-flight concerns when operating non-Navy aircraft onboard Navy ships. With its unique aviation HERO and EMV RDT&E capabilities, NSWCDD is able to identify design flaws, research and develop cost effective solutions, and assure Navy and joint operation commanders that non-Navy aircraft and ordnance will safely perform in the intense shipboard EME.

E^3 R&D. The Navy's surface warfare E^3 R&D program is intended to address current and emergent surface warfare systems needs that include EM shielding requirements, EMP and microwave hardening, reduction of electromagnetic interference (EMI), and early EMI assessment of systems. Specific R&D areas being pursued at NSWCDD are composite materials, topside model development, and low-level test and analysis.

Composite R&D. The composite R&D effort supports the Navy's potentially extensive use of composite and advanced materials for shipboard applications by providing the necessary E^3 requirements to ensure that EMC requirements are met. As more advanced composite materials are used aboard ship, NSWCDD provides the requisite E^3 technical expertise to define the E^3 specifications and, in concert with industry, develops fabrication techniques that ensure EMC with the affected shipboard systems.

EM Prediction Model. NAVSEA has funded and developed a number of EM prediction models to support the topside design process. As NAVSEA's technical agent, NSWCDD provides validation of the accuracy, and therefore the utility of the models, as part of the E^3

R&D effort. Such a function is naturally the responsibility of a government agency to insure that DoD remains "a smart buyer" in the development and procurement of modern ship designs (and major overhauls).

Low-Level Test Technique. The determination of the EMC of a Naval weapons systems' platform often requires threat level simulators which must be environmentally sensitive and can be extremely costly to develop. NSWCDD is investigating and developing low-level test and analysis procedures based on simple low-level magnitude response data. This highly specialized technical capability will give the Navy a cost effective and environmentally sound method to determine the extent to which a contractor has met the E^3 requirements specified for a system.

Electromagnetic Pulse. NSWCDD has been the lead Navy laboratory for nuclear weapons effects, including nuclear generated electromagnetic pulse, since 1969. As such, NSWCDD has conducted, or directed, all surface force EMP research and development (R&D). NSWCDD continues to provide technical guidance to Naval Sea Systems Command (NAVSEA) program managers on EMP hardening design for ships and shipboard systems, conducts R&D test programs, develops and operates test and specialized instrumentation systems, recommends specifications and standards for future acquisition programs, supports INSURVs, and develops life-cycle support programs and materials.

Military Standards. NSWCDD provides technical and engineering support in rewriting EME/EMC military standards, operational publications, and related technical publications on a daily basis. NSWCDD has an unequalled depth of experience with virtually all related publications, having participated in their development, revision, and implementation for decades (e.g. MIL-STD-1385, NAVSEA OP3565, NAVSEA OD 30393, NAVAIR AD 1115, MIL-HDBK-235). Through the use of fleet newsletters and inputs to the various naval training commands for personnel qualification standards, NSWCDD provides HERO and EMC training.

Operational EME. Proper definition of the operational EME is an extremely important part of the requirement definition of a weapon system. NSWCDD performs EME measurements aboard Navy ships and shore stations, continuously provides updates to MIL-HDBK-235, and has developed unclassified generic environmental tables that define the current friendly/hostile land, air, and sea electromagnetic threats. NSWCDD's ability to provide on-site measurement and evaluation of the shipboard EME is unique throughout DoD.

The primary facility used to support the above technical capability is the Electromagnetic Vulnerability Assessment Facility (EMVAF).

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12, of this data call.

See individual Special Facilities descriptions in Section II.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

The NSWCDD EMVAF is the only complete electromagnetic test facility able to simulate the high-power full-threat operational EME in which the Navy and other U.S. Armed Forces must operate. The EMVAF consists of ground plane test facilities (2), an anechoic chamber, a mode-stirred chamber, and a state-of-the-art telemetry collection and data reduction laboratory. These multipurpose test facilities are designed to generate the complex, modulated, high-power, radiated environments required for far-field evaluation of medium- to large-scale electronic and weapons systems,

NSWCDD is the only organization within DoD that currently maintains and operates all of these facilities at one unique site with the flexibility to generate high-power EM fields at government, private-sector, land-based, and/or ship-based sites.

Additionally, the availability of F-14, F/A-18, A-6 Aircraft, and aviation support facilities complement NSWCDD's extensive T&E capabilities. NSWCDD is ideally suited for use as a Joint Service Helicopter HERO/EMV test site.

4. Provide the gross weight and cube of the facility/equipment.

See individual Special Facilities descriptions in Section II.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

See individual Special Facilities descriptions in Section II.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

See individual Special Facilities descriptions in Section II.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

See individual Special Facilities descriptions in Section II.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The unique full spectrum E^3 engineering and test facilities at NSWCDD have been developed over many years at great expense to the government. Duplication of these facilities within the private sector would not be practical because of the expense in today's market place.

As the development of new ordnance, weapon systems and platforms will likely decline over time, and as new mission requirements are identified/redefined, each system presently in the inventory will require on-going modernization to ensure its continued operational effectiveness. Therefore, to ensure the reliability, survivability, and safety of all naval systems, it is essential that aggressive HERO, EMC, and EMV RDT&E expertise and facilities be maintained.

Training of technical personnel, acquisition of facilities, and development of requisite mature judgment are the time-consuming and expensive elements in an effective RDT&E program. Additionally, the collective understanding and knowledge acquired over time through "hands-on" experience in the detection and correction of HERO and EMV deficiencies would be lost. This factual and judgmental corporate knowledge resides at NSWCDD and allows for a rapid and successful response capability in times of crises.

The principal objective of the Navy HERO safety program is to ensure that safety, consistent with mission requirements, is designed into ordnance and weapon systems. One of the main thrusts is ordnance and weapon system safety and reliability.

A Navy in-house shipboard EMC and system safety program for HERO issues, located at one facility with a full spectrum E^3 RDT&E capability, is required to ensure that the Navy's warfighting abilities remain strong. NSWCDD is the only DoD facility that has the personnel and physical resources to provide cost effective E^3 RDT&E that addresses all safety issues.

See Section II for specific information concerning the EMVAF.

9. Indicate how and when the facility/equipment was transported and/or constructed at the site.

See Section II for specific information concerning the transportation and construction of the EMVAF.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

This capability provides the requisite full-spectrum E^3 RDT&E for the following major programs and/or NSWCDD TCs: TOMAHAWK Cruise Missile, AEGIS Weapons System, Rolling Airframe Missile (RAM), Standard Missile, Ship Self-Defense Systems, Electronic Warfare Systems, Gun Weapon Systems, US Army Special Operations Aircraft, Cooperative Engagement Capability (CEC) Systems, Weapons Materials, and US Air Force Special Operations Aircraft.

See Section II for specific functional support areas supported by the EMVAF.

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

This TC has experienced a modest but steady growth over the past five fiscal years. An influx of U.S. Army aircraft EMV and HERO tasking in fiscal years 1989 through 1991 created a substantial backlog that was handled by increasing the contractor workforce in order to maintain the highly technical core workforce to meet the "normal" tasking.

See Section II for specific information concerning the EMVAF historical utilization.

12. Provide the projected utilization data out to FY1997.

As new mission requirements are identified, and current missions are redefined, the present weapon and electronic systems will require on-going modernization. With this TC's unique full spectrum E^3 capabilities, it is reasonable to assume that the utilization will, at a minimum, remain consistent. As the Navy "right sizes" and other E^3 facilities are closed, the possibility exists for a modest growth in the outyears.

See Section II for specific information concerning the EMVAF projected utilization.

13. What is the approximate number of personnel used to operate the facility/equipment?

To perform the functions necessary for HERO, surface EMC, and EMV RDT&E, and provide for rapid response to fleet HERO/EMV/EMC problems, a diverse group of engineers,

scientists, and technicians is required. The required level of technical expertise is not readily available, although the scientific and technical basis for the work can be obtained through formal education. The specifics of HERO/EMV/EMC RDT&E require on-the-job training and experience that can only be acquired after 5-to-10 years of experience. The combined expertise currently involved in HERO, EMV, and surface EMC assessments consists of a core group who have been involved in this work since its inception and augmented by other government, university, and contractor technical personnel. Their corporate knowledge and experience are not duplicated anywhere within the government or private sector.

NSWCDD has the skilled personnel required to respond to a HERO crisis anywhere in the world at a moment's notice. During Operation Desert Storm, HERO and EMC problems were identified aboard ships and in-country that seriously impeded the ability of the Battle Force to execute operational orders. Within hours, NSWCDD technical personnel were onboard ship and in-country evaluating and effecting corrections for the HERO and EMC problems that were needed for this rapid surge and mobilization effort.

The following table lists the disciplines and experience of the assigned technical staff.

	0-1yr	1-5yr	5-10yr	10-20yr	20+yr
Systems Engineers					8
Program Manager				2	5
Electrical Engineer		4	13	13	12
Physicists		1			3
Computer Scientist		1		1	
Electronic Tech			1	3	9

The EMVAF is operated by government and contractor personnel. See Section II for specific information concerning the operation of the facility.

14. What is the approximate number of personnel needed to maintain the equipment?

See Section II for specific information concerning the maintenance of the EMVAF.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See Section II for photograph of the EMVAF.

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Facilities for Technical Capability for Weapon Systems Safety**

1. State the primary purpose(s) of the facility/equipment.

The Navy is responsible for the development of combat systems that are operationally capable, survivable and safe to operate and maintain. All of these elements coalesce in this TC. NSWCDD provides support for weapons/combat systems safety and survivability of Fleet surface warfare assets as an organic component of systems development and engineering. NSWCDD supports the development process with safety, design, and integration engineering through the assessment of system and item vulnerabilities including software, and specifies, designs, and develops means to remove failure modes, control environments, limit damage, or otherwise reduce possible loss of combat capability during all phases of operation from detection and control through engagement. The effects of design, operation and environments on system capabilities and personnel safety are determined and mitigation measures that maximize safety and operational capability are designed or specified. Systems safety, as an inherently governmental function, is the optimum degree of safety within the constraints of operational effectiveness, time, and cost attained through specific application of system safety management and engineering principles.

In concert with DODINST 5000.36 (System Safety Engineering and Management), our governing instructions; NAVSEAINST 5100.12 (System Safety Program for Ships, Shipbourne Systems and Subsystems, and Equipment), MIL-STD-882C (Systems Safety Program Requirements), NAVSEAINST 9700.1A (Pointing and Firing Cutout Zone Program for Shipboard Systems), NAVSEAINST 9110.1A (Structural Test Firing Program for Surface Ships), OPNAVINST 9072.2 (Shock Hardening of Surface Ships), and NAVSEAINST 9072.1A (Shock Hardening of Surface Ships) work together to provide total system safety that is core to the development of Navy surface ship combat systems. NSWCDD acts as primary technical advisor to, and sits on, two OPNAV chartered boards: Weapons Systems Explosives Safety Review Board (WSESRB) and Laser Safety Review Board; and Chairs the Software Safety Technical Review Panel. These boards provide System Safety standards, policy, direction, and critical safety review for all Navy and USMC weapons systems. NSWCDD has extensive interactions with foreign navies (FMS) weapons/systems evaluation through TDA roles in the

Structural Test Firing and Pointing and Firing Cutout Zone Programs. The majority of this TC is Navy related. Jointness is displayed in the membership maintained on Tri-Service committees such as the Laser Systems Safety Working Group and the Fuze Safety Working Group and oversight of joint USMC/Army weapon system acquisition programs to assure that the Navy shipboard environments and safety criteria are adequately addressed. With the increasing use of software controlled processes in the commercial sector, there is a high potential for use of the software analysis and evaluation techniques developed or applied in this TC.

System Safety provides a unique integrated view of combat and weapon systems across the development spectrum. This organic exchange of specifications, design requirements, engineering and test data, technology needs, and documentation is required for safe and effective system development. The NSWCDD Combat and Weapon Systems Safety effort furnishes the Navy with a systems safety program that is designed into systems from the beginning.

With multi-agency sponsorship, NSWCDD directs and conducts Navy and DoD programs in numerous technical areas, major examples are:

- Combat Systems, Weapons and Ordnance Systems Safety (TOMAHAWK, AEGIS, VLS, STANDARD Missile, CEC): Assure the adequacy of overall systems design and interfaces through a combination of system hazards analyses, design reviews and other systems engineering efforts.
- Software Safety (Computer Program Nuclear Safety Analysis (CPNSA) for TOMAHAWK, CEC): Identify, analyze and test critical elements of system code to assure operational safety. Chair WSESRB Software Safety Technical Review Panel (TRP).
- Weapons Systems Explosives Safety Review Board (WSESRB), Laser Safety Review Board (LSRB) and Naval Ordnance Center (NAVORDCEN) Safety Office Support: Primary technical advisor to and member of two OPNAV chartered boards that provide critical safety review of all Navy and USMC weapons and laser systems.
- Topside Design Engineering (All Naval surface ships and weapon systems): Analyze ship topside configuration to design and implement safe and operationally effective weapons firing arcs through ship modeling and sophisticated CAD techniques. Shipboard evaluation of weapons firings to minimize deleterious safety, structural and operational effects.
- Blast Effects Modeling (VLS, STANDARD Missile): Develop advanced computational and empirical models in the areas of fluid dynamics, heat transfer, ablative materials and structures to support weapons development and topside design safety and effectiveness.
- Land Based Integration Testing (VLS, TOMAHAWK, STANDARD Missile): Provide physical data ranging from software code evaluation to actual missile firings to predict and mitigate system design faults.

- Weapons/Ordnance Shock Qualification (All surface weapons): Shock hardening design expertise applied to determination of systems vulnerability and to improve systems survivability form operational shock environments, e.g., underwater explosion.

All of the above efforts operate collectively for the protection of personnel from injury or death and to prevent damage to, or loss of, equipment or mission capability. As can be seen above this TC serves a broad spectrum of programs and programmic areas. These applications require personnel functional in many disciplines along with support from a wide array of specialized facilities. NSWCDD facilities that are vital to the success of this TC are:

- Weapons Systems Safety Analysis & Evaluation Facility: Computer simulation, ship topside design, system safety analysis and evaluation
- Shock Laboratory: Shock qualification of ordnance
- AEGIS Computer Center - Support to AEGIS Principle for Safety
- Cruise Missile/UAV System Development & Integration Facility: TOMAHAWK software and firmware safety analysis and evaluation
- Program Assurance Facility: Software safety analysis and evaluation
- Computer Aided Engineering & Performance Assessment Facility: Weapons development modeling and engineering
- Prototype Fabrication Facility: Pointing & firing cutout cam fabrication
- Scientific & Engineering Computer Complex: Weapons and weapons effects modeling
- Electromagnetic Vulnerability Assessment Facility: Provides support for system safety assessments.

The NSWCDD safety effort is involved in all phases of the combat system lifecycle from specification of system requirements to verification of proper implementation leading to a safe and effective system design. NSWCDD maintains a strong effort in the integration of emerging technologies into this work to provide continually improving service to the fleet.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

See individual Special Facilities descriptions in Section II.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

A number of facilities exist at NSWCDD to assure integration of emerging technologies, relevant to weapons systems safety, into the weapons development and system safety process. These facilities are listed in section 1 above. The primary support facility for this TC is the Weapons Systems Safety Analysis & Evaluation Facility, however all personnel, equipment

and supporting facilities are synergistic and operate as a whole organism to achieve the final product.

Other equipment that contributes to this capability are:

- Laser Safety Laboratory consisting of Argon Ion, Dye, HeNe and Nd:YAG lasers, as well as, optical tables, photometers, standard light sources, monochromators, and lenses, in support of the Laser Safety Technical Direction Agent Program.

- Digital and Analog Recording equipment, as well as, necessary transducers for thermodynamic property measurement, in support of land-based and shipboard tests.

- Quarter-scale Vertical Launching System gas management system simulator.

4. Provide the gross weight and cube of the facility/equipment.

See individual Special Facilities descriptions in Section II.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

See individual Special Facilities descriptions in Section II.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

See individual Special Facilities descriptions in Section II.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

See individual Special Facilities descriptions in Section II.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The Combat System/Weapon System Safety role performed at NSWCDD is inherently governmental. Decision-making with regard to the safety of Navy weapons systems is a responsibility that should rest solely within the government. The following is justification for this role:

- NSWCDD is motivated solely by an institutional perspective toward system safety responsibilities without the profit motivation necessary to private industry;

- NSWCDD has, and must maintain, a strong internal system safety program so that the Navy can properly address its own needs with regard to system safety requirements. The existence of a wide-ranging RDT&E program is essential to the maintenance of a safe and effective defense capability;

- Selection of those sources that can best meet the needs and requirements of the government depends upon accurate, thorough, and impartial evaluation of contractor proposals;

- The competitive environment fosters contractor changes within the lifecycle of a weapon system. NSWCDD provides the needed repository of the Navy technological corporate memory. Corporate memory is also needed to avoid repetition of past safety problems as new systems are developed.

- As a government activity, NSWCDD provides rapid response to emergency situations and trouble-shooting requirements posed by operational situations. NSWCDD scientists, engineers, technicians, and support personnel provide the capability for this responsiveness.

Weapons Systems Safety is synergistic with programs residing at NSWCDD. The Weapons Systems Safety TC "dovetails" with over half of the NSWCDD TCs. The unimpeded exchange of specifications, software, test plans, test results, technology needs, engineering data, design requirements, and documentation is required for safe and effective weapon system development. Collocation with the system developers and support facilities is essential to this process.

Combat and weapons systems are introduced to the Fleet through a well-defined and rigorous safety engineering, test and evaluation process. NSWCDD performs much of this engineering and evaluation that leads to the certification process for the Weapons Systems Explosives Safety Review Board (WSESRB) and other review and approval boards. Because this TC is a core component of weapons systems engineering at NSWCDD; its loss, or the loss of vital supporting facilities, can have significant impacts, ranging from program delays and systems capability loss to potentially catastrophic personnel loss and injury. There are particular risks, as new systems are developed and existing system life cycles continue, in the loss of continuity (lessons learned) in the safety effort.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

NSWCDD involvement in the safe and effective design, development and operation of combat/weapons systems began at the dawn of the U.S. Navy guided missile era. In 1956-57 the Missile Safety Division was formed, the first missile Structural Test Firing was conducted (USS GALVESTON) and the process for determining Pointing & Firing Cutouts for

TARTER, TERRIER, and TALOS missiles was developed. The efforts rapidly expanded through the 1960's and 70's with the addition of air-launched and surface launched weapons and other ordnance system safety efforts. In 1967 at the creation of the Weapons Systems Explosives Safety Review Board (WSESRB), NSWCDD immediately became the primary technical advisor to the board as well as the repository of the Navy's system safety lessons learned in SAFEORD data banks. In this same period NSWCDD became responsible for STF of Naval guns and all P&FCO efforts. In 1979 NSWCDD initiated support to SPAWAR as the Technical Direction Agent for laser safety.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

See individual Special Facilities descriptions in Section II.

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

The current level of effort for this TC is 68 Man Years. Level of effort for supporting facilities can be found in their write-ups.

12. Provide the projected utilization data out to FY1997.

The level of effort is expected to be stable or have a slight rise through FY1997. Projected level of effort for supporting facilities can be found in their write-ups.

13. What is the approximate number of personnel used to operate the facility/equipment?

In the area of system safety for weapons systems, the Navy must be a "smart buyer". NSWCDD personnel maintain their technical expertise through a strong R&D effort in weapons systems safety so that emerging technology can be applied to weapons systems development and support. Training and experience in system safety engineering and/or one of the various specialty applications of the Weapon System Safety TC is required for all critical personnel. System Safety personnel require an average experience level of seven years in any particular area of weapons systems safety for full performance level. This allows NSWCDD to avoid relying solely on the technical judgment of the private sector in making safety decisions.

NSWCDD has, and must maintain, an in-house cadre of specialists who have in-depth and hands-on experience in all facets of weapons systems safety. The NSWCDD systems safety organization is a multi-discipline group consisting of:

- Computer Scientists with expertise in Data Structures, programming languages including ADA, C, FORTRAN, and CMS-2, as well as, in LANs, databases, UNIX, CAD, VMS, assembly language, and machine language.

- Electronics Engineers with expertise in electronic design, computer system design & operation, transducer theory and application, and microcode.

- Mechanical Engineers with experience in computational fluid dynamics, heat transfer, structures, and weapon system mechanical design.

- Technical Specialists (Physicists, Mathematicians, Engineering disciplines, ...) with significant systems engineering experience.

- Engineering Technicians with data acquisition experience.

14. What is the approximate number of personnel needed to maintain the equipment?

See individual Special Facilities descriptions in Section II.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See individual Special Facilities descriptions in Section II.

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Facilities for Technical Capability Chemical/Biological Warfare Defense Systems**

1. State the primary purpose(s) of the facility/equipment.

The purpose of this effort is multi-fold. It provides the basic and applied research in the fields of biological science that supports molecular computing. It performs chemical research on materials and the interaction of chemicals on CB protective equipment. It provides the engineering support to develop, test, and evaluate chemical/biological defense equipment for shipboard use. This includes support for the development of detectors, shipboard collective protection systems, and for formulating shipboard washdown/decontamination procedures. This effort is supported by two state-of-the-art science and engineering facilities. These include: the Chem-Bio Engineering Complex and the Chem-Bio Sciences Complex.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The facilities in the engineering complex are fixed. A land base engineering development and test chamber is a large double dome armor plate steel facility with pressure walls and filtration equipment. Equipment within the complex could be moved, but would require extensive funds and time to relocate. The equipment in the sciences complex has been installed and fixed in place with attendant building modifications such as fume hood vents, special gas lines, etc. Like any laboratory equipment, the equipment could be moved but at great expense and requiring extensive reinstallation/building modifications.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

The replacement value of the science and engineering facilities is 19.7M.

4. Provide the gross weight and cube of the facility/equipment.

See individual Special Facilities descriptions in Section II.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

No special utility support required other than substantial electrical power, chilled water for laser systems and large amounts of conditioned air for the toxic analysis facility and steady state humidity control for the analysis laboratory.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

No special budget requirements.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

The Engineering Complex requires air filtration and temperature/humidity control. The science facility requires special temperature and humidity control. Laser equipment requires chilled water. Toxic laboratory exhaust requires high efficiency air filtration systems.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The engineering complex is not relocatable to any other Navy site. The inherent capabilities would have to be replicated at another Navy site at considerable expense. This is unlikely given the attendant environmental regulatory issues that have to be considered. The complex is identified in the Chemical Weapons Treaty and, under the terms of this treaty, cannot be relocated to another site. The impact of loss of the complex would be to halt the total chem-bio detector development effort for the Navy. Improved chemical detector units would not be available for installation aboard combatants leaving fleet forces vulnerable to a chemical attack in any littoral conflict. The loss of the complex would also stop the biological detector engineering development effort which represents the only fieldable capability currently available to U.S. Armed Forces. The equipment at the science complex can be relocated to another site at considerable expense due to laboratory nature of equipment. However, the attendant environmental regulations and permitting constraints make it highly unlikely that such facilities could be easily started up at a new site. Loss of the facility and equipment would result in loss of the Navy's research efforts in defense of new toxic agents; loss of the only research efforts in the field of molecular computing in the Navy, and the chemistry facilities required to support Navy CBW defense technology efforts.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The development of this capability and the associated research complexes has been accomplished by a slow, steady progression of improvements, training and understanding. The hardware/equipment was an initial consolidation from Naval Weapons Lab, Naval Applied Science Lab and the Naval Radiological Defense Lab. This has since been amalgamated and improved upon as the state-of-art has allowed. The application of technology and engineering practices by the S&Es at this facility was the result of formal education, OJT, and improved scientific insight. The end result is a unique collection of personnel and hardware dedicated to improving the war-fighting capabilities of the US Navy.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1.3 Surface Ship
4.2 Coastal/Special Warfare Support
5.3 Special Sensors
10.6.3 Surface Ship
11.1 Computers

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

The facility has been in daily use (8hrs/day) for the last five fiscal years. The new molecular biology portion of the complex came online in July 1993 and has been utilized in excess of 10 hours per day. The LBTF has been used 50 hrs/week during this period.

12. Provide the projected utilization data out to FY1997.

Project utilization of the facility should remain high over the next three years.

13. What is the approximate number of personnel used to operate the facility/equipment?

Thirty-five people are supported by the work of the complex.

14. What is the approximate number of personnel needed to maintain the equipment?

There are no dedicated personnel required to support the facilities/equipment. By the very nature of the work, the personnel using the complex represent the full range of scientific personnel such as chemists, physicists, computer scientists, electrical and mechanical engineers. Their knowledge base is extensive in the field of CBW and detector technologies.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See individual Special Facilities descriptions in Section II.

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Facilities for Technical Capability for Warheads**

1. State the primary purpose(s) of the facility/equipment.

These facilities/equipments support all tho capabilities and efforts necessary to provide missile and underwater warheads for the fleet. It continues a long standing (over 35 years) and successful effort which has yielded world class warheads for such missiles as STANDARD, PHOENIX, TOMAHAWK, and SPARROW; for torpedos such as the MK 48 and MK 50; and explosives such as PBXN-103 (underwater systems), PBXN-109 (GP bombs), HNS (many aircraft, weapons, and space shuttle). These functions include significant capability in explosives research and development, fuzing and initiation systems, target vulnerability (including foreign systems), and in warhead and explosive testing. These functions allow the capability to cover the full spectrum required for warhead research and development. Customers have included NAVSEA, NAVAIR, ARMY, AIR FORCE, MARINE CORPS, NASA, ARPA, DNA, as well as foreign countries. It has included a healthy funding mix of research (6.1, 6.2, 6.3A), development (6.3B and 6.4), as well as certain weapons support funding (6.6). The market in this area is generally unique (no commercial value) and as such the expertise and capabilities support the "smart buyer" capability for the Navy.

NOTE: Center plans include the functional shift of the underwater warhead and explosives components of capability area to NSWC/IHD in April, 1994. These components are included here. The loss impact to the Center of missile warheads, target vulnerability, and testing is not compromised or lessened by this transfer.

The warheads technical capability provides a vital component to the current and future Naval mission as well as positively impacting the Air Force and Army power projection missions. Missile and underwater warheads have supported power projection and peacekeeping operations in the Persian Gulf, Desert Storm, and other limited third world engagements. TOMAHAWK, STANDARD, PHOENIX, SPARROW missiles and Marine Corps weaponry have been utilized extensively. Recent efforts have provided warheads to enhance capabilities against sea skimming cruise missiles. Current activity is involved in setting requirements and research goals for advanced systems and in conducting research leading to solutions to tactical problems posed by third world, littoral, and tactical ballistic missile threats.

The functions and products produced by this capability are wide ranging both in the Navy and in the tri-service arena. Within the Navy, research and development has yielded products for strike systems including projectiles and missiles, for underwater torpedo and mine systems, and for Marine Corps weapons systems. Work accomplished has also found use in Army and Air Force systems. In response to Navy Laboratory consolidation, in April, 1991 the Commanders of the Naval Sea Systems, Naval Air Systems Command, and Assistant Secretary of the Navy signed an agreement on missile research and development. In part, this agreement assigned the R&D of all missile warheads to the Dahlgren Division. Dahlgren Division personnel are active in Project Reliance, in the planning and policy for Reliance implementation and in the spirit of reliance cooperation. Warheads, explosives, and target vulnerability are particular areas in which the Dahlgren Division is cooperating in Reliance. For example, Dahlgren Division supplies the Army PATRIOT Program all vulnerability information on cruise missiles and on certain other foreign missiles. Similarly, the PATRIOT program has used Dahlgren Division explosives developments. The joint Air Force/Navy AMRAAM program is currently using warheads expertise from this TC. Elements of this TC also interact closely with the Department of Energy National Laboratories.

The work in this Technical Capability spans the entire range of the lifecycle of warheads, including basic research, enabling technology, development, testing, transition to production, and in service support. This includes technology components of warhead design, explosives, and fuze and initiation systems. Tremendous synergy exists due to this process as operational, production and in service issues can be fed directly into the research and development thrusts, resulting in improvements in newly upgraded warheads and in warheads for different missile systems. This process has yielded a series of high quality/high performance warheads for numerous missile and underwater systems.

This technical capability supports basic research. Basic research has been conducted for years in the NSWC Independent Research and Independent Exploratory Development arenas. Typical work has included fracture mechanics and impact dynamics of fragments and other metal surfaces and advanced explosive chemistry and physics. NSWCDD has also chaired working groups with the Department of Energy (Los Alamos, Sandia, and Livermore) to exchange newest ideas in basic research in fundamental forms of energy release and warhead concepts. Under Project Reliance, NSWCDD has been a principal member and committee chair for conventional weapons. In addition, NSWCDD has been very aggressive in the Small Business Innovative research area. It has sponsored scores of projects related to energy release, warhead concepts, and test techniques.

The main program for enabling technology continues to be sponsored by the Office of Naval Research. Technology block programs have been very strong in supporting warhead, energetic materials, and initiation system development. It has been instrumental in establishing air target vulnerability and weapons lethality data. A significant amount of engineering tests and

analyses have led to target vulnerability descriptions for a variety of threat missiles. These data have enabled much improved system analyses of warhead design to be made, resulting in better overall system effectiveness. The Block has supported advanced warhead concepts. It supported development of the continuous rod warhead concept in the 1970s and of fragmenting warheads in the early 1980s. It has continued to support advanced technologies which are in production for Navy systems. All underwater warheads have been developed under this TC. All Navy anti-air missile systems have benefited from the technologies developed under these programs. Other services have also used the technology including the Air Force (AMRAAM) and Army (PATRIOT).

NSWCDD has conducted a broad <u>warhead development</u> effort for over 30 years. This development has incorporated results of technology base work, sound engineering principles, and test and evaluation results to design warheads to meet modern threats. The development work has been supported by NSWCDD modeling and fabrication facilities, configuration and quality management, safety and electromagnetic compatibility engineering, and of course, the Explosive Experimental Area.

Fundamental to any warhead research and development are the <u>test and evaluation</u> capabilities for warhead, explosive, and fuze development. The Explosives Experimental Area at the Dahlgren Laboratory which make the development possible. These facilities include small scale explosive test ranges, and large scale test facilities capable of conducting full scale design verification and lethality tests. This facility is the only full spectrum facility on the east coast. The Laboratory also operates underwater, fuze, explosive test, and ordnance radiography facilities to conduct a full range of tests. The facilities also include a full range of capabilities for ordnance safety qualification tests.

NSWCDD provides the <u>acquisition support and in service engineering</u> for all warheads it develops. This support is consistent with a policy of handing off to the Indian Head Division and contractors major responsibilities for ordnance section fabrication, explosive loading, and fleet support. NSWCDD develops transition to production strategies and plans, prepares all support activities and contractors for production, and assures that the initial production is smooth. During the life of the warhead, NSWCDD is prepared to resolve problems which may develop, evaluate change proposals, and conduct product improvements.

The basic facilities included in this area include the following:

- **Warhead Development Facility**
- **Hydroballistics Facility**
- **Computer Aided Engineering and Performance Assessment**
- **Fuze Development Laboratory**
- **Energetic Research and Development Complex**

Included in other areas, but critically important to the work within the warhead development area are the following:

Potomac River Test Range
Prototype Fabrication Facility
Warhead Analysis Facility

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

See individual Special Facilities descriptions in Section II..

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

See individual Special Facilities descriptions in Section II.

4. Provide the gross weight and cube of the facility/equipment.

See individual Special Facilities descriptions in Section II.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

See individual Special Facilities descriptions in Section II.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

See individual Special Facilities descriptions in Section II.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

See individual Special Facilities descriptions in Section II.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were

lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The capabilities described for this work are currently resident at Dahlgren and White Oak. It is vitally important to keep missile warhead work in the Dahlgren Division due to the very close system engineering relationship of the warhead and total missile system as the engagement portion of the detect, control, engage tactical development functions of the Dahlgren Laboratory. This system engineering includes the related work of system requirements, target vulnerability, effectiveness analysis and assessment, and missile/warhead design. The explosives and underwater warhead work will transfer to Indian Head in April, 1994. It is crucially important and cost/schedule effective to maintain the synergetic functions of warhead technology and design, explosives and fuze development, and test and evaluation in a nearby co-located area. The Dahlgren/Indian Head locations will allow this to occur. Dahlgren possesses the unique east coast capability to perform warhead and missile system qualification testing which is a prerequisite for effective warhead development.

Similar, but not total facilities exist at the Naval Air Warfare Center/China Lake. It is not cost/schedule effective to routinely conduct test and evaluation on the west coast. The proximity to the Naval Air Warfare Center/Patuxent River is also beneficial for certain testing.

The warhead, explosives, fuze, target vulnerability, and end game analysis are key elements of our system engineering and product development responsibility. NSWCDD has an integrated team of scientists and engineers in the technology, design, effectiveness, explosives, fuze, and test which cannot be matched in other government or industry facilities and are not cost effective to be maintained by industry. Fracturing this capability will result in significant loss of technology flow and loss of design and test corporate knowledge. These factors, combined with the loss of a "smart buyer" capability will greatly add cost, risk, and schedule impacts to warhead programs. This forward looking in-house capability provides the technical edge which gives a right-sized US Naval Force Structure a military advantage. This capability has allowed quick response in "surge" periods such as Desert Storm, evaluation of fleet problems (USS Stark accident), and has been significantly useful in the tri-service arena.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

See individual Special Facilities descriptions in Section II.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

These laboratories support a wide range of Functional support areas including;

1.1 Undersea Platforms
1.3 Surface Ship Platforms
2.1 Gun systems
2.2 Missile systems
2.3 Free Fall Weapons
2.4 Torpedos
2.5 Mines
2.6 Directed Energy systems
2.7 Explosives
2.8 Launchers
2.11 Weapon Fuzing
2.13 Other Ordnance
3.3 Surface Combat Syst Integ
4.2 Coastal/Special Warfare Support
5.1 Sonar Systems
5.3 Special Sensors
8.1 Ballistic Missile Defense
8.2 Countermeasures
9.1 Navy Strategic Systems
9.2 Nuclear Weap & Effects
10.4 Diving, Salv & Ocn E.
11.1 Computers
11.2 Software
11.4 Electronic Devices
11.5 Materials & Processes
11.7 Propulsion & Eng Conv

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

These facilities have, in general, been used extensively, as the NSWC leadership role in warheads and explosives has required. For example, they were quite involved in supporting a surge capability and trouble resolution in the Persian Gulf War and in investigating the USS Iowa incident. Individual usage data is presented in the attached writeups. The programs requiring these facilities have remained relatively stable over the past five years.

Approximately 382 workyears in this technical area was directly funded in FY93 of which 295 workyears was in the Science and Technology area.

12. Provide the projected utilization data out to FY1997.

NSWC has the national leadership function for underwater warheads and the Navy leadership for missile warheads. Our successes have brought investments from the Army and Air Force under PROJECT RELIANCE and from ARPA and The Defense Nuclear Agency. Even with the prospect of National cutbacks, the emphasis on research and prototyping is expected to continue, thus assuring the need for these facilities. Individual usage data is presented in the attached writeups.

13. What is the approximate number of personnel used to operate the facility/equipment?

These various facilities/equipments require personnel with specialized expertise for operation. For example, the work involves explosives, so extensive training and certification is required from professionals, through skilled technicians, and certified ordnancemen. The scientists, engineers, and other technical personnel providing support to this Technical Capability have significantly broad backgrounds in order to support its various elements. As a minimum, the scientists and engineers (S&E) have Bachelor's degrees with a significant portion of the S&Es holding advanced degrees. Expertise in the specialized fields of explosive chemistry, detonation physics, and warhead design and test must be gained through years of practical hands on work. The knowledge and experience levels are:

1) Research Chemists with 10-25 years of experience in organic chemistry and the synthesis of explosive compounds and detonation physics.

2) Physicists with 5-15 years of experience in the areas of detonation physics, materials science, high speed hydrocode analysis, and warhead design phemonology and system engineering.

3) Mechanical engineers with 5-15 years of experience in areas of fracture mechanics, materials science at high stress/strain levels, and detailed warhead design characteristics. Also expertise in materials failure modes and system vulnerabilities.

4) Electronics engineers with 5-15 years of experience in high speed electronic system, component, integrated circuit, and logic design as relates to fuzing systems.

5) Engineering technicians and ordnance workers with 5-20 years experience in high speed instrumentation and ordnance handling. Test costs are so great, that these people must have the knowledge and experience to "get it right the first time".

Individual writeups attached provide details of the personnel per facility. Individual tests require more or less persons.

14. What is the approximate number of personnel needed to maintain the equipment?

See individual Special Facilities descriptions in Section II.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See individual Special Facilities descriptions in Section II.

TAB B

SECTION II

DAHLGREN SITE

SPECIAL FACILITIES/EQUIPMENTS

TAB B SECTION II DAHLGREN

INDEX TO DAHLGREN SPECIAL FACILITIES/EQUIPMENT

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**SLBM Weapons Control Facility**

1. State the primary purpose(s) of the facility/equipment.

The SLBM Weapons Control Facility is used for the development and testing of SLBM weapons control software, fleet problem investigation, fleet procedure development, technology and obsolescence studies and for the production and quality control of fleet media (i.e., magnetic media containing weapons control software and data and strategic targeting data). It also provides contingency systems for the targeting support performed in the SLBM Strategic Systems Operations Support Facility.

The facility consists of a general purpose computing complex, weapons control system test berths (and supporting equipment, SLBM guidance systems, parts and documentation storage and commercial computers) for UK POLARIS, C4 TRIDENT I, D5 TRIDENT II, and UK D5 TRIDENT II, and a secure network connecting the computer complex and the test berths to each other and to office spaces. The facility also includes a secure (to the SECRET level) communications room and facilities that support the development, integration and testing of new technologies for SLBM weapons control systems prior to possible incorporation into the deployed SSBNs. Each test berth is located in an alarmed strongroom and supports normal operation at the SECRET level. When used as a contingency system for targeting support, it allows operation at the TOP SECRET level.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The facility described above comprises both equipment and the specialized building which houses it. In general terms, the equipment includes a number of specialized weapons control computers, supporting equipment (such as SLBM guidance systems), uninterruptable power supply, power converters, spare parts, communication and encryption devices, and commercial computers, workstations and ancillary equipment. This equipment is moveable; however, it can only be moved to another building with the unique features of the existing facility. These features will be discussed in response to a

later question, but include those associated with an alarmed strongroom for security and unique requirements for power, cooling, and raised floors.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

It is estimated that the replacement value of the facility (excluding the building) is $90M.

4. Provide the gross weight and cube of the facility/equipment.

The facility is partitioned into spaces to support a variety of unique functions and comprises 18,032 sq.ft. of floor space. Assuming 12 ft. ceilings, this translates to a volume of approximately 220,000 cubic feet. The equipment weighs approximately 90,000 pounds.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

In addition to normal 120 volt 60 hz electrical power, this facility requires some specialized power supplies associated with using shipboard systems (e.g., 120 volt 400 hz power and 480 volt 60 hz power). In addition, the facility requires an uninterruptable power supply to allow an orderly shut down of equipment. It also requires both environmental and closed loop cooling consistent with the size of the specific room and the equipment within it.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

The facility is partitioned into a number of rooms to support unique functions. These rooms are alarmed strongrooms and must include the required alarms, sensors, and drop ceilings to allow operation at the SECRET and TOP SECRET SIOP/ESI levels. The computer spaces must provide a satisfactory TEMPEST environment. In addition, the spaces containing the SLBM weapons control computers require raised floors to allow for cabling. There is also a requirement for a power converter to provide electrical power to systems which are normally supplied by Ship's Services when they are in operational use.

7. State any environmental control requirements for the facility/equipment (i.e., temperature,

humidity, air scrubbing).

The facility requires temperature and humidity control compatible with the computer equipment housed within it. It requires both environmental and closed loop cooling systems. A fire suppressant system is also required.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

As noted above, the equipment housed within this facility can be relocated to a facility which meets the unique requirements previously described. There is a significant cost and effort required for this move, especially if the new site does not meet these requirements, many of which are most easily met during initial construction of the building or facility. It is also possible to replicate some of the equipment required to recreate the entire facility. Certain weapons control computers, for example, become available when SLBMs are retired; other equipment is available commercially. However, some of the equipment in the facility (such as the UK POLARIS weapons control computer) are unique. TEMPEST approval of the facility must be obtained and, when the communications center is moved, the required telephone lines and accreditation must be obtained.

The most significant difficulty in relocating the facility, however, results from the requirement that NSWCDD continue to provide operational support to the SLBM force and USSTRATCOM while relocating--a period that may last for 1 - 2 years, depending on the condition of the new site. This virtually necessitates a replication of the facility--in whole or in part--rather than a relocation.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The facility was originally built in the mid 1960s and expanded several times to allow additional test berths (and associated equipment) as the SLBM force grew in system types (i.e., POLARIS, POSEIDON, TRIDENT I and TRIDENT II). Space has also been added for expanded media preparation facility and for a communication center. Weapons control equipment has been moved in, installed, and checked out by the SSP fire control

system hardware contractor (Martin Marietta Defense Systems). Preparations for this equipment were made by the building expansion contractor, NSWCDD Public Works, and NSWCDD Strategic Systems engineers and technicians. Other commercial equipment has been transported and installed by either the equipment manufacturer or by NSWCDD engineers and technicians.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

9.1 Navy Strategic Systems.

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

The facility is equipped for 3 shift, 24 hour per day operation. Normally, however, the facility is manned 12 hours per day, Monday through Friday and 9 hours on Saturday. The facility has been used 3 shifts per day during periods of intense software development activity or when it has been used in its role as a contingency backup for the SLBM Strategic Systems Operational Support Facility. The facility has, on average during the period of interest, been in use between 10 and 12 hours per day.

12. Provide the projected utilization data out to FY1997.

It is expected that utilization of the facility will continue at approximately the same level as over the past five years.

13. What is the approximate number of personnel used to operate the facility/equipment?

Approximately 11 government and 18 contractor personnel are required to operate both this facility and the SLBM Strategic Systems Operational Support Facility. Efficiency is obtained by using a common pool of engineers and technicians to operate the two similar facilities.

14. What is the approximate number of personnel needed to maintain the equipment?

Approximately 11 government and 14 contractor personnel are required to maintain both this facility and the SLBM Strategic Systems Operational Support Facility. Efficiency is obtained by using a common pool of engineers and technicians to operate the two similar facilities.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

A photograph of the facility and the included equipment is attached.

VISUALIZATION/COMPUTATIONAL STATISTICS LABORATORY
TAB B, SECTION II, DAHLGREN
PAGE 87A OF 90
UIC: N00178

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Potomac River Test Range**

1. State the primary purpose(s) of the facility/equipment.

The Naval Surface Warfare Center, Dahlgren Division maintains a complex of land and water ranges at the Dahlgren Site known as the Potomac River Test Range (PRTR) for the test and evaluation of live or inert ordnance, weapon systems, and weapon system components. The water range is approximately three nautical miles wide and sixteen nautical miles long. Restricted air space over the test range can be obtained to an altitude of 60,000 feet. A gunnery complex facing down the river has 42 gun emplacements for firing all types of Naval guns up to and including 16 inch caliber. Included is a small caliber indoor range with multiple test bays. The PRTR also supports the Search and Track Sensor Test Site (STSTS) which supports developmental sensors, multisensor integration, and sensor integration to gun systems. Other test facilities included in the PRTR complex are:

- **Explosive Experimental Area**
- **Warheads Research Test Facility**
- **Electromagnetic Vulnerability Assessment Facility**
- **Electromagnetic Pulse Test Facilities**

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The PRTR is a comprehensive instrumented test range with both fixed and mobile equipments.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

$311M for PRTR complex.

4. Provide the gross weight and cube of the facility/equipment.

Not Applicable

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

Cranes, rail support, fiber-optic networking, airfield, etc.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

Gun mount foundations, range boats, etc.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

Not applicable

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The PRTR would be extremely difficult to replicate. It is currently unique within DoD, the US, and private industry.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

Evolved over the past 76 years.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

2.1 Gun Systems
2.7 Explosives
2.8 Launchers
2.9 Fire Control
2.10 Weapons Data Links
2.11 Weapons Fuzing
2.12 Weapons Propulsion

2.13 Other Ordnance
2.14 Explosive Ordnance Disposal
3.3 Surface
4.1 Landing Force Equipment and Systems
4.2 Coastal/Special Warfare Support
5.2 Radar Systems
5. 3 Special Sensors
5.4 Space Sensor/Surveillance Systems
10.7 Major Range Development and Operation

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

Average - 20 hours per day.

12. Provide the projected utilization data out to FY1997.

Expected to remain the same as the past.

13. What is the approximate number of personnel used to operate the facility/equipment?

213 MY operation.

14. What is the approximate number of personnel needed to maintain the equipment?

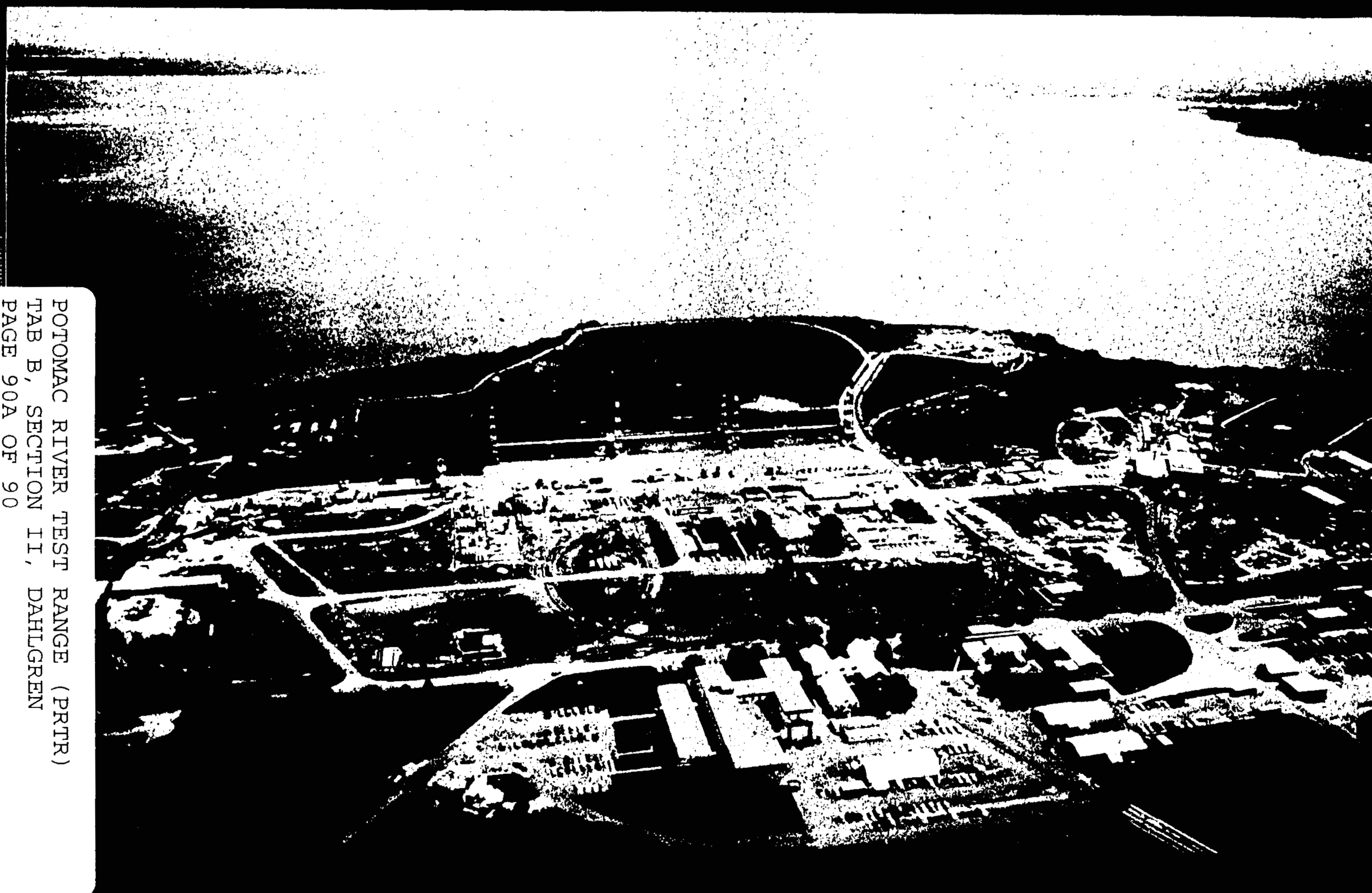
44 MY maintenance.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.

THE POTOMAC RIVER TEST RANGE (PRTR)

NSWC
DAHLGREN DIVISION

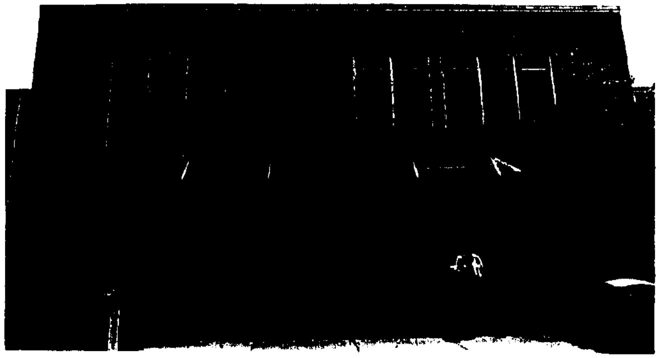


POTOMAC RIVER TEST RANGE (PRTR)
TAB B, SECTION II, DAHLGREN
PAGE 90A OF 90
UIC: N00178

NSWC
Naval Surface Warfare Center
DAHLGREN DIVISION

THE POTOMAC RIVER TEST RANGE (PRTR)

WEAPONS CONTROL SYSTEMS (WCS) SIGNIFICANT TECHNICAL FACILITIES



Strategic Systems Computations and Analysis Bldg.

Software Generation System
- Development Tools
- Testing
- Archiving of WCS Software
- Configuration Management
- Nuclear Weapons Safety and Software Security

SLBM WEAPONS CONTROL FACILITY
TAB B, SECTION II, DAHLGREN
PAGE 5A OF 90
UIC: N00178

for UK, C4 Trident I and D5 Trident II
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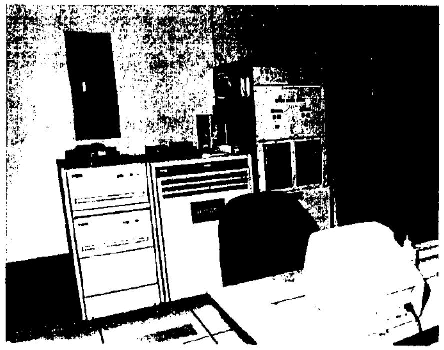
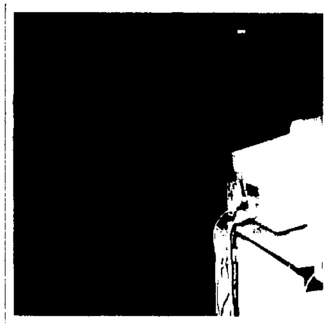
ing
ial Qualification
Problem Investigations
Resolution
Procedure Development
nology Studies
Shorebased UK Chevaline
in World
up for Targeting
ort

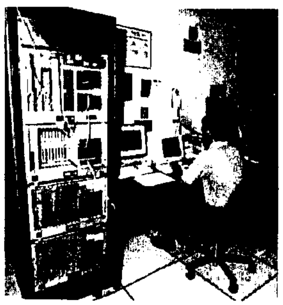


WCS Communication Facility
- Management of Specialized Electronic Media for WCS
- Control of Information to/from SSBN and Developers
- Archive Agent for SSBN

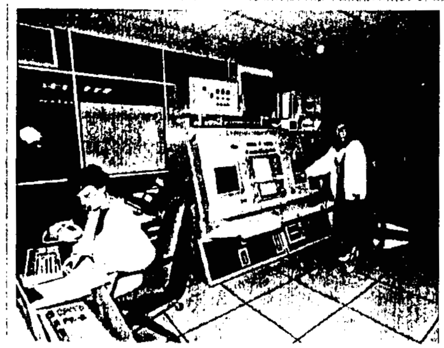


Central S&E Computer Complex
- Cray Based System
- Network, Secret High Ops
- Technology Studies
- Simulation and Modeling
- Algorithm Development
- WCS & USSTRATCOM Support
- Backup for Targeting Support

ed Development Laboratory
nology Studies
of Concept Demos
e WCS Prototyping

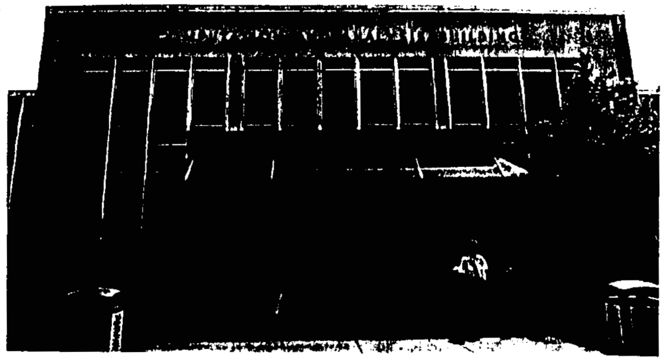


WEAPONS CONTROL SYSTEMS (WCS) SIGNIFICANT TECHNICAL FACILITIES

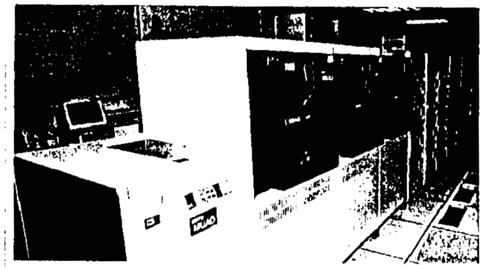


WCS's for UK, C4 Trident I and D5 Trident II

- Software Development
- Testing
- Formal Qualification
- Fleet Problem Investigations and Resolution
- Fleet Procedure Development
- Technology Studies
- Only Shorebased UK Chevaline WCS in World
- Backup for Targeting Support



Strategic Systems Computations and Analysis Bldg.

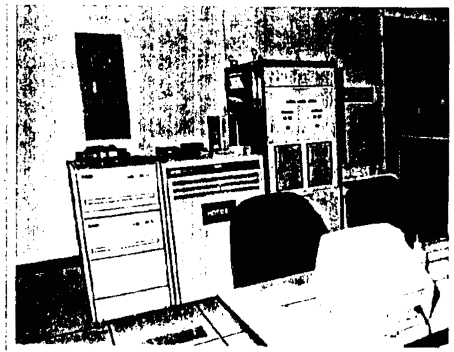


Software Generation System

- Development Tools
- Testing
- Archiving of WCS Software
- Configuration Management
- Nuclear Weapons Safety and Software Security

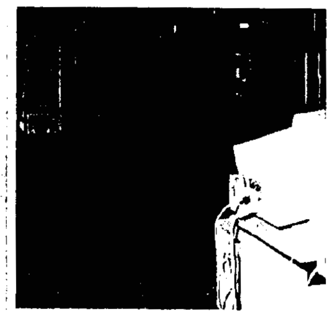
Advan‹ ed Development Laboratory

- Technology Studies
- Proof of Concept Demos
- Future WCS Prototyping



WCS Communication Facility

- Management of Specialized Electronic Media for WCS
- Control of Information to/from SSBN and Developers
- Archive Agent for SSBN



Central S&E Computer Complex

- Cray Based System
- Network, Secret High Ops
- Technology Studies
- Simulation and Modeling
- Algorithm Development
- WCS & USSTRATCOM Support
- Backup for Targeting Support

later question, but include those associated with an alarmed strongroom for security and unique requirements for power, cooling, and raised floors.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

It is estimated that the replacement value of the facility (excluding the building) is $60M.

4. Provide the gross weight and cube of the facility/equipment.

The facility is partitioned into spaces to support a variety of unique functions and comprises 12,587 sq.ft. of floor space. Assuming 12 ft. ceilings, this translates to a volume of more than 150,000 cubic feet. The equipment weighs approximately 60,000 pounds.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

In addition to normal 120 volt 60 hz electrical power, this facility requires some specialized power supplies associated with using shipboard systems (e.g., 120 volt 400 hz power and 480 volt 60 hz power). In addition, the facility requires an uninterruptable power supply to allow an orderly shut down of equipment and a 2 megawatt diesel generator to provide for 24 hours per day operation if normal power is lost. It also requires both environmental and closed loop cooling consistent with the size of the specific room and the equipment within it.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

The facility is partitioned into a number of rooms to support unique functions. These rooms are alarmed strongrooms and must include the required alarms, sensors, and drop ceilings to allow operation at the SECRET and TOP SECRET SIOP/ESI levels. The computer spaces must provide a satisfactory TEMPEST environment. In addition, the spaces containing the SLBM weapons control computers require raised floors to allow for cabling. There is also a requirement for a power converter to provide electrical power to systems which are normally supplied by Ship's Services when they are in operational use.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

The facility requires temperature and humidity control compatible with the computer equipment housed within it. It requires both environmental and closed loop cooling systems. A fire suppressant system is also required.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

As noted above, the equipment housed within this facility can be relocated to a facility which meets the unique requirements previously described. There is a significant cost and effort required for this move, especially if the new site does not meet these requirements, many of which are most easily met during initial construction of the building or facility. It is also possible to replicate some of the equipment required to recreate the entire facility. Certain weapons control computers, for example, become available when SLBMs are retired; other equipment is available commercially. TEMPEST approval of the facility must be obtained and, when the communications center is moved, the required telephone lines and accreditation must be obtained.

The most significant difficulty in relocating the facility, however, results from the requirement that NSWCDD continue to provide operational support to the SLBM force and USSTRATCOM while relocating--a period that may last for 1 - 2 years, depending on the condition of the new site. This virtually necessitates a replication of the facility--in whole or in part--rather than a simple relocation.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The building which houses this facility was completed in November 1990 and occupied in November 1991. It was designed specifically to meet the needs of SLBM strategic targeting and operational support. The Strategic Retargeting System (SRS) Operational Requirements document directs NSWCDD to provide the capability in facilities and people to support the strategic targeting requirements of the SLBM SWS. This support includes testing and validation of all preplanned SLBM targeting data and testing and transfer of all SLBM strategic targeting data and documentation among USSTRATCOM, NSWCDD and the CTFs to comply with the responsiveness requirements associated with changing strategic targeting. During this period, the necessary weapons control computers were installed by SSP fire support contractor engineers and the commercial computers were installed by the manufacturer (the CRAY was installed in 1993). Other computers and workstations were installed by the manufacturer or by NSWCDD Strategic Systems engineers and technicians.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

9.1 Navy Strategic Systems.

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

The facility is equipped for 3 shift, 24 hour per day operation. Normally, however, the facility is manned 12 hours per day, Monday through Friday and 8 hours on Saturday. The facility has been used up to 3 shifts per day during periods of intense targeting or retargeting support activity. The facility has, on average during the period of interest, been in use between 10 and 12 hours per day.

12. Provide the projected utilization data out to FY1997.

It is expected that utilization of the facility will continue at approximately the same or an increased level as retargeting activity increases with full implementation of the SLBM Retargeting System (SRS). An increased level of technical support to USSTRATCOM may have the same result.

13. What is the approximate number of personnel used to operate the facility/equipment?

Approximately 11 government and 18 contractor personnel are required to operate both this facility and the SLBM Strategic Systems Operational Support Facility. Efficiency is obtained by using a common pool of engineers and technicians to operate the two similar facilities.

14. What is the approximate number of personnel needed to maintain the equipment?

Approximately 11 government and 14 contractor personnel are required to maintain both this facility and the SLBM Strategic Systems Operational Support Facility. Efficiency is obtained by using a common pool of engineers and technicians to maintain the two similar facilities.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

A photograph of the facility and the included equipment is attached.

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**SLBM Strategic Systems Operational Support Facility**

1. State the primary purpose(s) of the facility/equipment.

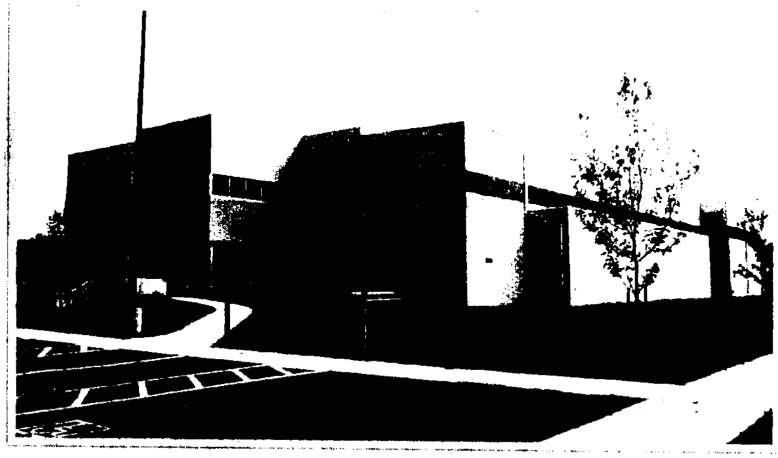
The SLBM Strategic Systems Operational Support Facility is designed for 24 hour per day operation in high defcon conditions. The facility is used, in accordance with the SLBM Software Development MOA between U.S. Strategic Command (USSTRATCOM) and Strategic Systems Programs (SSP), as an integral part of the process for the retargeting of the SLBM systems by USSTRATCOM and for the system level testing and validation of all SLBM strategic targeting data. It consists of a dedicated TOP SECRET computer system for SIOP targeting processing, SLBM weapons control test berths (and associated equipment) for the processing, and validation of SLBM targeting data for all deployed U.S. SLBM systems.

The facility also includes a secure (at the TOP SECRET SIOP/ESI level) communications room for the transfer of data and documentation among USSTRATCOM, NSWCDD and the CTFs, and a facility for the development of graphical user interfaces for NSWCDD strategic targeting software developed for USSTRATCOM. Each test berth is located in an alarmed strongroom and supports normal operation at the TOP SECRET SIOP/ESI level. In order to provide 24 hour per day operation, the facility also includes an uninterruptable power supply and a 2 megawatt diesel generator.

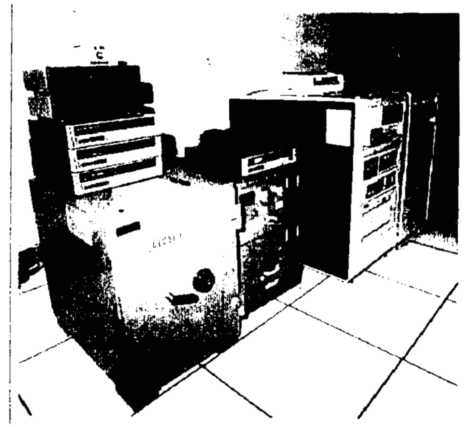
2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The facility described above comprises both equipment and the specialized building which houses it. In general terms, the equipment includes a number of specialized weapons control computers, supporting equipment (such as SLBM guidance systems), uninterruptable power supply, power converters, spare parts, communication and encryption devices, and commercial computers, workstations and ancillary equipment. This equipment is moveable; however, it can only be moved to another building with the unique features of the existing facility. These features will be discussed in response to a

STRATEGIC TARGETING SIGNIFICANT TECHNICAL FACILITIES



Strategic Systems Operational Support Facility
- Specifically Designed and Built to Satisfy SRS ORD
- Environment for
  - TS/ESI Operations
  - Computer Intensive Functions
- Around the Clock Operations for High DEFCON Conditions
  - Backup Power Source



Secure Communication Facilities
- Transfer of Strategic Targets and Documentation
- Connectors to
  - USSTRATCOM
  - Commanders Task Force (LANT & PAC)
- Operates at TS/ESI Levels
- Supports Rapid Communication of Strategic Targets

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SLBM Strategic Targets
Fleet Procedures
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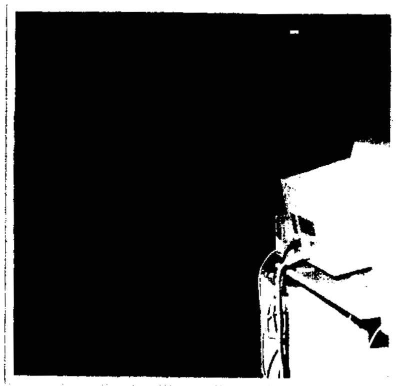
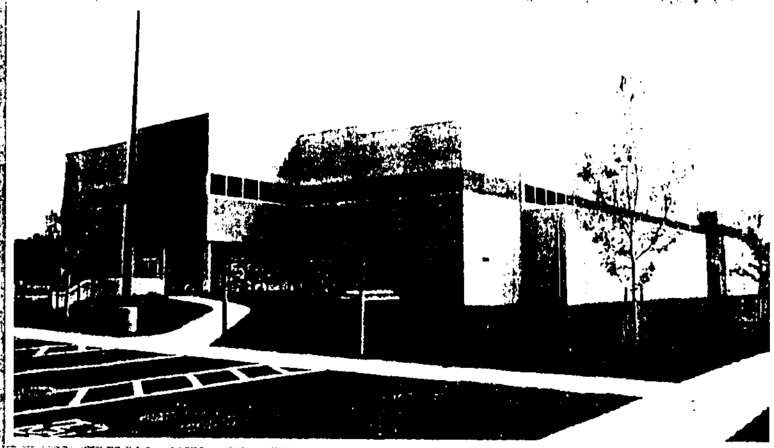
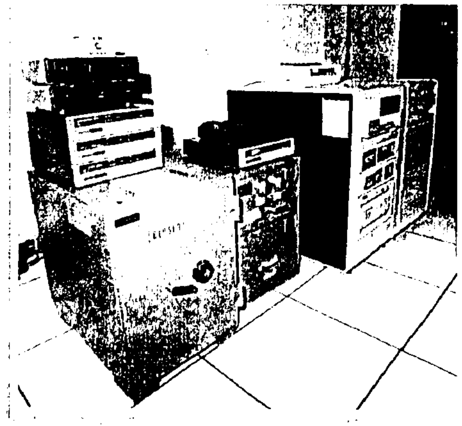


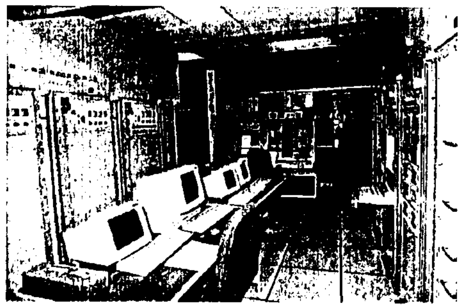
Scientific & Engineering Computer Complex
- Cray Based Computer Systems
- Strategic Targeting Processing
  - Target Analysis
  - Testing
  - Operational Documentation Development
- Development of Models for USSTRATCOM
- TS ESI OPS
- Backup for WS Software Development

STRATEGIC TARGETING SIGNIFICANT TECHNICAL FACILITIES

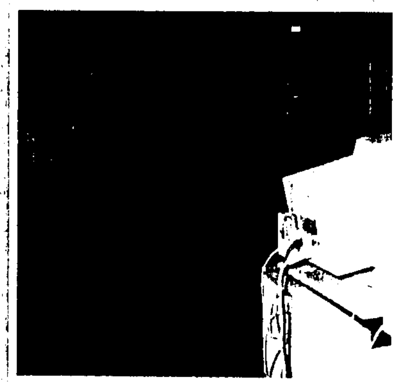




WCS's for C4 Trident I and D5 Trident II
- System Level Testing
  - SLBM Strategic Targets
  - Fleet Procedures
- Backup for WCS Software Development Operations



Strategic Systems Operational Support Facility
- Specifically Designed and Built to Satisfy SRS ORD
- Environment for
  - TS/ESI Operations
  - Computer Intensive Functions
- Around the Clock Operations for High DEFCON Conditions
  - Backup Power Source



Secure Communication Facilities
- Transfer of Strategic Targets and Documentation
- Connectors to
  - USSTRATCOM
  - Commanders Task Force (LANT & PAC)
- Operates at TS/ESI Levels
- Supports Rapid Communication of Strategic Targets

Scientific & Engineering Computer Complex
- Cray Based Computer Systems
- Strategic Targeting Processing
  - Target Analysis
  - Testing
  - Operational Documentation Development
- Development of Models for USSTRATCOM
- TS ESI OPS
- Backup for WS Software Development

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Scientific & Engineering Computer Complex**

1. State the primary purpose(s) of the facility/equipment.

The primary purpose of the facility is to provide high performance computing to the scientific and engineering personnel of the laboratory. Classified services up to the SECRET level are offered using a CRAY Y-MP2E supercomputer. Unclassified services are offered using a CDC 995E computer and a CRAY EL98 entry level computer; the CDC 995 will be phased out in FY95/96.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The computing equipment in the facility is moveable.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

The replacement costs of the equipment are:

CRAY system:	**$6.2M**
CDC system:	**$7.3M**

4. Provide the gross weight and cube of the facility/equipment.

The CRAY weighs 18,985 pounds and has a volume of 890 cubic feet. The CDC weighs 50,800 pounds and has a volume of 3000 cubic feet.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

The equipment requires the following utility support:

750 KVA Uninterruptable Power System (UPS)
79 tons of air conditioning
86 tons of 45 degrees Fahrenheit chilled water

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

The only special requirement for the computer facility is that it must reside in a SECRET strongroom capable of supporting open storage of SECRET material. Associated with this requirement are all of the necessary security controls and sensors and their maintenance and monitoring.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

The equipment requires that the room temperature be maintained at an ambient air dry bulb temperature of 72 +/- 6 degrees Fahrenheit and at 35 to 60 percent relative humidity.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The equipment could be relocated to another site, but there would be considerable expense in moving, site preparation, and startup costs ($200K to $500K). The impact to the Department of the Navy if this facility were lost is substantial. The facility directly supports the Submarine Launched Ballistic Missile (SLBM) Weapons Control Facility and the SLBM Strategic Systems Operational Support Facility. In addition, it is one of the few Navy computing facilities providing high performance classified services (up to the SECRET level) during prime shift operations.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The equipment was transported to the site by the computing system manufacturers (Cray Research and Control Data), then installed and checked out by their technical representatives. The power, chilled water, and ambient temperature conditioning were constructed by the NSWCDD Public Works Department. Installation of the CDC began in October 1988 and of the Cray in February 1992.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1.3 Surface Ships
2.1 Gun Systems
2.2 Guided Missiles
2.7 Explosives
2.8 Launchers
3.3 Surface
7.3 Shipboard
7.4 Land-based
8.1 Ballistic Missile Defense
9.1. Navy Strategic Systems
10.9 Activity Mission and Function Support
11.5 Materials and Processes
11.10 Other Technology Base Programs

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

CRAY:	**FY92 Installed 2/92; data not taken**
	FY93 70% CPU utilization
CDC:	**FY89 52% CPU utilization**
	FY90 58% CPU utilization
	FY91 45% CPU utilization
	FY92 39% CPU utilization
	FY93 24% CPU utilization

12. Provide the projected utilization data out to FY1997.

CRAY:	**FY94 73% CPU utilization**
	FY95 76% CPU utilization
	FY96 79% CPU utilization
	FY97 83% CPU utilization
CDC:	**FY94 18% CPU utilization**
	FY95 15% CPU utilization
	FY96 0
	FY97 0

13. What is the approximate number of personnel used to operate the facility/equipment?

Operation of the facility requires 28 government and 5 contractor personnel.

14. What is the approximate number of personnel needed to maintain the equipment?

Maintenance of the facility requires 1 government and 5 contractor personnel.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

A photograph of the facility and the included equipment is attached.

SCIENTIFIC AND ENGINEERING COMPUTER COMPLEX
TAB B, SECTION II, DAHLGREN

UIC: N00178

SCIENTIFIC & ENGINEERING COMPUTER COMPLEX

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Program Assurance Facility (PAF)**

1. State the primary purpose(s) of the facility/equipment.

The PAF is a multi-user/project facility which provides a wide variety of surface ship combat system development functions. This includes an environment for the development, test and evaluation, certification and acceptance, production and system integration of real-time tactical and simulation software for combat and weapon system elements in their target environment of shipboard computers and peripherals. The facility's commercial computer equipment is utilized for requirements development and review; software design, development, and compilation for the target hosts; status accounting and configuration management; data analysis of test events and event reconstruction; and algorithm development and analysis.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The PAF equipments are Class 2 Moveable.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

Current replacement cost is estimated to be $18 million. This cost is based on procurement of: a) new equipment for all equipment still in production, b) estimated refurbished cost of militarized equipment not in production, and c) open market value for commercial equipment no longer in production. Software license for commercial products is currently valued at $1.2 million.

4. Provide the gross weight and cube of the facility/equipment.

Weight = 65 tons
Volume = 25,000 cubic feet
(Note: above values are estimated crated for shipping)
Facility volume = 160,000 cubic feet

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

None - facility equipment is utilized for special power conditioning, chilled water control and conditioning, and air filtration and control.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

Facility must meet all requirements required for tempest shielded certification. The PAF must operate in a classified environment with access controlled 24 hours per day. Special alarms for water leaks, high temperature, unsafe power, heat, smoke and fire protection are required. Also, all computer areas must have a high capacity (>350 PSF uniform load) raised floor and an isolated ground plane built in place to filter high operating frequencies and prevent ground loops harmful to the equipment.

Other special facility/equipment requirements include: cableways, vaults, secure media storage/retrieval libraries, spare parts storage/retrieval facilities, delivery staging and cable storage areas, contingency planning and off-site media back-up storage/retrieval facilities.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

Facility equipment is utilized for special power conditioning, chilled water control and conditioning, and air filtration and control.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The programs/projects currently utilizing the facility include: Vertical Launching System (VLS), Gun Weapon System (GWS), Ship Self Defense System (SSDS), TARTAR Missile System, Anti-Submarine Warfare (ASW), and Radiant Mercury/Cryptologic Interface Unit (CIU).

Replication of this equipment configuration would be extremely difficult as many items are well past production although still in use in the fleet and required as part of the equipment configurations.

Relocation of the PAF would be an extremely difficult task given the uniqueness of the configurations and their interconnectivity to other systems contained in other local facilities, i.e., AEGIS Computer Center (ACC), TOMAHAWK Weapon System Development and Integration Laboratory, AN/SLQ-32 Electronic Warfare Development Laboratory, and the System Control Laboratory (SCL). Relocation of the PAF would also present a significant impact on the schedules and milestones of the above programs/projects.

The individual configurations (baselines, versions, or mods) of many of these combat and weapons systems are located at other widely dispersed commercial facilities and government activities (Design Agents for new hardware/software configurations of individual components of the Combat System and In-Service Agents for operational configurations) but there is no single location which can support interoperability of CG47, DDG51, DDG963, DDG993, CGN38, and CGN36 class combat system elements.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The PAF was established in 1967 as a multi-user, multi-program computer facility in Building 1200 at NSWCDL to support the TALOS, TERRIER, and TARTAR Missile Fire Control Systems. Further evolution of the facility incorporated support for MK68, MK86, MK92, SGS and current users. The equipment was moved to its current location in Building 1500 in February 1983. The current collection of equipment in the various suites has been incrementally delivered and installed in phases with development and ship schedules.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1.3 Surface Ship
2.1 Gun Systems
2.8 Launchers
2.9 Fire Control
2.10 Weapons Data Links
3.3 Surface
3.4 Multi-platform
5.1 Sonar Systems
5.2 Radar Systems
7.3 Shipboard
10.1.1 Surface Ship-Related Training Systems
10.9 Activity Mission and Function Support

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

During this period, there have been five separate programs utilizing the facility (VLS, GWS, TARTAR, SSDS, Radiant Mercury/CIU) and of the estimated 150 work-years directly related to computer programs, 60% of this effort is contingent upon the hardware suites for software development, test and evaluation activities.

12. Provide the projected utilization data out to FY1997.

The utilization is anticipated to remain constant as programs evolve through different phases of the software life-cycle which will result in a level demand.

13. What is the approximate number of personnel used to operate the facility/equipment?

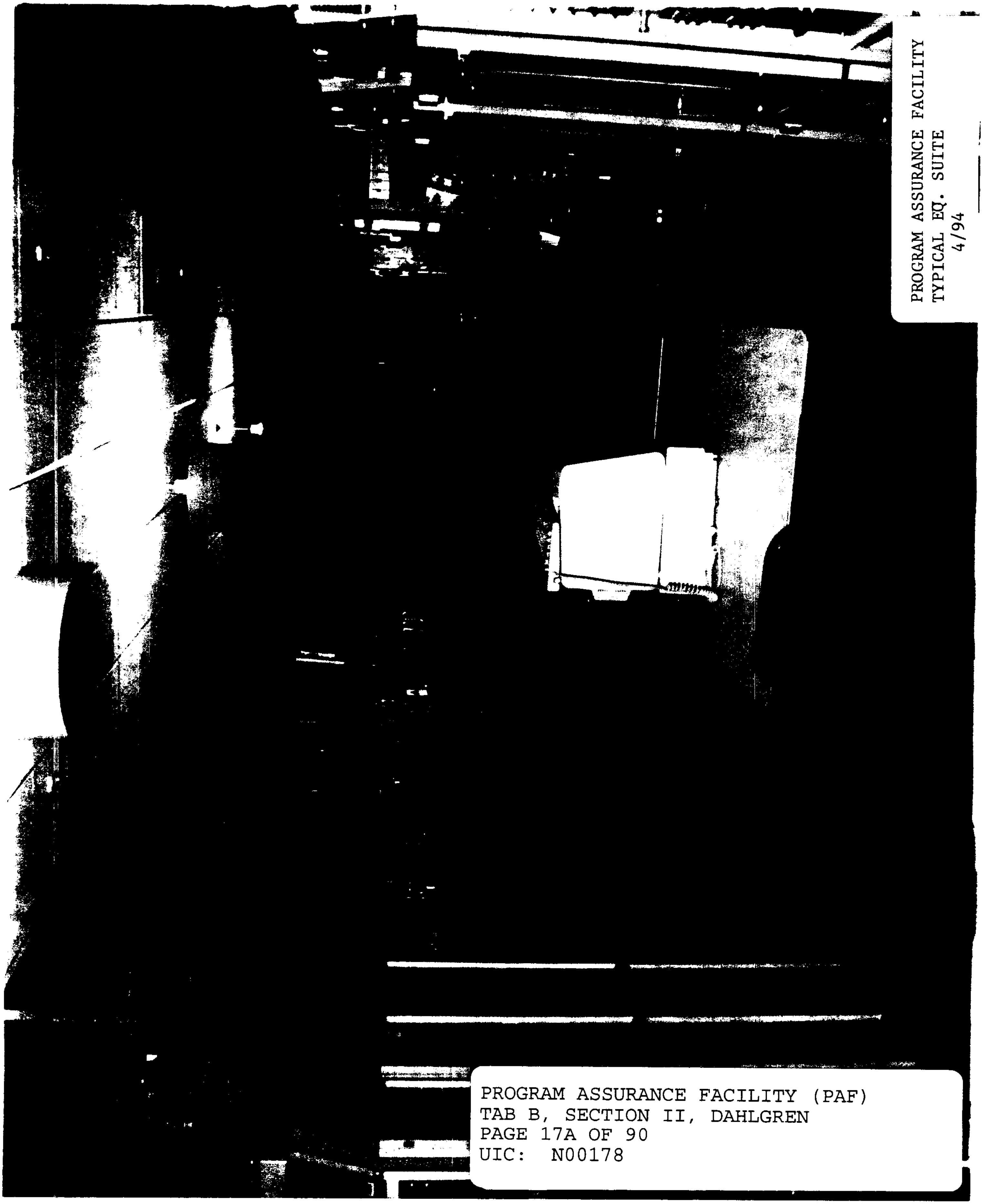
There are two government and three contractor personnel required to operate the facility. Support includes access control, facility planning and management, installation and checkout.

14. What is the approximate number of personnel needed to maintain the equipment?

There is one contractor personnel involved in militarized equipment maintenance (preventive & corrective) at the level of one man-year.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

Photo of typical equipment suite is attached.



PROGRAM ASSURANCE FACILITY (PAF)
TAB B, SECTION II, DAHLGREN
PAGE 17A OF 90
UIC: N00178

PROGRAM ASSURANCE FACILITY
TYPICAL EQ. SUITE
4/94

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**AEGIS Computer Center (ACC)**

1. State the primary purpose(s) of the facility/equipment.

The AEGIS Computer Center (ACC) is the designated computer program Lifetime Support Engineering (LSE) facility for supporting CG-47 and DDG-51 class ships. The ACC supports ships during construction, operation and modernization phases by providing the tactical computer programs and training exercises needed to make AEGIS ships and sites operational. The ACC is a major facility which is vital to surface ship combat systems engineering, RDT&E, acquisition and computer program support. The ACC supports all in-service AEGIS Cruiser and Destroyer baselines across the spectrum from research applications to computer program development, test and evaluation, generation, delivery and configuration management. The ACC is also the hub of the AEGIS tactical and commercial communication networks.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

All ACC equipment should be considered to be Class 2 Moveable.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

The ACC is composed of multiple tactical computer suites (including Combat Information Center (CIC) configurations with actual shipboard display consoles), combat system wrap-around simulations (i.e., radars, launchers, illuminators, etc.), tactical data link simulations, computer program compilation systems, data reduction systems, and multiple commercial and tactical peripherals and emulators. There are over 2200 pieces of equipments in these categories in the ACC and the current replacement cost of these equipments is approximately $155 million. The replacement cost of the facility and its infrastructure support systems is about $7.8 million.

4. Provide the gross weight and cube of the facility/equipment.

The estimated gross weight of the equipments and cables is approximately 473,000 lbs or 236.5 tons.

The estimated gross volume of the equipments is approximately 14,103 cubic feet.

The estimated gross volume of the facility housing the equipments is approximately 288,000 cubic feet.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

The power required by ACC tactical systems must be conditioned to filter voltage surges, spikes, sags, brownouts and harmonics. ACC equipments require the types of power summarized below:

Power Summary:

120/208 Volts 1 Phase 60 Hz	**2762.18 Amps**	**274570 Watts**
120/208 Volts 2 Phase 60 Hz	**137.00 Amps**	**21364 Watts**
120/208 Volts 3 Phase 60 Hz	**964.20 Amps**	**158620 Watts**
115 Volts 3 Phase 60 Hz Delta	**283.95 Amps**	**45553 Watts**
115 Volts 1 Phase 400 Hz Delta	**3.60 Amps**	**280 Watts**
115 Volts 3 Phase 400 Hz Delta	**2873.9 Amps**	**358921 Watts**

Many of the equipments also require water cooling which must be de-ionized, demineralized, filtered (to 0.2 micron particles), and a constant temperature 71 F +/- 1 F. A high capacity (>8 Gallon per Minute) water recirculator system with electrical interlocks is required.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

The ACC must operate in a classified environment with access controlled 24 hours per day. Special alarms for water leaks, high temperature, unsafe power, heat, smoke and fire protection are required. Also, all computer areas must have a high capacity (>250 PSF uniform load) raised floor and an isolated ground plane built in place to filter high operating frequencies and prevent ground loops harmful to the equipment.

Other special facility/equipment requirements include: cableways, elevators, vaults,

secure media storage/retrieval libraries, spare parts storage/retrieval facilities, delivery staging and cable storage areas, contingency planning off-site media back-up storage/retrieval facilities, video tele-conferencing capability, multiple tactical/commercial data link capabilities, special access control security features (i.e., key card system and video surveillance), and electronic fabrication workshops.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

Environmental control requirements for the facility/equipments are summarized below:

Temperature/Humidity Summary:
Temperature = 68-72 degrees Fahrenheit
Humidity = 40%-60%
Low Dust Environment

Heat Dissipation/Cooling Requirement Summary:
Heat Extended to Air = 2,131,520 BTU
Heat Extended to Water = 770,020 BTU
Total Heat Dissipation = 2,901,540 BTU

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The ACC would be extremely hard to relocate or replicate at another site. The equipment interconnectivity and most of the shipboard equipments are uniquely configured to the AEGIS Combat System (ACS) and the mission cannot be accomplished at government wide or commercial sites. The site at NSWCDL is unique in that it is strategically located adjacent to the Combat Systems Department and the AEGIS Training Center (ATC) and within sight of several other Navy Combat System facilities. The ACC is the Hub of a fiber optic network connecting the TOMAHAWK Weapon System Development and Integration Laboratory, the AN/SLQ-32 Electronic Warfare Development Laboratory, the Program Assurance Facility (Vertical Launching System, Guns), and the System Control Laboratory (prototype engineering). The close proximity of these facilities allows the Division to conduct combat system experimentation, concept exploration/proof of concept and the ability to T&E actual Navy weapon system hardware

and software in a highly integrated environment. This ability to tie together the AEGIS Weapon System, TOMAHAWK, SLQ-32, VLS and Guns during initial design and computer program development is a unique capability for the surface Navy.

The ACC is also the Hub of Tactical TADIL testing which supports Navy sites and shipyards across the country. Much of the initial level testing conducted by AEGIS ships under construction is supported by the ACC at a tremendous cost savings compared to using real ships and aircraft to support the shipyard testing. In addition, the ACC is the Hub of the AEGIS Sites Network which provides computer interconnection between the ACC and all other AEGIS landbased test sites. This network allows classified computer programs and data recording information to be passed electronically between each site. Extensions to this system allow data to be transferred between the ACC and satellite groundstations that interface to ships at sea. Loss of the ACC to the Navy could be catastrophic in situations where AEGIS ships are called upon to support critical situations all over the world.

The following are examples of this:

- The ACC is used to design and to test required AEGIS computer program changes when AEGIS ships - due to new/unforeseen threats, or in response to new/unforeseen environments - become involved in critical situations that require a quick and effective response. For instance, when a critical situation arises, data recording tapes may be sent to the ACC for analysis. Teams of experts use the ACC's systems to reconstruct and to analyze the situation. If design changes to the computer programs, doctrine, etc. are deemed necessary, these changes are developed and tested in the ACC. The modified computer programs are then delivered to operational ships.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The ACC was constructed in 1981 and became operational in October 1982 as the LSE facility supporting CG-47 and DDG-51 class ships. The AEGIS fleet grew from one ship under construction in 1982 to the fleet of 27 Cruisers and the still growing fleet of 10 Destroyers. AEGIS ships are built in baselines and each new baseline contains new and unique equipments which must be provided to the ACC to support computer program development and testing. The growth of the ACC equipment configuration has been gradual with new equipments arriving every year since 1981. The equipments are transported via trucks.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1.3 Surface Ship
2.1 Gun Systems
2.2 Guided Missiles
2.8 Launchers
2.9 Fire Control
2.10 Weapons Data Links
3.3 Surface
3.4 Multiplatform
5.1 Sonar Systems
5.2 Radar Systems
5. 3 Special Sensors
5.4 Space Sensor/Surveillance Systems
5.5 Ocean Surveillance
6.3 Surface Ship Navigation Systems
6.4 Weapons Navigation systems
6.5 Satellite Navigation Systems
7.3 Shipboard
7.5 Space Communications Systems
7.8 Intelligence Information Systems
8.2 Countermeasures (CM)
8.3 Electronic Warfare System
10.3 Facilities Engineering
10.6.3 Surface Ship
10.9 Activity Mission and Function Support

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

Average usage of the ACC has grown over the last five FY's (89-93) as follows:

- **Physical access list grew from 900 to over 1200 persons.**
- **Hours of full tactical system time used per week grew from 168 hours to 280 per week.**
- **The number of operational ships supported grew from 24 ships to 37 ships.**
- **The number of commercial system user accounts grew from 900 accounts to over 2000 accounts.**
- **The number of magnetic tapes being used grew from 36,000 to 59,000.**

- **The number of tactical link exercises with AEGIS ships remained steady at about 65 link exercises per year.**

12. Provide the projected utilization data out to FY1997.

Projected utilization out to FY97 is as follows:

- **Physical access list expected to reduce slightly to 1100-1200 persons.**
- **Hours of full tactical system time used per week expected to grow from the current level of 280 hours per week to about 570 hours per week due to requirements associated with new baseline 5 and 6 ships.**
- **The number of operational ships supported is expected to grow from the current 37 ships to 49 ships.**
- **The number of commercial system user accounts is expected to remain relatively stable at about 2000 accounts. These accounts include users at AEGIS sites all across the country.**
- **The number of tactical link exercises with AEGIS ships is expected to remain steady at about 65 link exercises per year.**

13. What is the approximate number of personnel used to operate the facility/equipment?

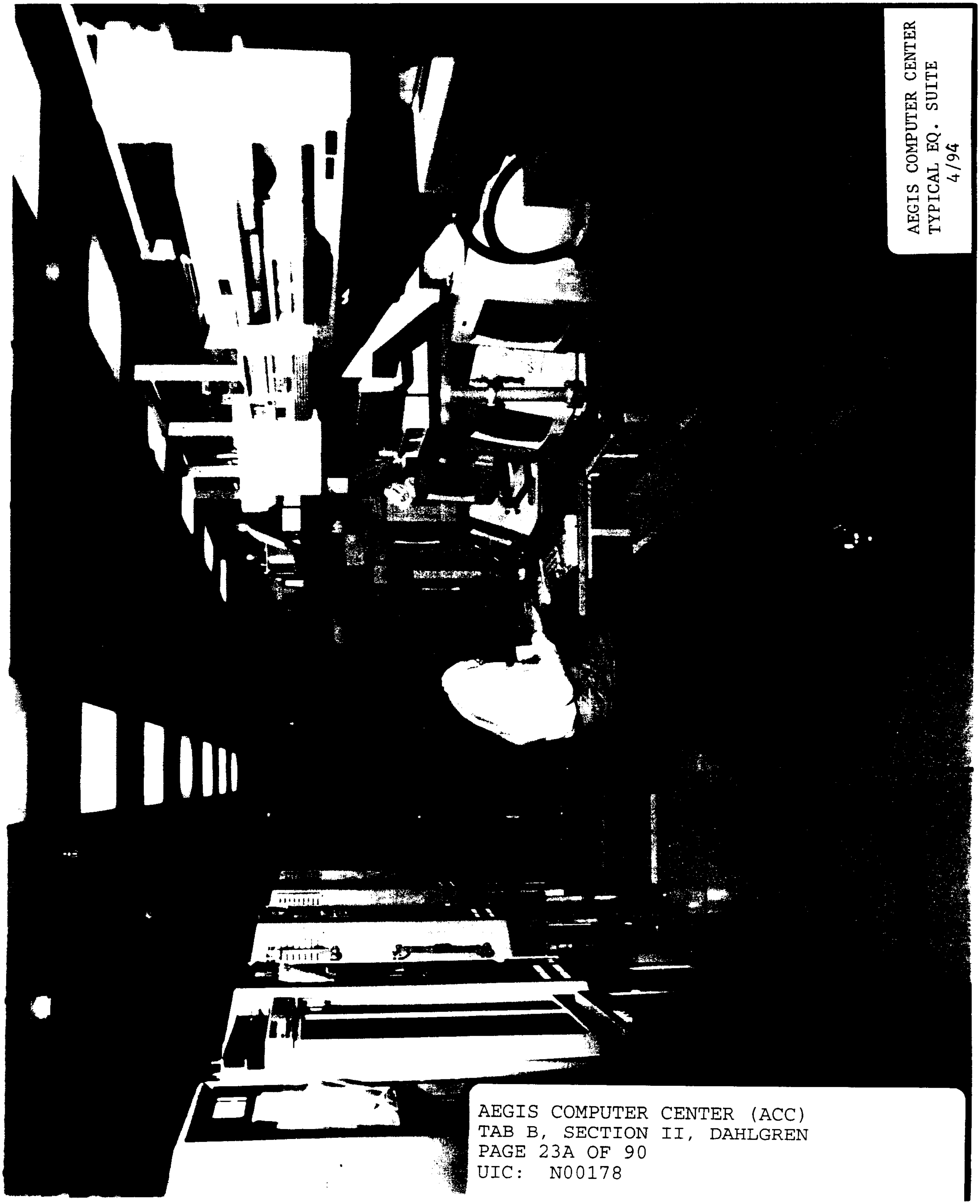
There are approximately 17 government and 90 contractor personnel involved in operation of the ACC facility and equipments.

14. What is the approximate number of personnel needed to maintain the equipment?

There are approximately 3 government and 15 contractor personnel involved in equipment maintenance.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

Attached is a black and white photo showing a typical suite of equipment for the ACC.



AEGIS COMPUTER CENTER (ACC)
TAB B, SECTION II, DAHLGREN
PAGE 23A OF 90
UIC: N00178

AEGIS COMPUTER CENTER
TYPICAL EQ. SUITE
4/94

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Cruise Missile and UAV System Development and Integration Facility**

1. State the primary purpose(s) of the facility/equipment.

Conduct of concept development, software development, and system integration and test, to accomplish full spectrum end-to-end development, integration, and life cycle support of all elements of the TOMAHAWK Weapon System, and all elements of the shipboard Unmanned Aerial Vehicle (UAV) system, as well as the development and integration of interfaces between these systems and with the AEGIS Combat System.

The Facility is unique in that it duplicates the classified, tactical, operational environment as closely as possible, including computer software, computer hardware, and operational data links with other tactical systems and with national systems. It is the only facility where the entire TOMAHAWK Weapon System can be integrated and tested, and where the TOMAHAWK Weapon System can be tested with AEGIS and other surface ship weapon systems.

Due to the operational equivalency of the facility, it is used for formal Navy Developmental Testing (DT), and by ships' crews for training. It also uniquely allows realistic experimentation and concept development of emerging technology for joint strike systems. The facility has been in daily use, at a rate greater than one shift per day, and growing and evolving since 1980.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

All equipment and data links could be moved and re-established elsewhere in a similar building(s). The connectivity with other surface ship systems at Dahlgren Division would be lost, in addition to NSWCDD's ability to serve as back-up for certain operational shore sites. (See #8).

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

Building Costs:	**$ 5M**
Equipment Costs:	**$50M**
Cost of Personnel to Maintain:	**$ 1.3M**
Cost of Personnel Using Facility To Accomplish Purpose:	**$22.5M**

4. Provide the gross weight and cube of the facility/equipment.

Gross Weight of Equipment: Approx 200,000 lbs
Cubic Size of Equipment: Approx 20,000 cu ft.
Space: 14,000 sq.ft. lab floor space
33,000 sq.ft. offices/corridors/lounges, etc.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

Uninterrupted Power Supply, Patch Panels for Data Links, Power Distribution Unit. Also: 400Hz Delta power, 440V power, 115V Delta power.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

Physical Security features (like single and double lock doors, single and double lock safes, access control system, etc.) required for Secret, Top Secret, and SCI portions of the facility.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

Each room in the facility requires Temperature and Humidity control appropriate to the size, equipment contained, and number of personnel using.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment

were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The close proximity of NSWCDD to the headquarters of the Atlantic theater in Norfolk, Virginia has allowed NSWCDD to be highly responsive to operational and national crises (within hours, for example) particularly regarding the handling and transportation of Top Secret/SCI data and equipment, in resolving emergency system problems, and in being a back-up site for TOMAHAWK fleet operations.

If this facility were eliminated, the impact would be the loss of unique NSWCDD functions on which the DOD relies, and a long severe breach in the continuity of the evolving development of these essential joint service weapons. Some specific examples are:

- **Loss of a back-up TOMAHAWK mission planning facility to supplement or perform operational functions during times of national crisis or covert operations; particularly as a back-up to the Cruise Missile Support Activity at CINCLANT.**

- **Loss of the Navy and DOD ability to evolve strike and UAV weapons to be more integrated and coordinated in their use; especially in the area of strike and mission planning, from national level down to unit level, both within each service and across all services.**

- **Loss of in-depth Top Secret total weapon system knowledge, expertise, experience, and facilities for TOMAHAWK, accumulated over 20 years, and used to develop fleet deliverables.**

- **Loss of government integration and validation of the total weapon system prior to the introduction of each upgrade into the fleet.**

- **Loss of timely technology advancement and enhancement to respond to the nation's change in how these weapons are used, particularly in how their missions are planned and targets are acquired.**

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The facility was first established in 1980 with the installation of a single, Secret, TOMAHAWK Weapon Control System equipment suite, and has evolved into the facility described above. As more equipment was brought to NSWCDD and facility space became inadequate, a MILCON was completed in the late 1980's to provide the majority of the

present facility (as well as office space). In 1990 and 1991, the present Top Secret/SCI facilities were added.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

2.2 Guided Missiles Weapon Systems
2.9 Weapon Systems Fire Control
3.3 Combat System Integration, Surface
3.4 Combat System Integration, Multiplatform
7.8 Intelligence Information Systems

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

1989 - 1993: 106 hours per week
[(17 hrs/day x 6 days/wk) + 4 hrs/wk extra = 106 hrs/wk]

12. Provide the projected utilization data out to FY1997.

1994 - 1997: 120 hours per week

[(20 hrs/day x 6 days/wk) = 120 hrs/wk]

13. What is the approximate number of personnel used to operate the facility/equipment?

Facility Users:	**225**
Facility Maintainers (see 14):	**25**
TOTAL:	**250**

The figures include both government and contractor users. The total includes the personnel in #14.

14. What is the approximate number of personnel needed to maintain the equipment?

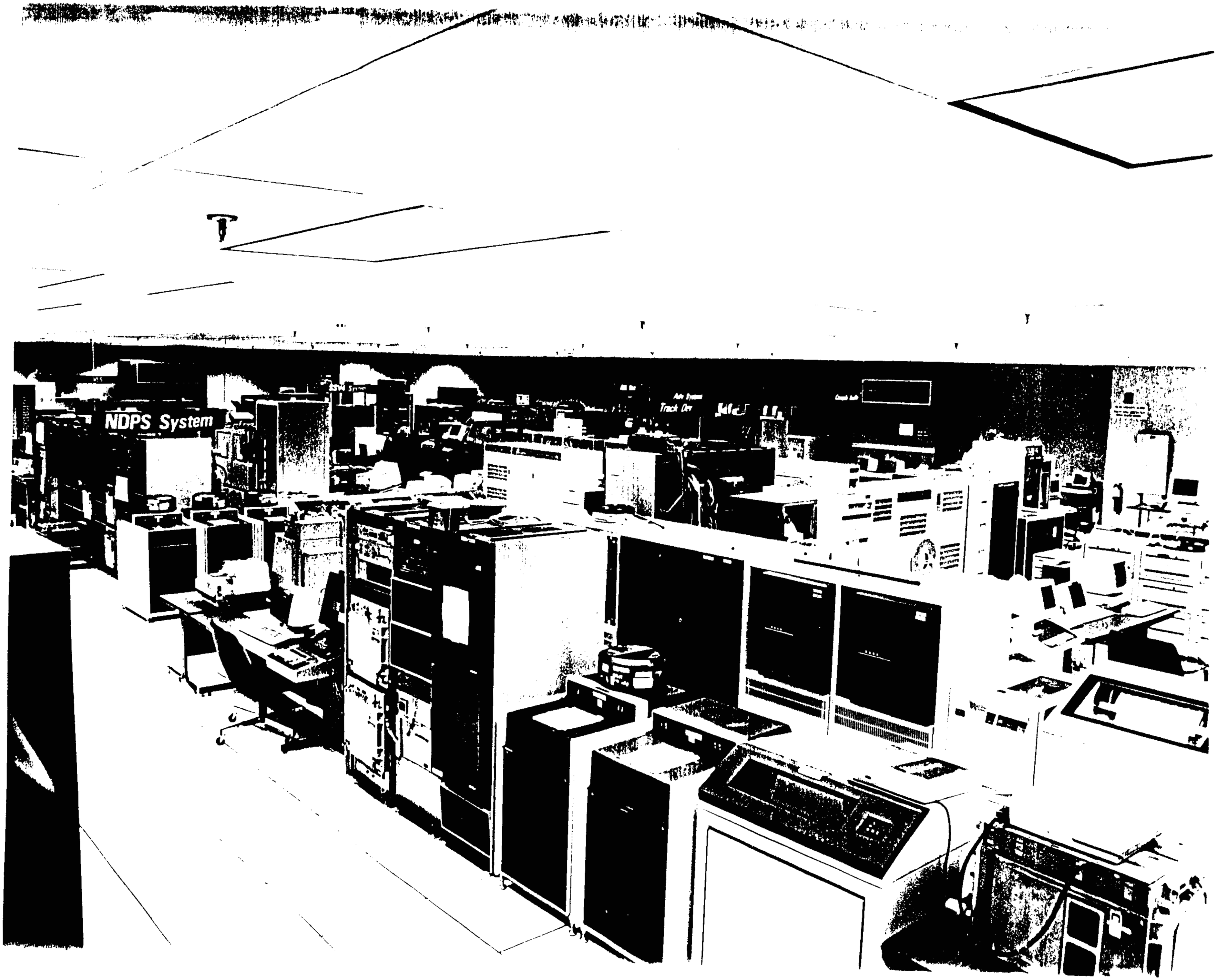
The figures include hardware technicians, security control personnel (for rooms and materials), and system administrators.

Hardware Technicians:	**8**
System/Network Administrators:	**7**
Security Control Personnel:	**10**
TOTAL:	**25**

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

    See attached photograph.

CRUISE MISSILE/UAV SYSTEM DEVELOPMENT
AND INTEGRATION FACILITY
TAB B, SECTION II, DAHLGREN
PAGE 28A OF 90
UIC: N00178



CRUISE MISSILE/UAV SYSTEM DEVELOPMENT & INTEGRATION FACILITY

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Computer Aided Engineering & Performance Assessment Facility**

1. State the primary purpose(s) of the facility/equipment.

The purpose of this facility is to support the development of weapons systems in the phases of concept development, engineering design, analysis, documentation, and prototyping. This facility contains high performance graphics computers and engineering workstations in a networked "engineering environment" that links multiple users to a common set of engineering tools for structural, mechanical, aerodynamic, thermal, and performance assessment. Product development is also supported with virtual prototypes and simulations. Full interconnectivity has been achieved in that this engineering environment is accessed by multiple users in three of the divisions of the Weapons Systems Department at NSWCDD. Access to the same network of engineering data and tools is available by this network which is shared between the Dahlgren and White Oak sites of NSWCDD. These facilities also include specialized labs containing system specific hardware and measuring equipment for performance assessment and system integration in support of the Vertical Launching System and Surface Launched Missile Systems.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

This facility/equipment is moveable. The only special support equipment required is air conditioning for the computers and shock isolation systems for some of the specialized performance measuring equipment.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

Replacement cost: $8.2M

4. Provide the gross weight and cube of the facility/equipment.

Gross Weight: 59,566 lbs
Gross Cube: 18,675 cubic feet

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

Computers and workstations require air conditioning, raised flooring. The VLS system equipment requires 115V 400 Hz power and special 20 amp electrical outlets.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

a. Aero Lab equipment needs isolated concrete pad for stability
b. Computer operations involve classified data processing
c. Optics bench requires special foundation

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

For efficient operation of computers, temperature should be maintained at 68 deg F +/- 2 deg; and humidity at 50% +/- 5%.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

This capability can be moved, but it can not be lost. This facility, or its equivalent, is critical to the development, integration, and introduction of STANDARD Missile, Evolved SEASPARROW, Vertical Launch System, missile warheads, Naval gun ammunition, and Marine Corp Weaponry.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

This facility/equipment has evolved at the present location over a period of years. Equipment was transported to the existing facility from equipment vendors or from other locations at NSWCDD.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1.3 Surface Ship Platforms
2.1 Gun Systems
2.2 Guided Missiles
2.3 Free Fall Weapons
2.4 Torpedoes
2.5 Mines
2.6 Directed Energy Systems
2.7 Explosives
2.8 Launchers
2.9 Fire Control
2.10 Weapons Data Links
2.11 Weapons Fuzing
2.12 Weapons Propulsion
2.13 Other Ordnance
3.3 Surface Combat System Integration
4.2 Coastal/Spec Warfare
5.3 Special Sensors
8.1 Ballistic Missile Defense
10.7 Major Range Dev & Opn
11.1 Computers
11.4 Electronic Devices
11.5 Materials & Processes

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

FY89-93 Average Utilization: 110%
Unit of Measure: Time operating/time available (single shift)

12. Provide the projected utilization data out to FY1997.

FY94 130%
FY95 130%
FY96 130%
FY97 130%

13. What is the approximate number of personnel used to operate the facility/equipment?

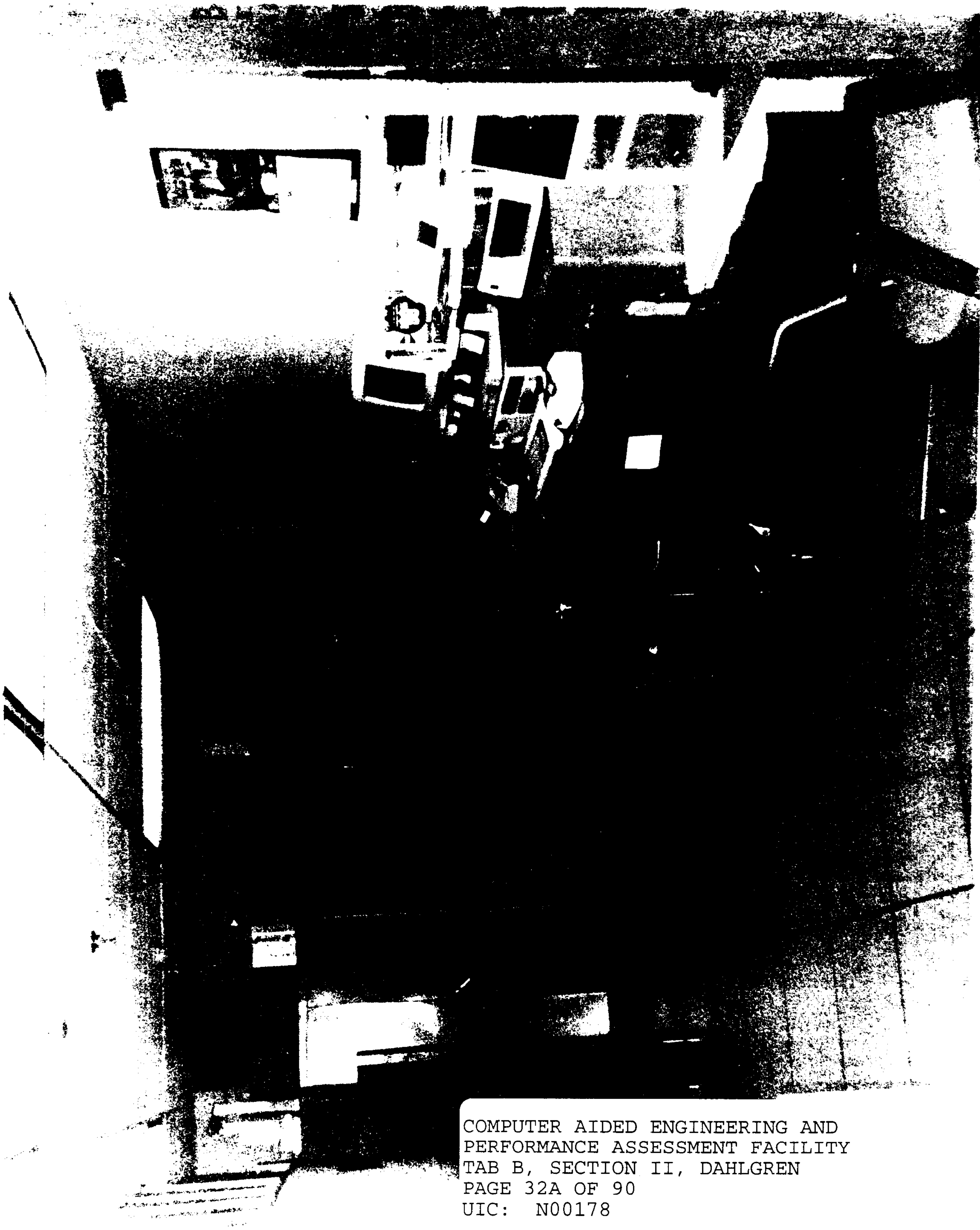
29 people operate the equipment in this facility. Over 200 people in a wide variety of programs are users of this facility.

14. What is the approximate number of personnel needed to maintain the equipment?

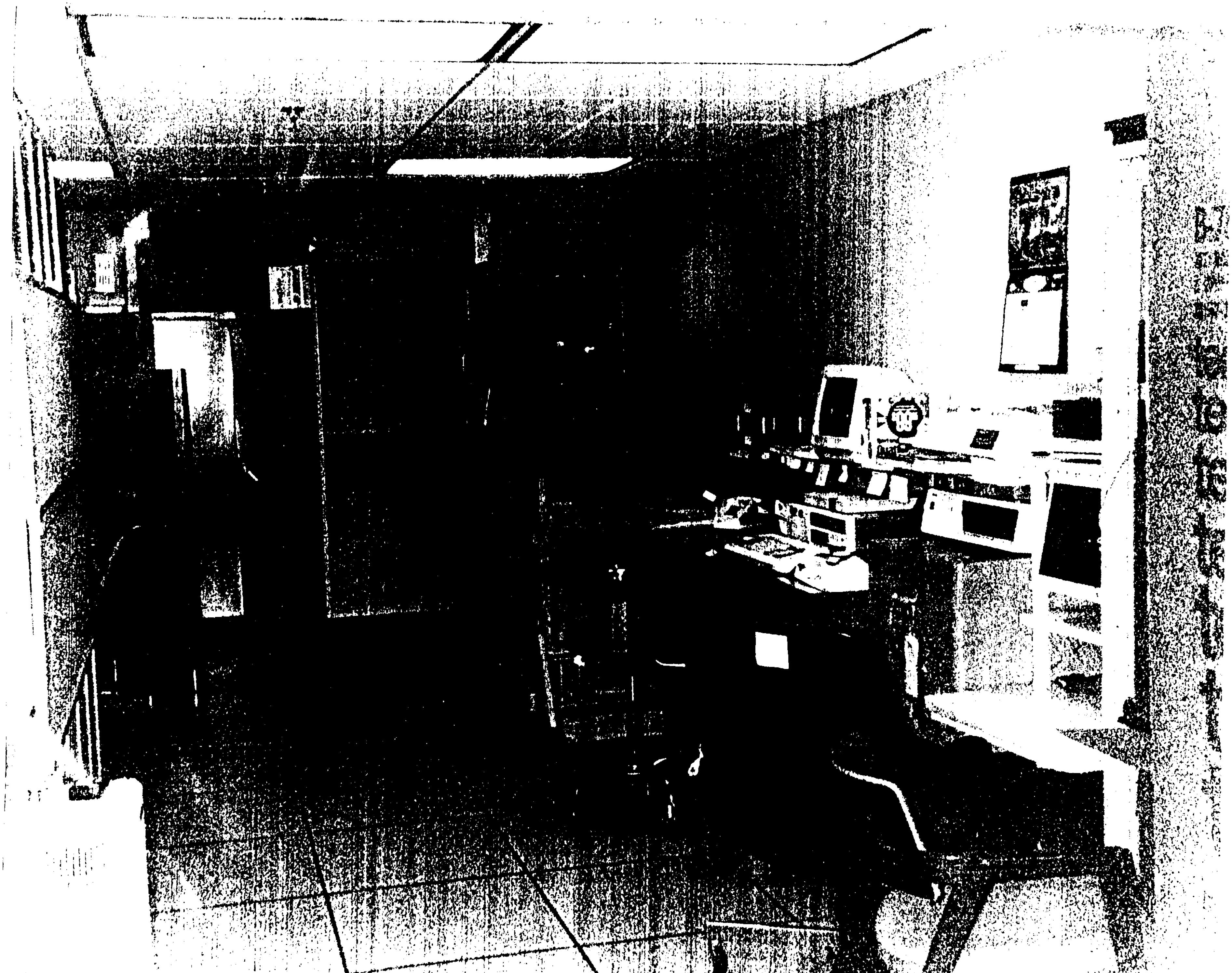
4

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

The attached photograph depicts computing and test equipment in the Vertical Launch System Firmware Test Lab. This equipment is representative of the equipment in the Computer Aided Engineering and Performance Test Facility.



COMPUTER AIDED ENGINEERING AND
PERFORMANCE ASSESSMENT FACILITY
TAB B, SECTION II, DAHLGREN
PAGE 32A OF 90
UIC: N00178



COMPUTER AIDED ENGINEERING & PERFORMANCE ASSESSMENT FACILITY

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Prototype Fabrication Facility**

1. State the primary purpose(s) of the facility/equipment.

The purpose of this facility is to fabricate one-of-a-kind models and prototypes for a wide variety of R&D programs at NSWCDD. This facility includes: (a) an "engineering environment" that offers advanced tools for concept development, modeling, virtual prototyping, simulation, engineering analysis, and detailed design; and (b) fabrication facilities integrated into the engineering environment to provide rapid prototyping of engineering concepts, and allow "lessons learned" in prototype fabrication to be incorporated into production data packages. Fabrication facilities include: precision machining, precision gaging, sheet metal and composites fabrication, and welding. As required by BRAC 91, substantial actions have been completed in an effort to consolidate and "right size" this capability to the minimum needed for future DD R&D support requirements. From FY93 through FY94, prototype fabrication personnel were reduced from 88 to 40; and in FY94, equipment is being reduced from 450 items to less than 200 items; and space is being reduced from 90,000 sq. ft. to less than 30,000 sq. ft.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

This facility/equipment is moveable. Due to the delicate nature of precision machine tools and gaging equipment, special rigging, packaging, and foundations are required in order to relocate much of the equipment in this facility.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

Total replacement value of equipment: $3.25M

4. Provide the gross weight and cube of the facility/equipment.

Gross weight: 758,000 lbs
Gross cube: 47,160 cu. ft.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

Electrical: Power requirements up to 220 VAC, 3 Phase, 75 Amp. Compressed Air is required throughout this facility.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

Due to weight of machinery and the need to eliminate vibrations during precision machining operations, special foundations are required to support much of the equipment in this facility.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

The Gage Lab (approx 1200 sq. ft.) requires 70 +/- 2 deg F and =/< 40% RH. Operations in welding area and composite shop create fumes and dust which require special ventilation to ensure safety.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

Replication or relocation of this facility/equipment is possible. Impact if lost: (a) the pace of engineering development would be degraded; (b) the existing capability to respond quickly to urgent requirements, e.g., Desert Storm type operations, would be lost; (c) the opportunity would no longer exist for designers to gain valuable insights into manufacturing options during early concept development.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

This facility is currently undergoing major renovation required by BRAC 91. On 1 June 1994, consolidation of prototype fabrication operations (required by BRAC 91) will

be completed. Equipment is being relocated from White Oak site of NSWCDD via commercial haulers.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

2.1 Gun Systems
2.2 Guided Missiles
2.8 Launchers
2.11 Weapons Fuzing
2.13 Other Ordnance
10.9 Activity Mission and Function Support

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

FY89-93 Average Utilization: 33%
Unit of Measure: 100 employees full time/300 major machine tools

12. Provide the projected utilization data out to FY1997.

Projected Utilization: FY94 60%
FY95 60%
FY96 60%
FY97 60%

13. What is the approximate number of personnel used to operate the facility/equipment?

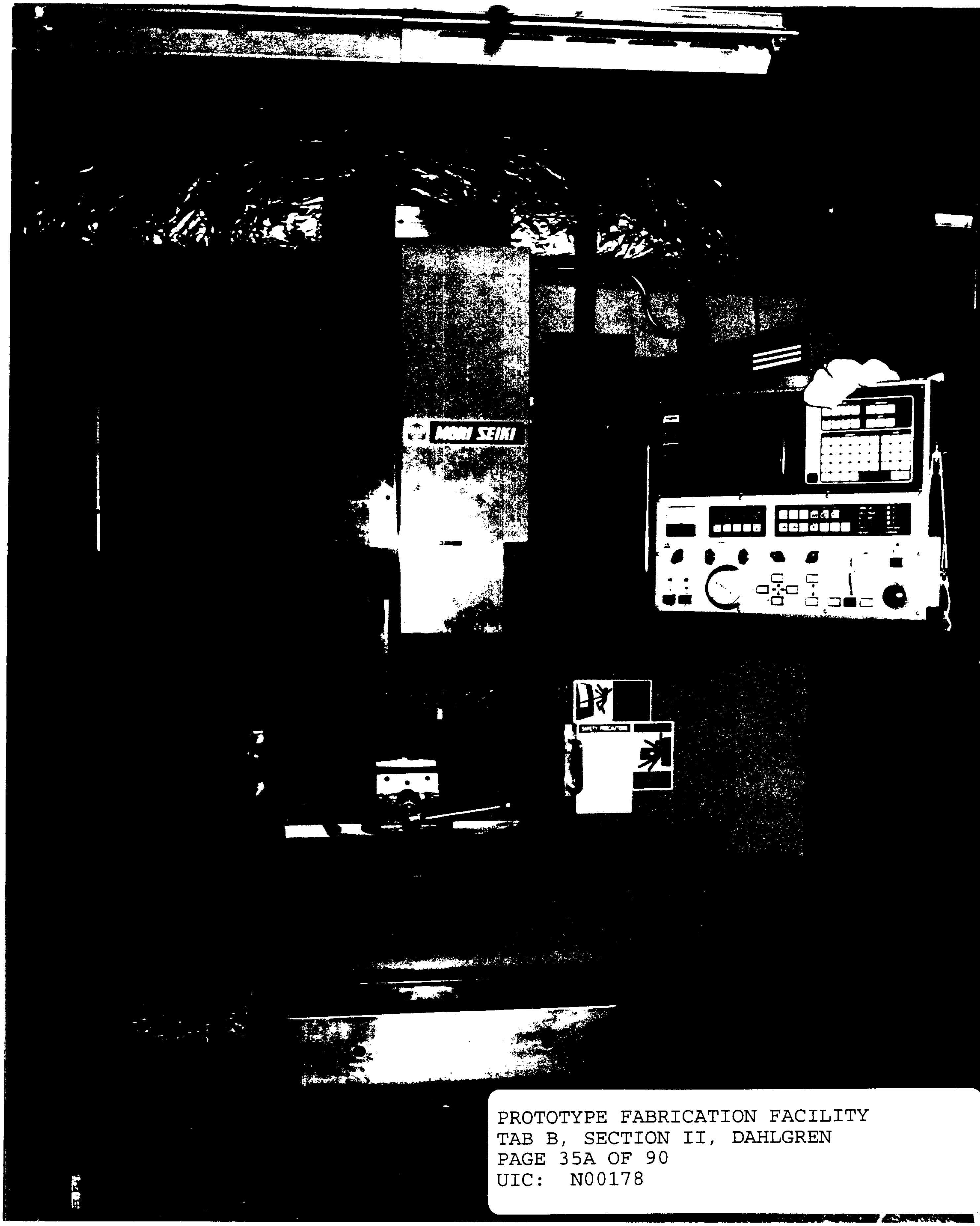
40

14. What is the approximate number of personnel needed to maintain the equipment?

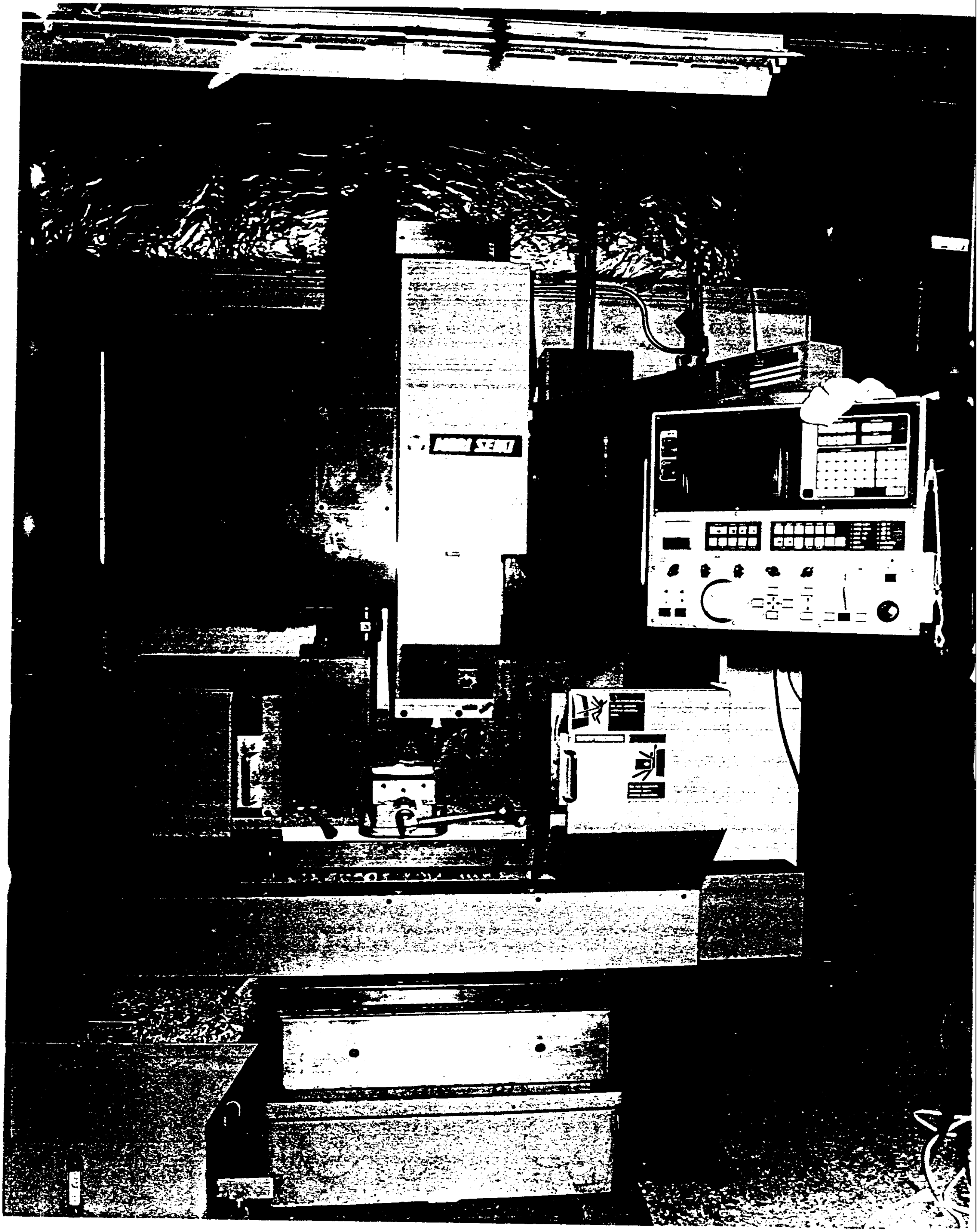
1

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

The attached photograph depicts a Computer Numerical Controlled (CNC) machining center with automatic tool changer; representative of the type of equipment contained in the Prototype Fabrication Facility.



PROTOTYPE FABRICATION FACILITY
TAB B, SECTION II, DAHLGREN
PAGE 35A OF 90
UIC: N00178



PROTOTYPE FABRICATION FACILITY

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Warhead Development Facility**

1. State the primary purpose(s) of the facility/equipment.

The Warhead Development Facility is utilized to support the research, development, assembly, and test of warhead materials, components and assemblies for missile warheads. This facility consists of five sub-facilities each of which provide a unique support function in the Research and Development of Missile Warheads. These facilities include:

(a) Warhead Assembly Laboratory: The primary purpose of this facility is to provide tools, equipment, and meters to clean, inspect, measure, test, and assemble inert warhead components and units. The facility also includes space for ready storage of classified warhead components.

(b) Warhead Structural Laboratory: The purpose of this laboratory is to provide equipment to assess the structural characteristics of inert warhead components and assemblies.

(c) Warhead Analysis Laboratory: This laboratory houses equipment necessary to conduct data reduction and analysis of warhead designs and test results.

(d) Gas Gun Research Laboratory: This is a multi-purpose experimental facility used for the characterization and optimization of warhead materials and components, to develop shock wave equation of state data, and to conduct precision impact experiments over a wide range of velocities.

(e) Material Test Laboratory: This laboratory is used to conduct mechanical strength, physical properties, metallurgy and microscope studies and evaluations for warheads and weapons systems. The test instruments are used to characterize new materials, new compositions, lot acceptance for procurement, and for failure and safety analyses.

These facilities are generally multi-purpose for the ordnance and missile field. They are used to support missiles, warheads, and gun and projectile programs. They support basic

research, development, and the resolution of in-service problems. In addition to these in other facilities at the Dahlgren site including, Computer Aided Engineering, performance assessment, Prototype Fabrication, and the Weapons Systems Safety Analysis and Evaluation facility.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

These different laboratories contain many different types of equipments, which have a wide range of moveability. The following is a basic assessment by laboratory:

Laboratory	Moveability
Warhead Assembly Laboratory	Mostly Class 2, generally moveable with minor building power and exhaust modifications
Warhead Structural Laboratory	Mostly Class 2 and 3. Some of the equipment is very heavy.
Warhead Analysis Laboratory	Mostly Class 3
Gas Gun Research laboratory	Class 2; the gas gun requires major construction to relocate
Materials Test Laboratory	Class 2; several items are large and require building modifications for foundation, power, water, and air conditioning

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

Laboratory	Equipment Replacement Cost (FY94 EST Value)
Warhead Assembly Laboratory	$ 0.1M

Warhead Structural Laboratory	**0.1M**
Warhead Analysis Laboratory	**0.1M**
Gas Gun Research Laboratory	**2.0M**
Material Test Facility	**1.0M**
ESTIMATED TOTAL	**3.3M**

4. Provide the gross weight and cube of the facility/equipment.

Facility	Equipment Weight	Facility Cube (cubic feet)
Warhead Assembly Laboratory	**3,000 lbs**	**1053**
Warhead Structural Laboratory	**2,500 lbs**	**369**
Warhead Analysis Laboratory	**1,000 lbs**	**293**
Gas Gun Research Laboratory	**25,000 lbs**	**9000**
Materials Test Facility	**4,900 lbs**	**4495**

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

Facility	Requirements
Warhead Assembly Laboratory	**none**
Warhead Structural Laboratory	**none**
Warhead Analysis Laboratory	**none**
Gas Gun Research Laboratory	**220 Volt, 3 Phase power**
Materials Test Facility	**440/220 Volt, 3 Phase power**

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

The gas gun facility requires concrete support piers to precisely support the gun launch tube. Parts of the Materials Test Facility require 10 foot ceilings and solid concrete support structures.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

The gas gun research laboratory must maintain temperature control of 70 +/- 10 degrees F and humidity control of 60% +/- 10% to ensure repeatability of launch conditions. The Materials Test Facility requires temperature controlled to 70 +/- 05 degrees F and humidity controlled to 50 +/- 10%. These are required by many ASTM and MIL SPEC test procedures particularly for plastics and composite materials.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

(a) Warhead Assembly, Structural, and Analysis: These facilities contain equipment which would not be difficult to replicate or relocate. However, these are the working laboratories of warhead researchers and designers performing many functions which are inherently governmental. Removing the facilities would make it very difficult, costly, or almost impossible to effectively perform their work.

(b) Gas Gun Research Laboratory:

(1) Replicate. It is estimated that it would cost approximately $2.0M to replicate the complete facility, including the gas gun and associated hardware, concrete piers and concrete slab, high pressure gas control panels, water recovery and other soft recovery and sabot stripping hardware, electronic instrumentation including laser interferometry and flash x-ray diagnostics, and special fixtures and hardware for preparing targets and target assemblies. This does not include the building cost.

(2) Relocate. It would be difficult but not impossible to relocate this facility to another site. This is a multipurpose gas gun facility; it can be used for equation-of-state and impact studies on materials mounted in target assemblies at or near the gun muzzle and it can be used to launch items of interest into actual military hardware (up to several yards on a side) positioned up to 20 ft from the gun muzzle. Several other government and commercial laboratories have gas gun facilities that can be used for either equation-of-state studies or for launching items into hardware. As far as we know, the NSWCDD facility is unique since it is the only facility that has all the aforementioned capabilities using one gas gun.

(3) Impact on DON. This facility has continuously supported Navy research

and development and fleet-support programs since its first operation in 1971. Major programs supported include: 5" Gun Ammunition program, Standard Missile program, Insensitive Munition Advanced Development program, NAVAIR and NAVSEA 6.2 Block programs related to Surface Weaponry, Underwater Weaponry, Composite Materials, and Pulsed Power, and the NSWC Independent Research and Exploratory Development programs. These programs have benefitted from the flexible, fast-response, multifunctional, minimum-manpower and cost-effective capabilities of the facility.

(c) Material Test Facilities. These are generally standard, commercial instrumentation found in many locations. The value of the equipment is that it is in close proximity to the research and design engineers and other test facilities which are necessary to conduct warhead research and development and inherently governmental activities. The equipment could be relocated to another site, but the cost and technical effectiveness of the

associated researchers could be comprised. It is imperative that the Navy maintain the capability to perform inherently governmental activities such as lot acceptance, design evaluations, safety studies, and other independent evaluations.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

(a) Warhead Assembly, Structural, and Analysis Laboratories: These laboratories were established at their current building in 1991. Some of the equipments have been at Dahlgren for several years, others have been purchased as late as 1993. All items were transported by truck.

(b) Gas Gun Research Laboratory: This facility was established in 1971, and has been in continuous upgrade as requirements have developed. The building housing the equipment was enlarged and modernized in 1993. The equipments were transported by truck.

(c) Materials Test Facility: The equipments in this facility was purchased between 1964 and 1993. It was transported by truck.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

2.1 Gun Systems
2.2 Missile Systems
2.4 Torpedoes

2.6 Directed Energy Systems
2.8 Launchers
2.13 Other Ordnance
11.5 Materials and Processes

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

(a) Warhead Assembly, Structural, and Analysis Laboratories: Elements of these laboratories are used daily, depending on program progress and requirements. Some equipments are used daily, others less frequently. An average utilization of the laboratories 85-100% based on the fact that they are daily used for some function.

(b) Gas Gun Research Laboratory: Estimate 90% utilization. This includes munition concept definition, design of experiments, fabrication of test hardware, set-up of gun, set-up of target configuration, set-up of diagnostic electronics, performance of experiment, post-test photos of hardware, post-test metallographic evaluation, and analyses of results.

(c) Materials Test Facility: This facility contains many types of test equipment and the proper equipment is selected depending on the test specimen and test required. Average estimated usage for individual instruments is in the 25%-35% range. However, taken as an aggregate, the historical usage is approximately 70%.

12. Provide the projected utilization data out to FY1997.

(a) Warhead Assembly, Structural, and Analysis Laboratories: Based on projected research and development programs, the projected usage is expected to remain in the 85%-100% range.

(b) Gas Gun Research Laboratory: Based on projected programs, utilization is expected to remain at the 90% level.

(c) Material Test Facility: Based on projected programs, the usage is projected to remain at the 70% level.

13. What is the approximate number of personnel used to operate the facility/equipment?

(a) Warhead Assembly, Structural, and Analysis Laboratories: The number of persons to operate the equipment is variable. Most equipment requires one person.

However, the Structural Evaluation Fixture requires four persons to operate.

(b) Gas Gun Research Laboratory: Two persons are required to operate this facility.

(c) Material Test Facility: Variable by equipment from one to two persons.

14. What is the approximate number of personnel needed to maintain the equipment?

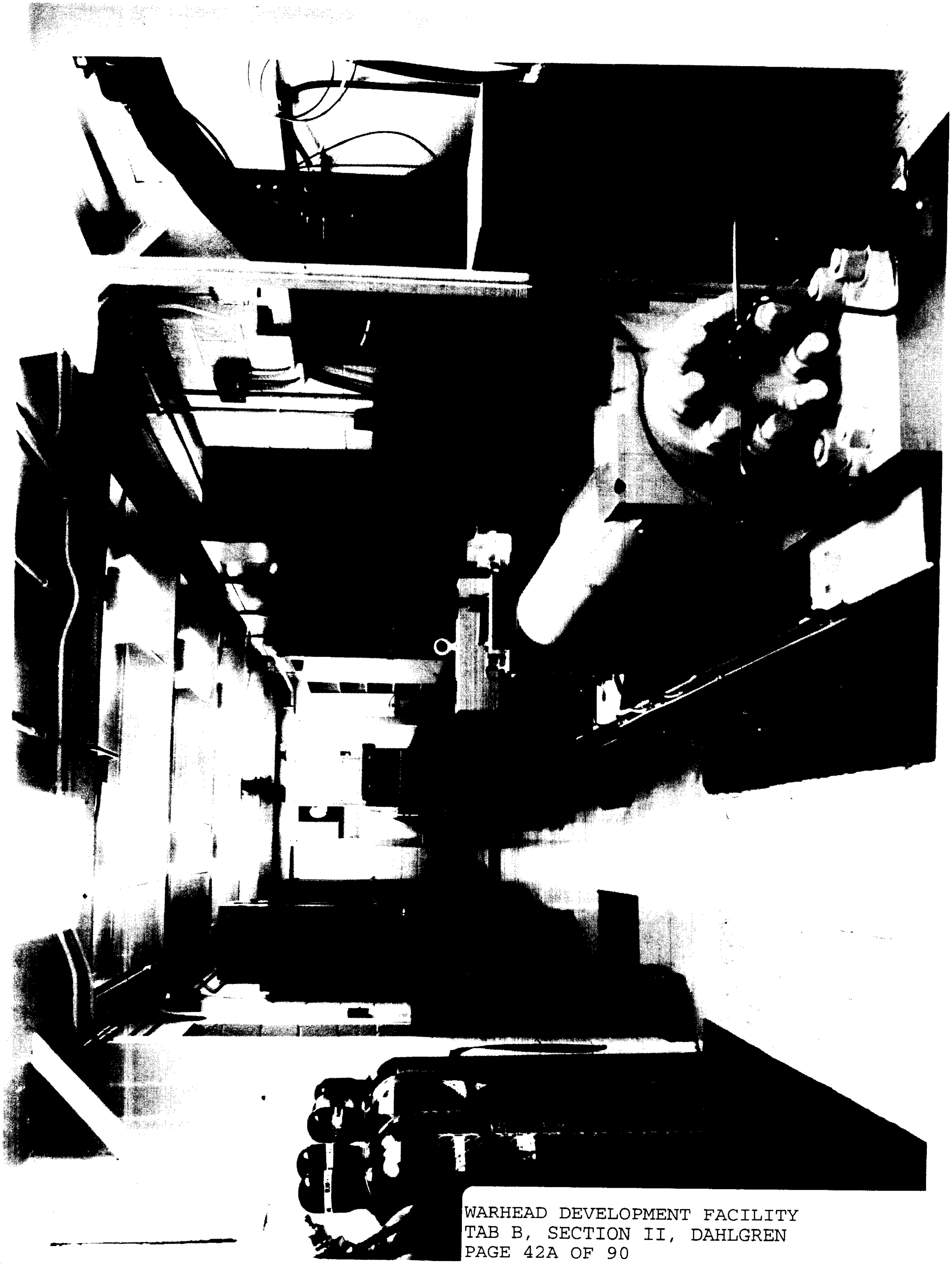
(a) Warhead Assembly, Structural, and Analysis Laboratory: Maintenance is very small. It required part of one person's time.

(b) Gas Gun Research Laboratory: Maintenance is very small, much less than one person per year.

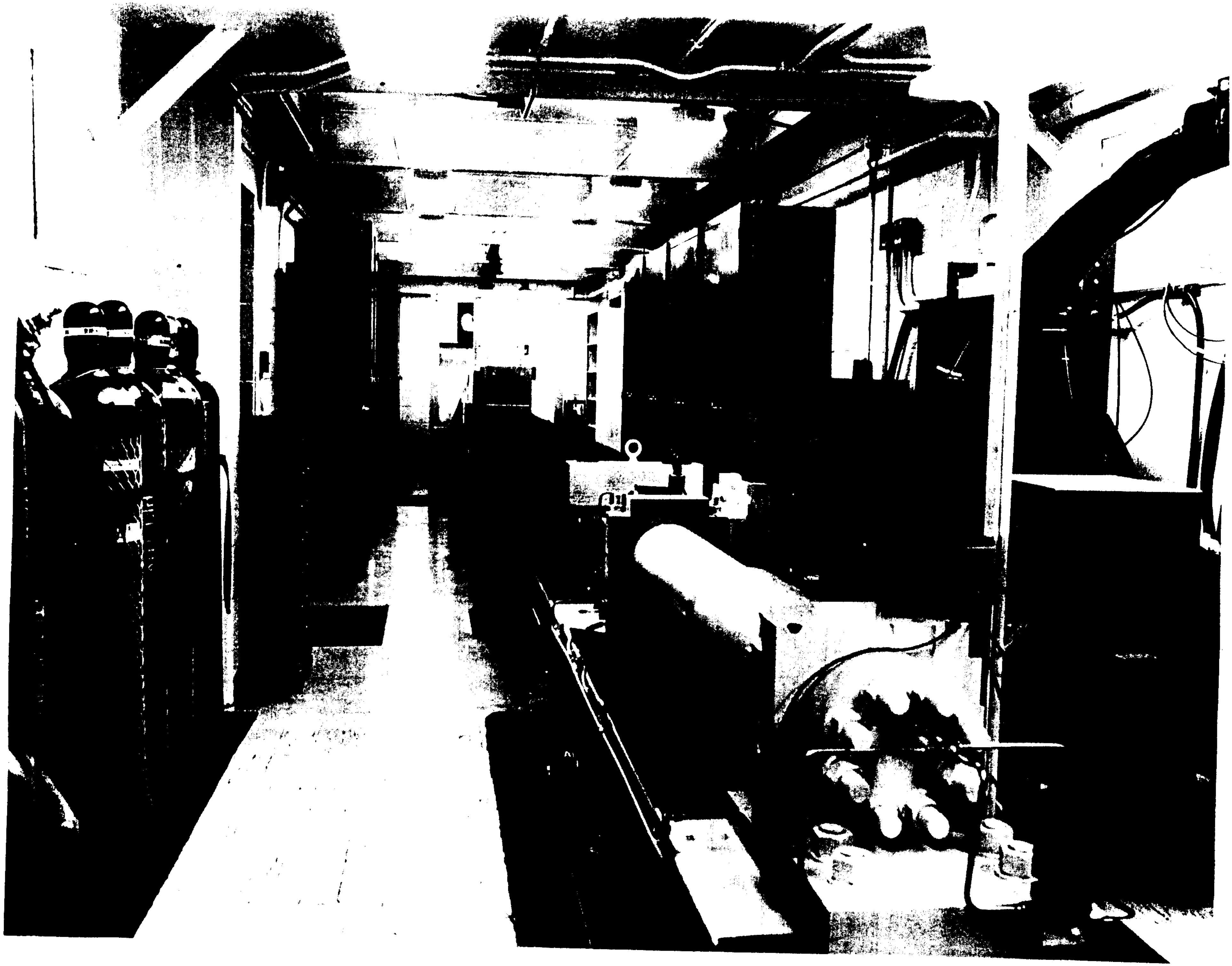
(c) Materials Test Facility: Less than one person.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.



WARHEAD DEVELOPMENT FACILITY
TAB B, SECTION II, DAHLGREN
PAGE 42A OF 90
UIC: N00178



WARHEAD DEVELOPMENT FACILITY

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Search and Track Sensor Test Site (STSTS)**

1. State the primary purpose(s) of the facility/equipment.

The STSTS allows over water testing of individual Radio Frequency (RF) and Electro-Optical sensors or complex sensor systems during and/or at the completion of their development cycle. This facility is used in conjunction with the Potomac River Test Range (PRTR), can provide an 80,000 yard over-water, littoral, laser certified, instrumented range capability. The STSTS provides the ability to fly subsonic static, manned, towed, and gun launched targets at altitutdes down to the surface for sensor performance evaluations.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The equipment within the STSTS is portable. The buildings and towers which are utilized at the STSTS are fixed. In addition, the unique location of the STSTS to the restricted over-water range on the Potomac River is also fixed.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

The replacement cost for the equipment at the STSTS is approximately $5.6M. This does not include the replacement cost for the buildings and towers at the STSTS.

4. Provide the gross weight and cube of the facility/equipment.

The equipment at the STSTS is approximately 3500 cu.ft. and 55 tons in gross weight. The fixed assets such as buildings and towers are not included in these estimates.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

To operate some of the electronic equipment integral to the STSTS and some of the sensors/systems being tested and/or developed, the following support is required:

Water Chillers for cooling equipment
440 Volt, Delta and Wye, 400 Hz, 3 Phase electrical power
480 Volt, Delta, 400 Hz electrical power

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

Because the sensors typically being developed and tested are for shipboard use, the foundations have to be at an altitude resembling that expected on a ship and can support a minimum weight of several hundred pounds. The STSTS utilizes several steel towers for this purpose.

To secure heavy systems which are to be operated at ground level, a concrete slab is needed for a solid foundation to anchor to. It is also needed to allow alignment of these ground-based sensors.

Secure work areas are required for sensitive/classified development and test work.

EMI is continually a concern with emitters located at and around the test site. Special precautions including EMI shielding and special grounding requirements are implemented.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

In a portion of the facility, temperature (heating and cooling) and humidity control is required for operation of a VAX computer. The remainder of the facility requires temperature control (heating and cooling) due to the requirement for operation of complex electronic equipment.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment

were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The ability to replicate littoral environments, representative targets, downrange ground truth and an integrated infrastructure to support multi-sensor testing requires real estate, access and use rights that could not be met within CONUS, if at all. The unique and irreplaceable capability to develop and test multi-sensor systems in a controlled littoral environment would be lost, seriously damaging the Navy's future ability to counter anti-ship missiles.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The STSTS has evolved over time by a combination of inheriting existing buildings and new construction. The main building as well as an adjacent, smaller support building at the STSTS has a date of 1975. The main building was expanded with new construction in 1989. Another adjacent test fixture was converted in 1992 to add additional test and integration capabilities to the site. Towers and support equipment have been added to the test site over time as projects have had requirements.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

5.2 Radar Sensors and Surveillance Systems
5.3 Special Sensors and Surveillance Systems
8.3 Electronic Warfare Systems

The STSTS has also supported the following functional support areas on a less frequent basis:

2.0 Weapons Systems
3.3 Surface Combat System Integration
4.2 Special Warfare Support

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

The average utilization over the last 5 years is 63.8 manyears.

The unit of measure is approximate manyears of direct labor and contractor support in the planning, development, setup, test, etc. related to the STSTS project efforts.

12. Provide the projected utilization data out to FY1997.

1994: 25 manyears
1995: 40 manyears
1996: 30 manyears
1997: 40 manyears

The unit of measure is approximate manyears of direct labor in the planning, development, test, etc. related to the STSTS project efforts.

13. What is the approximate number of personnel used to operate the facility/equipment?

On average, the approximate number of personnel needed to manage and operate the STSTS is 4.

Note: The STSTS is a totally project operated/funded facility. It does not have a full-time permanent staff. During testing, project personnel support the STSTS operations. This unique arrangement makes sensor evaluations at the STSTS highly cost effective yet responsive to relatively short notice requirements.

14. What is the approximate number of personnel needed to maintain the equipment?

The approximate number of personnel needed to maintain the STSTS equipment is 2. See note above.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

Photo is attached.

SEARCH AND TRACK SENSOR TEST SITE
(STSTS)
TAB B, SECTION II, DAHLGREN
PAGE 46A OF 90
UIC: N00178

SEARCH & TRACK SENSOR TEST SITE

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**PHALANX Instrumented Test Facility**

1. State the primary purpose(s) of the facility/equipment.

The primary purpose of the PHALANX Instrumented Test Facility is to provide an instrumented over water range for testing the PHALANX system.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

Equipment is portable.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

Replacement value for equipment:

a. CIWS MK 15 Mod 11-14 on Trailer	
PHALANX Mount	**$2,800K**
Trailer	**120K**
Cabin	**6K**
Chiller	**14K**
Power Conditioner	**7K**
Total:	**$1,947K**
b. CIWS MK 15 Mount Mod 1-4&6	**$2,500K**
c. Trailer Control & Instrumentation	**250K**
d. Sea Van Support (2 - 5K ea)	**10K**
e. Sea Van Instrumentation & Control	**15K**
f. Test Target Simulator (2 - 14K ea)	**30K**
TOTAL:	**$5,752K**

4. Provide the gross weight and cube of the facility/equipment.

Gross weight and cubic measure of facility/equipment:

	Weight	Cubic Feet
a. CIWS MK 15 Mod 11-14 on Trailer		
PHALANX Mount		
Trailer		
Cabin		
Chiller		
Power Conditioner		
Total:	**32,000**	**7,680**
b. CIWS MK 15 Mount Mod 1-4&6	**13,500**	**1,536**
c. Trailer Control & Instrumentation	**24,500**	**5,500**
d. Sea Van Support (2 - 5K ea)	**12,000**	**3,200**
e. Sea Van Instrumentation & Control	**6,000**	**1,600**
f. Test Target Simulator (2 - 15K ea)	**1,000**	**512,000**
TOTAL:	**88,500**	**531,436**

Area required for distribution of instrumentation 250 ft x 600 ft.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

480 3 Phase VAC at 275 KVA
208 3 Phase VAC at 175 KVA

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

8 foot raised berm for CIWS.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

No environmental control requirements.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

Replication requires an over water site with an instrumented range which allows air targets to fly at the PHALANX mount. It is not impossible to find but locations are very limited. No other facility of this nature exists within the PHALANX program.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The site was established in 1986. The berm was constructed and equipment was trucked to the site.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1.3 Surface Ship
2.1 Gun Systems
2.9 Fire Control
2.10 Weaons Data Links
3.2 Air
3.3 Surface
3.4 Multiplatform
5.2 Radar Systems
5.3 Special Sensors

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

Site and/or equipment has received 100% utilization over the last 5 years.

12. Provide the projected utilization data out to FY1997.

Expect 100% utilization through FY97.

13. What is the approximate number of personnel used to operate the facility/equipment?

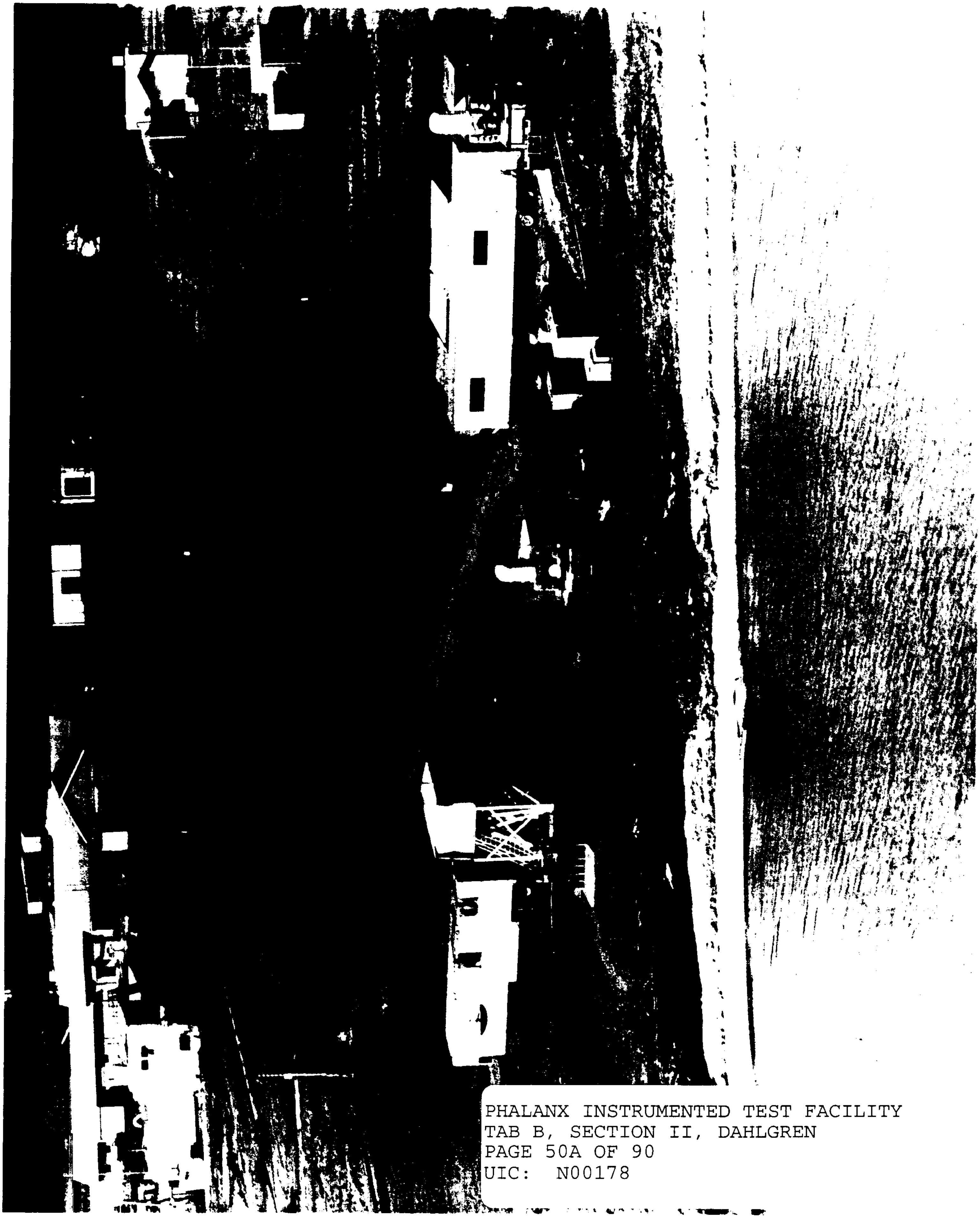
Personnel required to operate the facility/equipment: 2 - 15 depending on the type of test being conducted.

14. What is the approximate number of personnel needed to maintain the equipment?

Personnel required to maintain equipment: 2.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.



PHALANX INSTRUMENTED TEST FACILITY
TAB B, SECTION II, DAHLGREN
PAGE 50A OF 90
UIC: N00178

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**AN/SLQ-32(V)1 Program Generation Center, RF**

1. State the primary purpose(s) of the facility/equipment.

Development, production, and Fleet support of AN/SLQ-32(V) software and libraries and RDT&E of AN/SLQ-32(V) hardware improvements. In addition, the close proximity of this facility to personnel and equipment focused on developing other systems for ships (e.g., AEGIS Combat System, PHALANX Gun Weapon System, Ship Self Defense System, Electronic Warfare Decoy System, and Follow-on EW Systems), provides critical connectivity toward fielding effective combat systems.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

Most of this equipment consists of large computer and computer-like mainframes installed as integral parts of spaces and is classifed at Class 2 "Moveable".

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

Replacement cost of equipment/facilities is $21.3M.

4. Provide the gross weight and cube of the facility/equipment.

Gross weight and volume: 91, 550 lbs and 8,400 cubic feet.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

Normal power and air conditioning required by computers and shipboard equipment.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

Rooms housing AN/SLQ-32(V) equipment and environmental simulators must have electromagnetic shielding for security.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

Environmental controls are those normal for mainframe computers and shipboard electronic equipment.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

Impact to Navy of moving facility is the significant down time in Fleet support capability during move and reconstruction. Also, critical connectivity to developments in other parts of the ship combat system will be lost.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

Equipment was initially installed in 1981 and gradually enhanced since that time.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1.3 Surface Ship
2.2 Guided Missiles
2.13 Other Ordnance
3.3 Surface
5. 3 Special Sensors
7.3 Shipboard
8.2 Countermeasures (CM)
8.3 Electronic Warfare System
10.1.3 Surface Ship-Related Training Systems

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

Average utilization is 17 hours per day, 5 days per week with occasional periods of 24 hours per day, 7 days per week continuous utilization. Utilization is defined as the time any portion of the facility is used to develop, test, or produce a product.

12. Provide the projected utilization data out to FY1997.

Average utilization is expected to remain constant through FY 1997.

13. What is the approximate number of personnel used to operate the facility/equipment?

Facilities operated by approximately 37 people.

14. What is the approximate number of personnel needed to maintain the equipment?

Facilities maintained by approximately 14 people.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.

AN/SLQ-32(V)1 PROGRAM GENERATION
CENTER, RF
TAB B, SECTION II, DAHLGREN
PAGE 53A OF 90
UIC: N00178

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Anechoic Test Facility**

1. State the primary purpose(s) of the facility/equipment.

The Anechoic Test Facility, Building 1400, along with Building 1401, is situated within a fenced-in compound area and provides a "test bed" for a multitude of RF and communications program support from conceptual design through test and verification. The primary purpose of the Facility is to provide support for Special Projects within the Navy, DoD and other U.S. Government agencies and to support EW Systems programs within the Center.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The Anechoic Test Facility is a Class 2 Fixed asset. By definition, the facility could not be moved without major demolition and major reconstruction.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

The Anechoic Test Facility (Bldg 1400) consists of a metal building, 125 feet long by 40 feet wide by 40 feet tall; twin concrete storage vaults measuring 12x12x10 feet; a fully shielded, tapered anechoic chamber measuring 98 feet long by 30 feet wide by 30 feet tall and a fully shielded integral instrumentation pit (below ground level) measuring 25 feet by 19 feet by 12 feet deep; and all associated instrumentation. The estimated cost to replace the structures indicated above would be approximately $4.5M, not including necessary land. Building 1401 is a metal structure measuring 16 feet wide by 16 feet long by 10 feet tall and is fully insulated with double wall construction add concrete foundation. The estimated cost to replace Builidng 1401, not including land, would be approximately $100K. Replacement value of associated instrumentation is estimated at $1M.

4. Provide the gross weight and cube of the facility/equipment.

##DATA NEEDED

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

Other than normal electrical power, the only utility requirements are water, voice grade telephone lines and two metallic pair of alarm lines.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

The only special budgetary considerations have been the maintenance/replacement of RF absorber material; maintenance of instrumentation; and maintenance of associate security alarms. All of these expenses have been paid by the programs supported at the Facility.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

The only environmental control requirements are the heating/cooling of work areas within Building 1400 for an ambient temperature of 65 degrees to 75 degrees F and hating of Building 1401 for an ambient temperature of 60 degrees to 70 degrees F.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

Due to the nature of the construction of Building 1400 and the tapered anechoic chamber within, it would be technically impossible to dismantle and relocate the Facility. Mechanical alignment of the wall, floor, overhead, and conical sections of the chamber is critical to the electrical operation and performance of the anechoic chamber. Due to the age of the chamber, any attempt to dismantle and move the chamber would render it unusable for its intended purpose. The physical and electicial characteristics of this chamber are unique, not just within the Navy, but throughout DoD and other Government agencies. There are no known facilities such as this in the private sector that could perform over the broad RF spectrum afforded by this facility. Loss of this facility would have a direct negative impact on Special Navy, FBI, and DEA programs.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The Anechoic Test Facility, Building 1400, was constructed in 1972 to support the Special Effects Program. Since that time it has been upgraded and supports a broad range of classified Special EW and RF related programs.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

The Anechoic Test Facility supports, or has supported tests involving:
1.2 Aircraft
1.3 Surface Ship
1.4 Space Satellite
4.1. Landing Force Equipment and Systems
5.3 Special Sensors
7.4 Land-Based
7.8 Intelligence
8.3 Electronic Warfare (EW) Systems
11.4 Electronic Devices

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

The Anechoic Test Facility has been FULLY funded for the past 6 years. Due to the wide range of capabilities of the Facility, several programs have been supported simultaneously, resulting in reduced costs to Navy programs. Many Navy programs were supported at ZERO COST to the U.S. Navy. Equipment maintenance was funded by other Government program sponsors.

12. Provide the projected utilization data out to FY1997.

The Anechoic Test Facility is FULLY FUNDED through an Interagency Agreement through FY98. Although fully funded for a particular program, the Facility will be available to support other Navy and DoD programs, which will result in a considerable cost savings to the U.S. Navy.

13. What is the approximate number of personnel used to operate the facility/equipment?

Normally, the Facility is staffed by one person to operate and maintain the

equipment/facility. Program sponsors provide their own personnel when additional manpower is necessary.

14. What is the approximate number of personnel needed to maintain the equipment?

    See 13 above.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

    See attached photograph.

ANECHOIC TEST FACILITY
TAB B, SECTION II, DAHLGREN
PAGE 57A OF 90
UIC: N00178

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Weapons Systems Safety Analysis & Evaluation Facility (WSSAEF)**

1. State the primary purpose(s) of the facility/equipment.

The Weapons Systems Safety Analysis and Evaluation Facility (WSSAEF) is a state-of-the-art network of computers used for safety-related calculations and software analysis. The facility supports complex and sophisticated computational efforts, e.g., fluid dynamics, structures, systems and software safety that assess system vulnerabilities and specify, design and develop means to remove failure modes, control enviornments, limit damage, or otherwise reduce loss of combat capability. Programs supported by the facility include TOMAHAWK, Vertical Launch System, STANDARD Missile Program, Structural Test Firing Program, and Pointing and Firing Cutout Program. The Naval Ordnance Center (NAVORDCEN) Safety and Ordnance (SAFEORD) database, supporting the NAVORDCEN Safety Office (N71) and the Weapon System Explosives Safety Review Board (WSESRB), is also hosted on one of the microVAX computers. A vital adjunct to this facility is the Explosive Experimental Area (EEA) facility for the conduct of weapons safety test and evaluation.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The WSSAEF is Class 2 Installed Equipment which can be classified as "moveable". The network consists of three (3) microVAX comptuers, one (1) VAX 8250 computer, one (1) DEC LPS-40 High Speed Laser Printer, one (1) Silicon Graphics (SGI) CHALLENGE Workstation, one (1) IBM 320H Workstation, four (4) SGI Iris Workstations, six (6) SUN Workstations, one (1) INTERGRAPH Workstation, thirty-five (35) Personal Computers, and peripheral devices. Computers are assessable via local ethernet and NSWCDD Local Area Net. Some parts of the network, such as the ethernet backbone, would require replacement if moved. It should be noted that while this facility is classified as moveable, the supporting EEA facility would require significant relocation costs.

CHEM-BIO SCIENCES COMPLEX
TAB B, SECTION II, DAHLGREN
PAGE 74A OF 90
UIC: N00178


EMERGENCY
EXIT
LABORATORY
FILM

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Pulsed Power Technology Complex**

1. State the primary purpose(s) of the facility/equipment.

The primary purpose is to conduct systems research and development in pulsed power technology areas concerning the generation, storage, switching, and pulse conditioning of very high electrical powers. This includes megavolt and kiloamp switching, dielectric breakdown, arc research, corona plasma reactors, bulk optical switches, energy storage, high average power devices (100 kW), and fast diagnostics. These technologies support systems that require high peak power, short pulse and repetitive electrical powers.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

Some components of the complex are moveable such as power supplies, capacitor banks, transformers, and optical or laser test beds. The facility and some of the associated equipment are fixed, including the main power train, controls, screen rooms, modulators water breakdown equipment, diagnostics, and facilities which are partially built into the permanet building structures.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

Replacement value is estimated to be $6.5M.

4. Provide the gross weight and cube of the facility/equipment.

The Gross Weight and Cube (excluding fixed buildings) is 100 tons; 108,800 cu.ft.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

Special utility support is 200 KW average electrical power at 50 kV, 4A plus three-phase service for lasers, 3/4 inch water lines for cooling, floors suitable for optical tables, 20-foot ceilings for high voltage work, limited windows and normal lab utilities. Also, a separate 60 kW motor-generator is required to conduct experiments independent of commercial power.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

There are no special budget requirements for the complex.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

Normal air temperature and humidity control is required. A fume hood for the processing lab, door interlocks and cameras for laser and electrical safety.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

This facility would be difficult to replace or relocate due to the size and weight of the components. If this facility were lost, 200 kW pulsed power experiments could not be performed anywhere else in the Navy (other facilities would have to be constructed). In addition, some of the high voltage equipment requires extensive setup and calibration procedures. Related work is performed in the Army and Air Force, but not specifically in the areas of Navy needs. This includes high power RF sources, directed energy weapons, electro-thermal guns, high power transfer and control aboard ship, and high-power optical switching.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

This complex was established on-site in the mid 1970s with continual upgrades and additions to the present.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

2.6 Directed Energy Systems
8.3 Electronic Warfare (EW) Systems
10.6.3 Surface Ship
11.4 Electronic Devices
11.5 Materials and Processes
11.6 Energy Storage
11.10 Other Tech Base Programs

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

The complex has been used continuously (based on a 40 hour workweek) since its construction in the mid 1970s.

12. Provide the projected utilization data out to FY1997.

It is projected that this complex will be used continuously 40 hours per week through 1977.

13. What is the approximate number of personnel used to operate the facility/equipment?

Approximately twelve to eighteen people use this complex depending on the experiments being performed.

14. What is the approximate number of personnel needed to maintain the equipment?

There is very little direct maintenance of the equipment; personnel are required to setup and conduct experiments. There are no "designated" upkeep personnel.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.

CHEM-BIO ENGINEERING COMPLEX
TAB B, SECTION II, DAHLGREN
PAGE 68A OF 90
UIC: N00178


LABCONCO
DANGER

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Chem-Bio Engineering Complex**

1. State the primary purpose(s) of the facility/equipment.

The purpose of this complex is to develop, test, and evaluate chemical/biological defense equipment for shipboard use. The facilities in the complex include: (1) the Shipboard Collective Protection System (CPS) Development Facility, (2) the Shipboard Countermeasure Washdown (CMWD) Test Facility, and (3) The Land Based Test Facility (LBTF).

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The facilities in the complex are fixed. The land based engineering development and test chamber is a large double dome facility with pressure walls and filtration equipment. Equipment within the complex is mobile, but would require extensive funds and time to relocate.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

The replacement value of the facilities is $3.2M.

- CMWD =	**$250K**
- CPS =	**$750K**
- Test Chamber =	**$2.2M.**

4. Provide the gross weight and cube of the facility/equipment.

The gross estimate weight and cube of the complex is as follows:

- CPS Facility **- 40 feet x 15 feet x 10 feet weighing 10,000 lbs**

- CMWD **- 30 feet x 20 feet weighing 60,000 lbs with a 10,000 gallon water tank weighing 5,000 lbs (w/o water)**

- LBTF **- 60 feet in diameter, 45 feet in height double wall steel construction weighing approximately 400,000 lbs exclusive of 280,000 punds of concrete foundation**

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

No special utility support required other than substantial electrical power.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

No special budget requirements.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

The LBTF facility requires air filtration and temperature/humidity control.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The entire complex is not relocatable to any other Navy site. The inherent capabilities would have to be replicated at another Navy site at considerable expense. The impact of loss of the complex would be that the total chem-bio detector development effort for the Navy would be halted. Improved chem detector units would not be available for installation aboard combatants leaving fleet forces vulnerable to a chemical attack in any littoral conflict. The loss of the complex would also stop the bio detector engineering development effort, which represents the only fieldable capability currently available to U.S. Armed Forces.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The current facility was first constructed in the mid 1960's utilizing both

contractor and NSWC personnel. The CPS capabilities and CMWD capability were added in the 1980's using contractors and NSWCDD public works staff.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

10.6.3 Surface Ship

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

The complex has been in use daily for the past five fiscal years. The LBTF has been used approximately 50 hours per week during the entire period.

12. Provide the projected utilization data out to FY1997.

No change expected in utilization out to 1997. Limitation of facility unless modified will be in the area of biological agent simulant testing with detector systems.

13. What is the approximate number of personnel used to operate the facility/equipment?

Approximately 15 people make use daily of the complex and one person is required to be in the complex during normal working hours due to security issues.

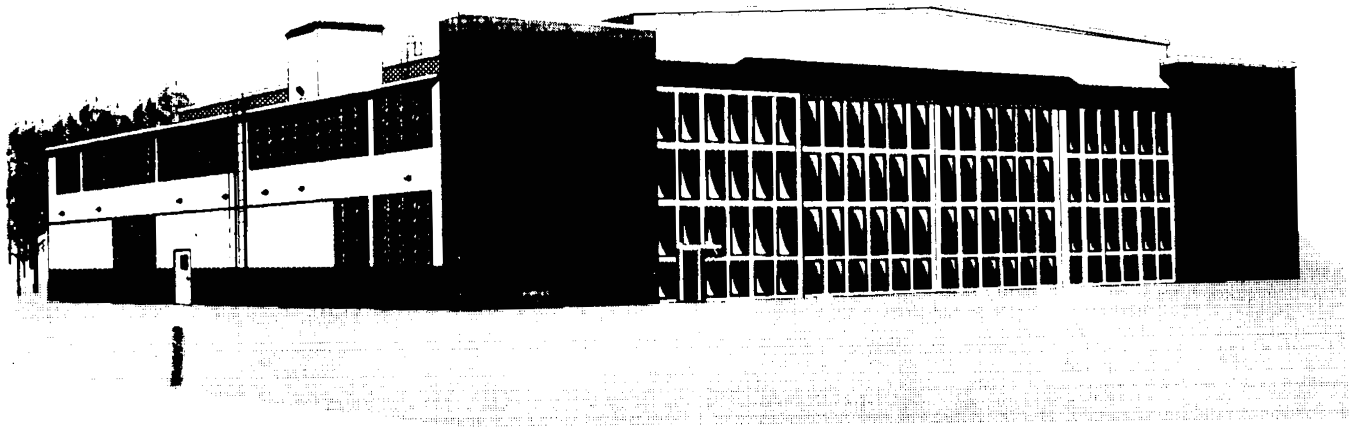
14. What is the approximate number of personnel needed to maintain the equipment?

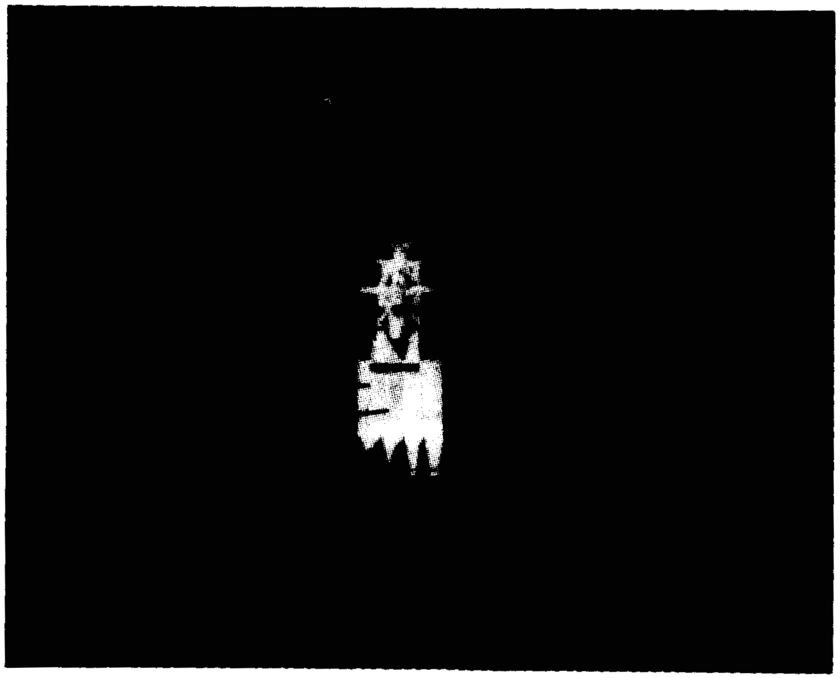
There are no dedicated personnel required to support the facilities/equipment.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.

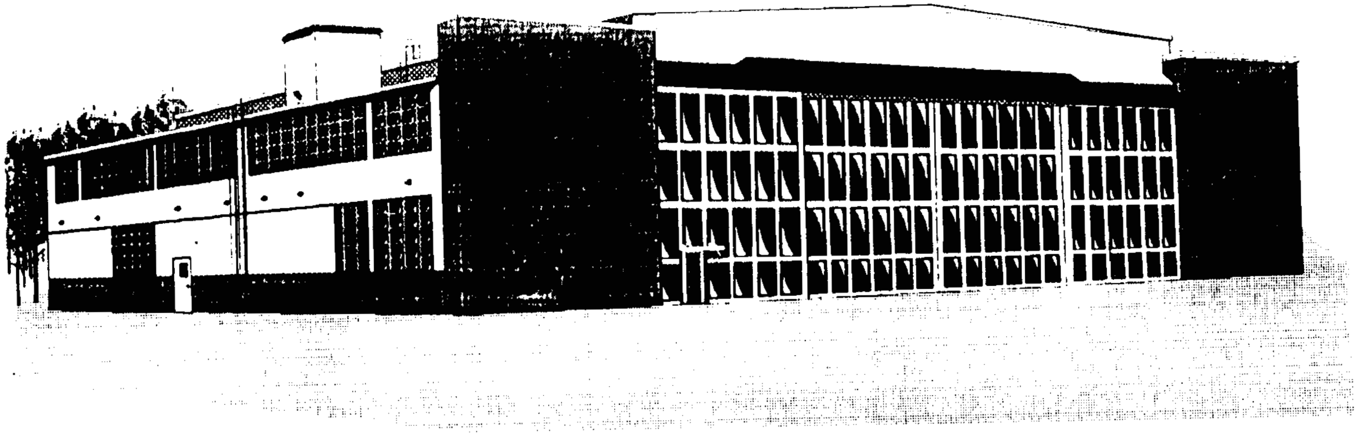
ELECTROMAGNETIC VULNERABILITY ASSESSMENT FACILITY (EMVAF)

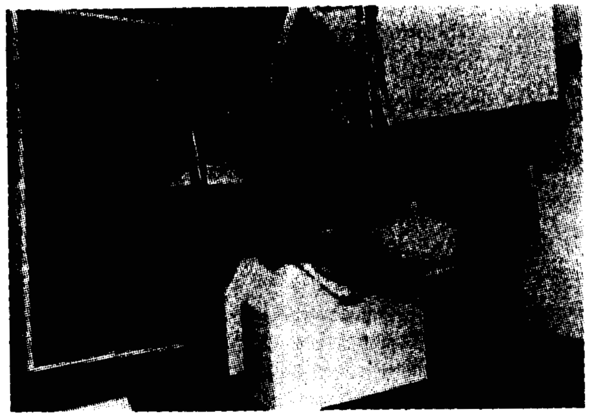


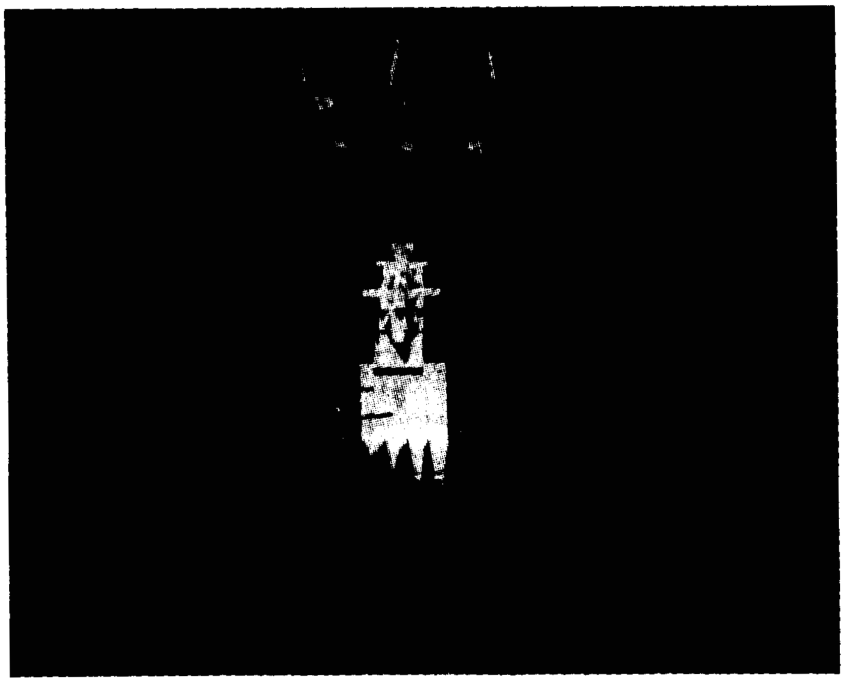


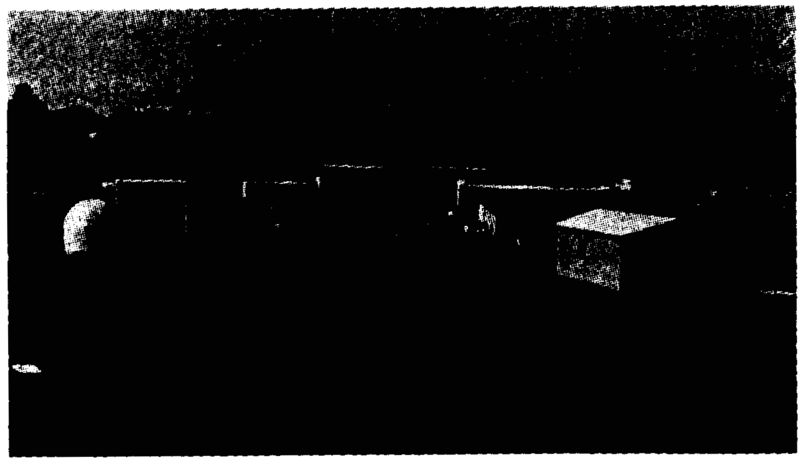
ELECTROMAGNETIC VULNERABILITY
ASSESSMENT FACILITY (EMVAF)
TAB B, SECTION II, DAHLGREN
PAGE 65A OF 90
UIC: N00178

ELECTROMAGNETIC VULNERABILITY ASSESSMENT FACILITY (EMVAF)









SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Electromagnetic Vulnerability Assessment Facility (EMVAF)**

1. State the primary purpose(s) of the facility/equipment.

This is a complete electromagnetic test facility used to simulate the high-power full-threat operational electromagnetic environment (EME) in which the armed forces must operate. The EMVAF consists of ground plane test facilities, anechoic chamber, mode-stirred chamber, and state-of-the-art telemetry collection and data reduction laboratories.

Typical activities include:

o Evaluation of the effects of a joint U.S. Armed Forces tactical EME upon electro-explosive, electronic, electrical, and electro-mechanical systems.

o Measurement of the susceptibility and vulnerablity of weapon systems and shielding effectiveness of enclosures and material.

o Evaluation of electronic and weapon systems in their full-threat launch-to-target operational environment.

In 1993, all electromagnetic effects test facilities and equipment assigned to NSWCDD were interconnected and combined into one facility known as the EMVAF. Because the EMVAF consists of previously independent facilities and equipment that now make up a complete test facility which cannot be adequately addressed in its parts, this submission includes the following sub-facilities listed in the request for data:

- Anechoic Chamber and Transmitter Room
- EM Vulnerablity Assessment Program (EMVAP) Laboratory
- EMC Support Laboratory
- HERO/EMV Ground Plane, and
- Mode-Stirred Chamber.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The EMVAF is a fixed asset that would require major demolition and construction to relocate.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

$20.6M

4. Provide the gross weight and cube of the facility/equipment.

The EMVAF is a fixed facility. Gross weight is approximately 360 tons and gross cube is approximately 173,000 cu.ft.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

Aircraft and shipboard electrical power sources are required.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

Facility requires radio frequency (RF) shielded chambers, anechoic material, electrical power filtering and conditioning, a turntable 15 feet in diameter with a load capacity of 25 tons, a turntable 25 feet in diameter with a load capacity of 18 tons, and special foundations with unique grounding to support the steel simulated shipboard decks.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

Temperature and humidity controls are required.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The facility would be extremely difficult to relocate at another site. The cost to replicate the facility at another site would be prohibitive ($20.6M).

The loss of this facility would affect Navy Fleet safety.

A Navy in-house system safety program for hazards of electromagnetic radiation to ordnance (HERO) issues, located at one facility with a full spectrum electromagnetic environmental effects (E3) RDT&E capability, is required to ensure that the Navy's warfighting abilities remain strong. NSWCDD is the only Department of Defense facility that provides costs effective HERO RDT&E that addresses all safety issues.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The initial construction began in 1958 with the construction of two ground planes. In 1972, an Anechoic Chamber was added with the Mode-Stirred Chamber being constructed in 1984. The electromagnetic vulnerability assessment program laboratory and most of the additional support facilities were added during the in-between years. In 1993, the entire facility was interconnected with a state-of-the-art fiber optic data collection and instrumentation systems and all individual systems were integrated in to the EMVAF.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1.1 Undersea
1.2 Aircraft
1.3 Surface Ship
1.4 Space Satelites
1.5 Ground Vehicles
2.1 Gun Systems
2.2 Guided Missiles
2.3 Free Fall Weapons and Rockets
2.4 Torpedoes
2.5 Mines
2.6 Directed Energy Systems
2.7 Explosives
2.8 Launchers
2.9 Fire Control
2.10 Weapons Data Links
2.11 Weapons Fuzing
2.12 Weapons Propulsion
2.13 Other Ordnance
2.14 Explosive Ordnance Disposal
3.1 Subsurface
3.2 Air
3.3 Surface
3.4 Multiplatform
4.1 Landing Force Equipment and Systems
4.2 Coastal/Special Warfare Support
5.2 Radar Systems
6.1 Submarine Navigation Systems
6.2 Aircraft Navigation Systems
6.3 Surface Ship Navigation Systems
6.4 Weapons Navigation systems
6.5 Satellite Navigation Systems
7.3 Shipboard
8.2 Countermeasures (CM)
8.3 Electronic Warfare System
9.1 Navy Strategic Systems10.2 Logistics Planning and Implementation
9.2 Nuclear Weapons and Effects

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

The unit of measure used is 120 hours per week (three shift operation).

Of the possible 120 test hours available per week, the EMVAF has operated a minimum of 80 test hours per week for the past 5 fiscal years.

12. Provide the projected utilization data out to FY1997.

Of the possible 120 test hours available per week, the projected utilization for the EMVAF is a minimum of 60 hours per test week through FY97.

13. What is the approximate number of personnel used to operate the facility/equipment?

67

14. What is the approximate number of personnel needed to maintain the equipment?

4

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.

WEAPONS SYSTEMS SAFETY ANALYSIS AND
EVALUATION FACILITY (WSSAEF)
TAB B, SECTION II, DAHLGREN
PAGE 61A OF 90
UIC: N00178

WEAPONS SYSTEMS SAFETY ANALYSIS AND EVALUATION FACILITY

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

The entire WSSAEF could not be replaced with identical equipment since the VAX 8250 and microVAX computers are no longer being produced. In order to adequately replace the facility, approximately $1M would be required and a "down time" of at least three months would be necessary.

4. Provide the gross weight and cube of the facility/equipment.

The gross weight and cube for the WSSAEF are difficult to estimate since the system is highly distributed. Estimated parameters are:

7,000 pounds
20,000 cubic feet (including room volumes)

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

"Special" utility support required by the WSSAEF consists of eight (8) 120 V AC circuits with special twist-lock connectors.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

No special budget support is required for the WSSAEF.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

Environmental control requirements for the WSSAEF are limited to a conditioned environment to dissipate heat loads generated by the large computer systems and maintain the operating conditions within specified parameters.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The hardware requirements for the WSSAEF could be physically replicated or relocated to another site. However, such relocation would be fiscally difficult due to high

costs and down time. The loss of this facility would have serious negative impacts to the ability to conduct the inherently governmental responsibility for the analysis and evaluation of the safety of Navy combat systems. Along with systems analysis capabilities, the facility is the foundation for the Navy surface weapons safety "lessons learned" data. The loss of competent and capable system safety efforts can have significant impacts, ranging from program delays and system capability loss to potentially catastrophic personnel loss and injury.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The WSSAEF has evolved over a number of years. The initial pieces of VAX computer hardware were procured and installed in the 1986 timeframe, with additional equipment and software added on a continuing basis to the present.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

2.1 Gun Systems
2.2 Guided Missiles
2.8 Launchers
2.9 Fire Control
2.11 Weapons Fuzing
2.12 Weapons Propulsion
3.3 Surface
9.1 Navy Strategic Systems
11.2 Software
11.5 Materials and Processes
11.8 Design Automation

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

FY	# MY
89	2
90	2
91	8
92	17
93	17

#MY...Actual time as facility user.

12. Provide the projected utilization data out to FY1997.

FY	# MY
94	17
95	18
96	19
97	20

13. What is the approximate number of personnel used to operate the facility/equipment?

The approximate number of personnel required to operate the WSSAEF is 1.5. The technical capabilities of this facility are utilized by 17 personnel.

14. What is the approximate number of personnel needed to maintain the equipment?

The approximate number of personnel required to maintain the WSSAEF is 0.5 persons. Major maintenance is done under contract and is included in the figure given.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**System Technology Facility Complexes**

1. State the primary purpose(s) of the facility/equipment.

A. System Technology I Classified Complex: This facility complex consists of the System Control Lab (SCL) and the System Software Lab (SSL). These RF TEMPEST Shielded Classified STRONGROOM laboratories provide an environment for research and development at the combat systems or warfare areas level while moving toward a full ship environment for future surface ships. These two unique laboratories are interconnected via an RF shielded trunk providing secure data/hardware connectivity (Figure 1). The objective is to provide a facility where major systems up to total ship systems can be configured and evaluated. The SCL/SSL laboratories accommodate systems evaluation ranging from a simulated (mock-up) system to an "all-up" fully operational total ship system. Interface and integration with the AEGIS Computer Center (ACC) and Warbreaker can be provided.

B. System Technolgy II Open Complex. This facility complex consists of the System Development Lab (SDL), the Digital Technology Lab (DTL), the Fiber Optics Development Lab (FODL) and the Advanced Self Defense Combat System/Advanced Technology Demonstration Lab (ASDCS/ATD). The SDL laboratory is used for component and element level electronic and microprocessor systems research and development. The lab provides support tools and test equipment required for development and evaluation of "breadboard" hardware and software. In addition to general development/evaluation equipment, the lab is equipped to support both 8-bit and 16-bit microprocessors. The SDL also supports R&D of man-machine interface experiments, including Virtual Reality and Voice I/O. The DTL supports the Computer Open System Implementation Program (COSIP) by providing testbed and stations used for the evaluation of commercial off-the-shelf (COTS) hardware. These test stations aid in determining how well COTS hardware will meet naval requirements. The test facility also supports the test and evaluation of the Advanced Display System (ADS) which is the next generation tactical display. The DTL also supports a Local Area Network (LAN) testbed involving FDDI. This network has enabled research for AEGIS and other programs with issues over shipboard deployment of fiber based networks. Expansion of the fiber optic

research into the area of ATM is being done to examine the future needs of shipboard programs. The FODL Laboratory is used for research and development of fiber optic cable system components and design standards. It is also used for research and development of advanced concepts in optical switching and computing. The fiber optic component and standard development efforts support the implementation of surface warfare fiber optic systems. The laboratory contains a fiber optic analysis system for characterizing fibers as well as equipment to perform environmental tests on fiber optic components and evaluate connector fabrication procedures. The optical switching and computing efforts are aimed at meeting long-term emerging requirements. The laboratory is equipped with a precision optical bench and associated optical components to perform critical experiments on switching and computing. The ASDCS/ATD Lab is primarily used to support the development of the Advanced Self Defense Combat System (ASDCS) Advanced Technology Demonstration (ATD). The facility is equipped to support experimentation with advanced combat system architecture and control concepts.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

All facilities are fixed assets. Based on BRAC Definition, all facility equipment can be considered moveable.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

System Technology I Classified Complex:
Total Facility/Equipment Value = $17,837,600.00

System Technology II Open Complex:
Total Facility/Equipment Value = $8,500,000.00

4. Provide the gross weight and cube of the facility/equipment.

System Technology I Classified Complex:
Gross Equipment Weight = 150 ton
Total Facility Area = 33,000 cu.ft.

System Technology II Open Complex:
Gross Equipment Weight = 125 ton
Total Facility Area = 40,030 cu.ft

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

System Technology I Classified Complex:
400 Hz/100kva Power System, Deionized Chilled Water Computer Cooling System, 120/208v, 3ph, 60Hz, 400 amp service

System Technology II Open Complex:
400Hz/100kva Power System, De-ionized Chilled Water Computer Cooling System, 120/208v, 3 ph, 60Hz, 400 amp service.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

System Technology I Classified Complex:
RF TEMPEST Shielded STRONGROOMS, Raised Computer Floor, Intrusion Detection System, Video Monitored Remote Access Control System, under floor fire protection/extinguishing system

System Technology II Open Complex:
Raised Computer Floor, under floor fire protection/extinguishing system

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

70 deg F, 50% Hum, Computer Room Air Filtration System

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

SCL/SSL: Due to the TEMPEST shielding and power requirements this facility would be extremely difficult to replicate. This facility directly supports the High Performance Computing Initiative. This initiative is investigating advanced computer architectures and hardware for the AEGIS combat systems. The loss of this facility would effectively halt this effort and thereby significantly impact the ability of the AEGIS program to adopt new distributed architecture concepts. In addition, the loss of the facility would impact the development of advanced concepts in doctrine processing which support future AEGIS baselines. These capabilities could be significant to the ability of AEGIS to address emerging warfare requirements.

SDL/DTL: This facility is relocatable. These labs support several related efforts. The SDL primarily supports new special purpose hardware developments for programs such as UAV. The DTL supports the evaluation of emerging COTS equipment. The evaluations include addressing AEGIS requirements in terms of Local Area Networks as well as testing the applicability of various COTS equipment in a shipboard environment. The loss of this capability could affect the Navy's ability to rapidly address emerging technology requirements. This could effectively keep the Navy from making use of new COTS equipments and could therefore impact the affordability of future ship combatants. The inability to rapidly prototype new elements could have devastating effects on future ship capabilities and costs.

ASDCS/ATD: This facility is relocatable. This facility is used to support the development of the ASDCS. The ASDCS is an ATD to address ship performance capabilities in the littoral environment. The ATD is an important element of the quick reaction capabilities which are necessary for future combatants to operate in the littoral environment. The loss of this facility could effectively halt the further development of the ATD and therefore risk the development of a capable littoral solution for surface combatants.

FODL: This facility includes an optics bench for photonics experiments. This bench is rather large and difficult to initially setup. Due to the optics bench, this facility would be difficult to relocate. The facility primarily supports the evaluation of fiber optic components for shipboard use. This includes performing environmental and functional tests on the various components. The facility supports evaluation of components for AEGIS as well as other ship programs. The loss of this program could significantly impact the inclusion of fiber optic components in future AEGIS baselines as well as their inclusion in other shipboard programs. This would result in higher cost and less capable ship programs.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

SCL - Constructed on site 1983
SSL - Constructed on site 1987
SDL - Constructed on site 1987
DTL - Constructed on site 1984
FODL - Constructed on site 1987
ASDCS/ATD - Constructed on site 1993

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

SCL/SSL Labs (Classified):	**11.2 @ 75%, 3.3 @ 15%, 7.8 @ 10%**
SDL DTL Labs:	**SDL - 11.1 @ 50%, 11.2 @ 30%, 11.9 @ 20%**
	DTL - 3.3 @ 40%, 7.3 @ 30%, 11.3 @ 30%
FODL Lab:	**3.3 @ 20%, 7.3 @ 40%, 11.4 @ 20%, 11.3 @ 20%**
ASDCS/ATD Lab:	**11.2 @ 80%, 11.9 @ 20%**

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

SCL/SDL Labs (classified): Facility/equipment utilization has been continuous (100%) based on an average of 88 hours per week. (16 hrs/day Mon - Fri w/8 hrs Sat).

SDL/DTL Labs: Facility/equipment utilization has been continuous (100%) based on an average of 60 hours per week. (12 hrs/day Mon - Fri).

FODL Lab: Facility/equipment utilization has been continuous (100%) based on an average of 50 hours per week. (10 hrs/day Mon - Fri).

ASDCS/ATD Lab: ASDCS/ATD - Constructed 1993

12. Provide the projected utilization data out to FY1997.

SCL/SDL Labs (classified): Project continuous (100%) utilization based on an average of 88 hours per week thru FY1997. (16 hrs/day Mon - Fri).

SDL/DTL Labs: Project continuous (100%) utilization based on an average of 50 hours per week thru FY1997. (12 hrs/day Mon - Fri).

FODL Lab: Project continuous (100%) utilization based on an average of 50 hours per week thru FY1997. (10 hrs/day Mon - Fri).

ASDCS/ATD Lab: Project continuous (100%) utilization based on an average of 60 hours per week thru FY1997. (12 hrs/day Mon - Fri).

13. What is the approximate number of personnel used to operate the facility/equipment?

System Technology I Classified Complex - 65
System Technology II Open Complex - 63

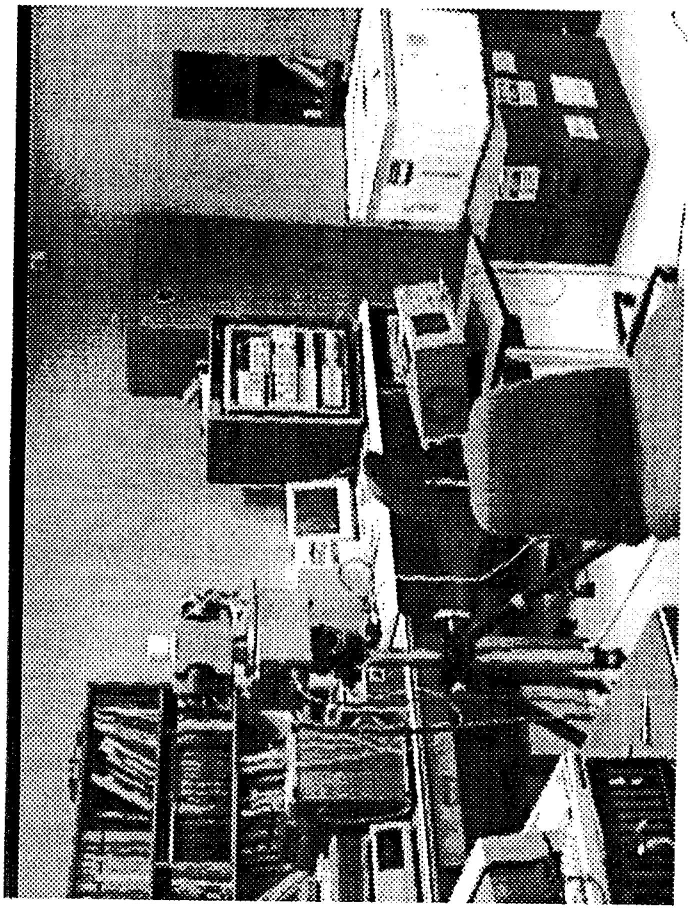
14. What is the approximate number of personnel needed to maintain the equipment?

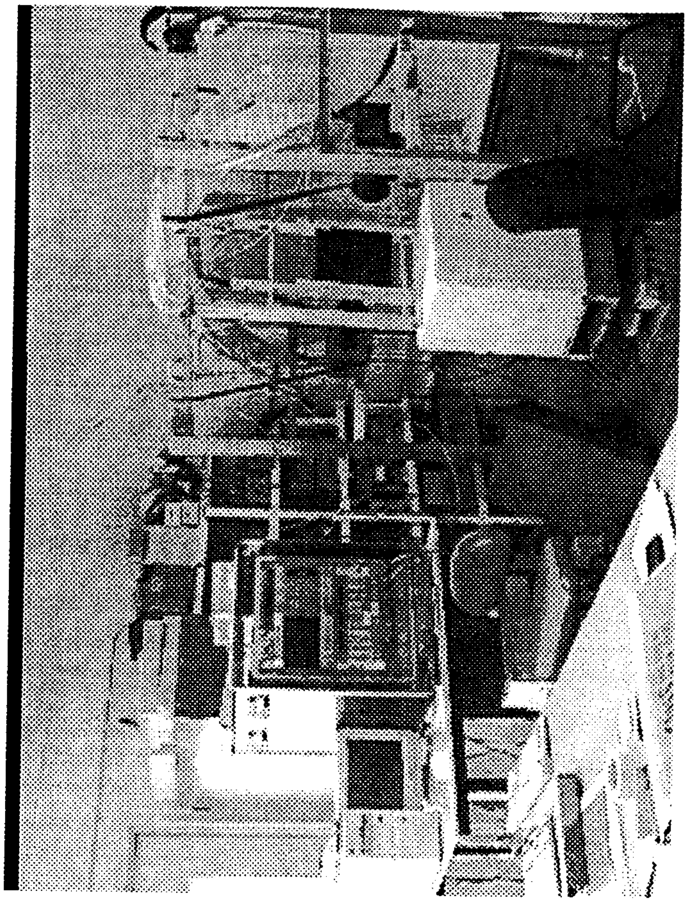
System Technology I Classified Complex - 10
System Technology II Open Complex - 13

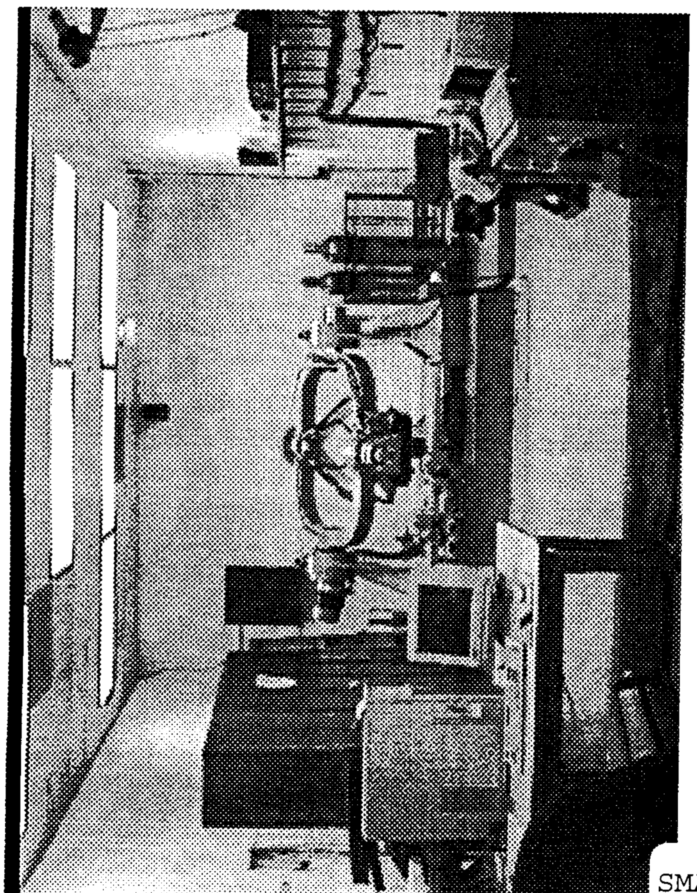
15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

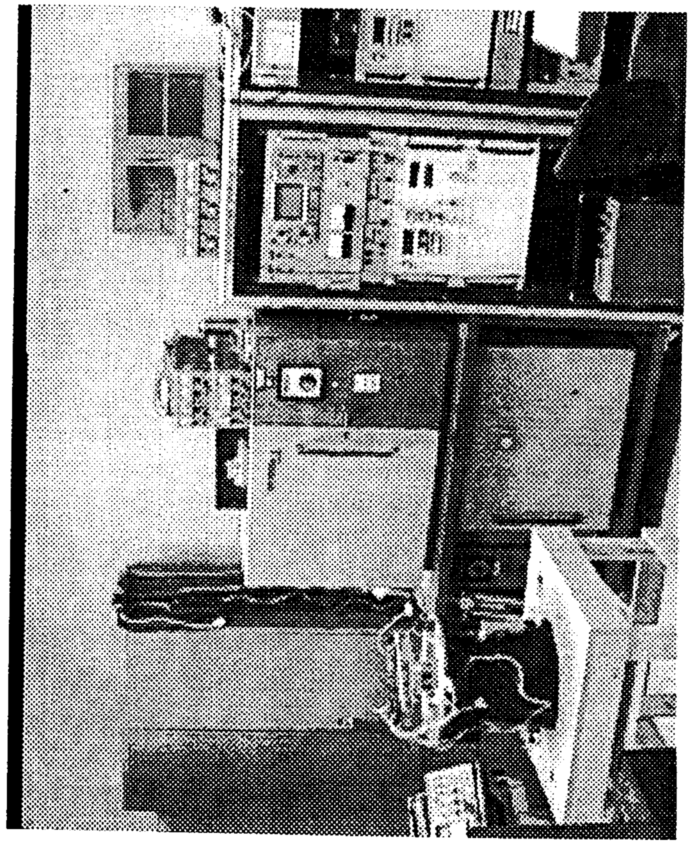
No photos available. Sketches (Figures 2 and 3)

Smart Munitions Development Laboratory

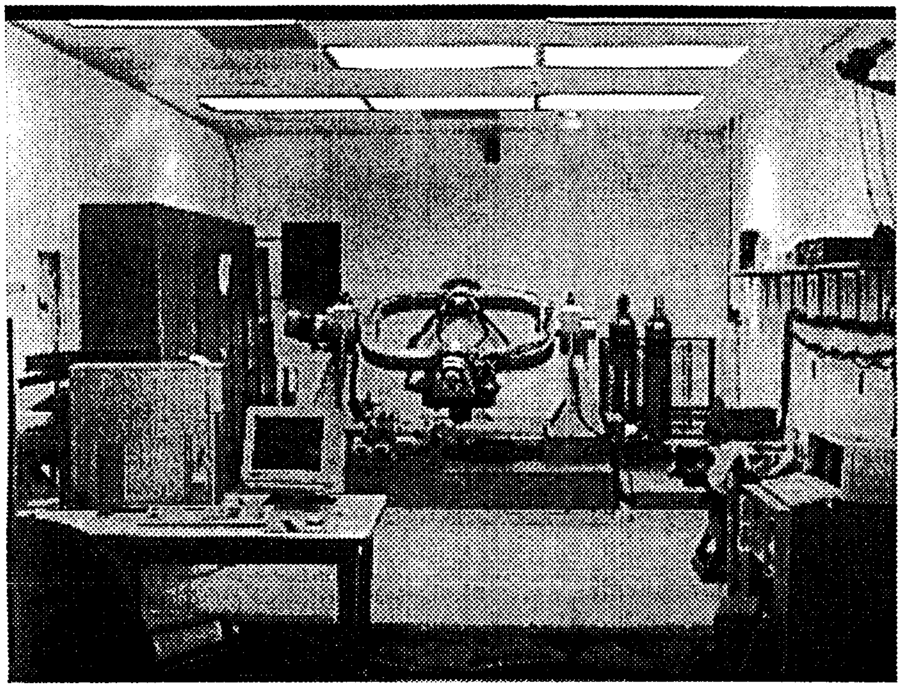


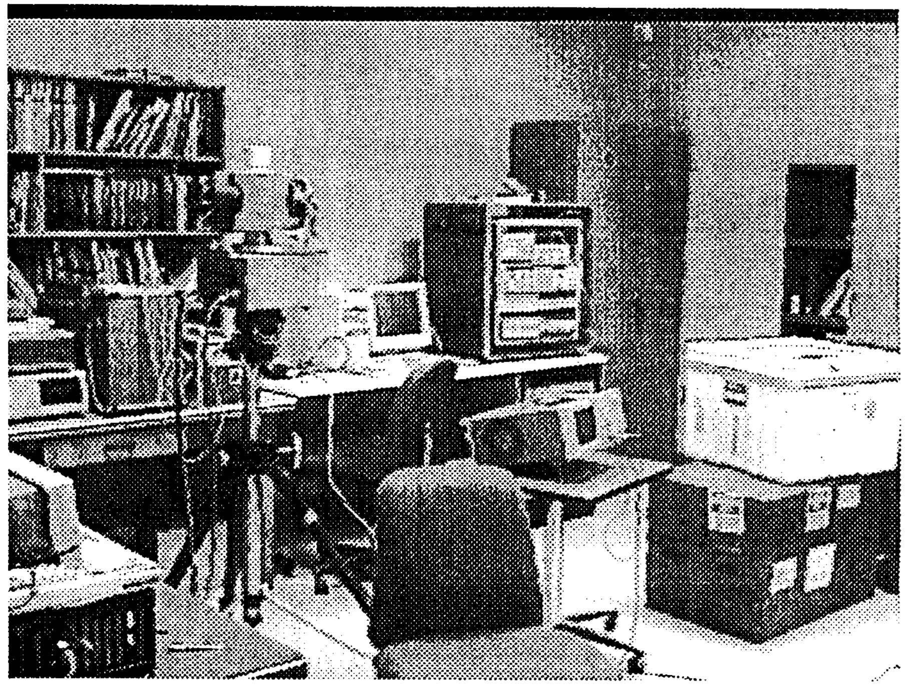


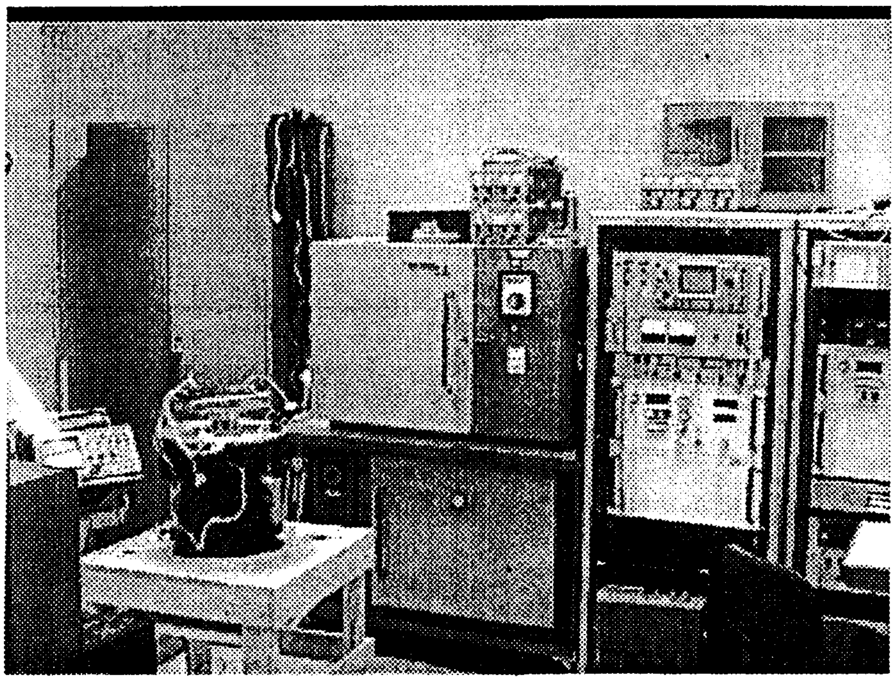


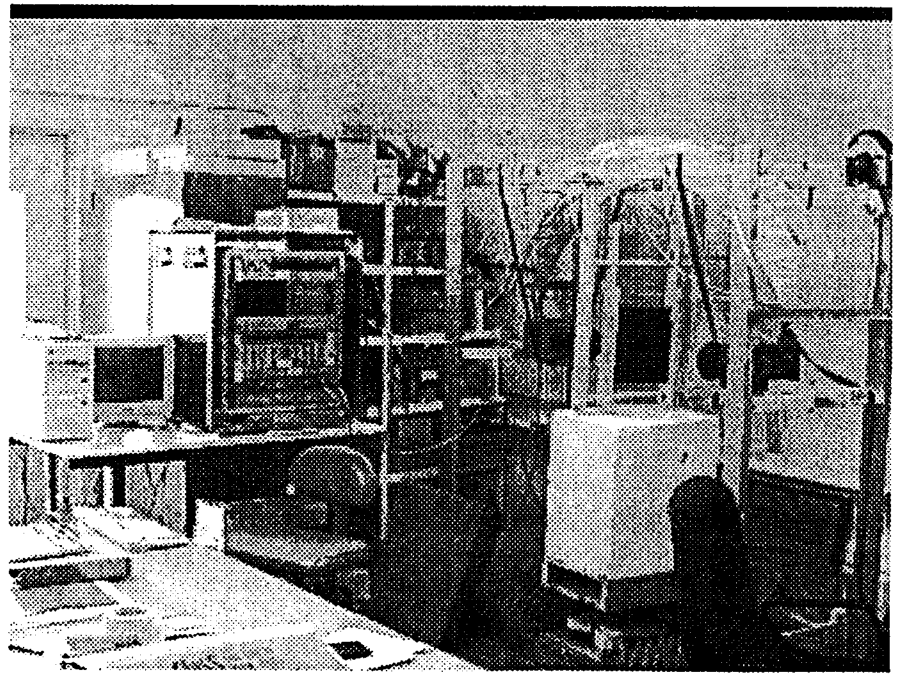


Smart Munitions Development Laboratory









SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Smart Munitions Development Laboratory**

1. State the primary purpose(s) of the facility/equipment.

The Smart Munitions Development Laboratory is located in Buildings 221, 462, and 150. This laboratory supports the development of guidance and control electronics for smart weapons and the development of advanced sensors for various Marine Corps 6.2/ 6.3A programs including the Advanced Sensor for Air Defense, the Forward Observer/Forward Air Controller, the Advanced Processors for Weapon Sensor Fusion and the Expendable Acoustic Remote Sensor (EARS). The facility is also used to support the Predator program (a shoulder-launcher anti-tank weapon) and the development of radar absorbent materials (RAM).

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The laboratory is fixed and the equipment is generally portable (class 3) with the exception of the 3 axes motion table which is only movable with extreme difficulty (class 2). The motion table requires a special constructed foundation, water cooling and a temperature controlled room.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

The equipment in this laboratory has an estimated replacement value of $3.8M.

4. Provide the gross weight and cube of the facility/equipment.

The gross weight and cube for facility/equipment is 25,000 lbs and 30,865 cubic feet.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

"Special" utility support includes 3/4 inch tap water feed, 4" drainage line, 3 phase 480 volt service at 100 amps per leg and a gas ventilation hood.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

Special budget requirements include $0.1M for the construction of a foundation and the installation of the special services shown above.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

Environmental controls would include positive air pressure control to reduce particulate contamination, temperature control to avoid overheating computing equipment, and a temperature controlled room for the motion table and its hydraulic pump.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The loss of this equipment would not allow the engineers and scientists to conduct their assigned mission to develop weapons and sensors to support the Navy's Naval Surface Fire Support Mission. While some of this equipment exists at other facilities or could be replicated at other facilities, locating this equipment at a remote site would make it extremely difficult and costly to construct prototypes, conduct tests or run simulations.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

Most of the equipment has been purchased and installed over the last 30 years.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1.3 Surface Ship
1.5 Ground Vehicles
2.1 Gun Systems

2.2 Guided Missiles
2.3 Free Fall Weapons and Rockets
2.8 Launchers
2.10 Weapons Data Links
2.11 Weapons Fuzing
2.13 Other Ordnance
4.2 Coastal/Special Warfare Support
5.2 Radar Systems
5. 3 Special Sensors
8.3 Electronic Warfare System
11.1 Computers
11.2 Software
11.4 Electronic Devices
11.9 Human-Systems Interfaces
11.10 Other Technology Base Programs

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

This facility is used almost continuously.

12. Provide the projected utilization data out to FY1997.

Projects are planning to use this facility continuously from now to FY97.

13. What is the approximate number of personnel used to operate the facility/equipment?

This facility is used by approximately 14 engineers/technicians.

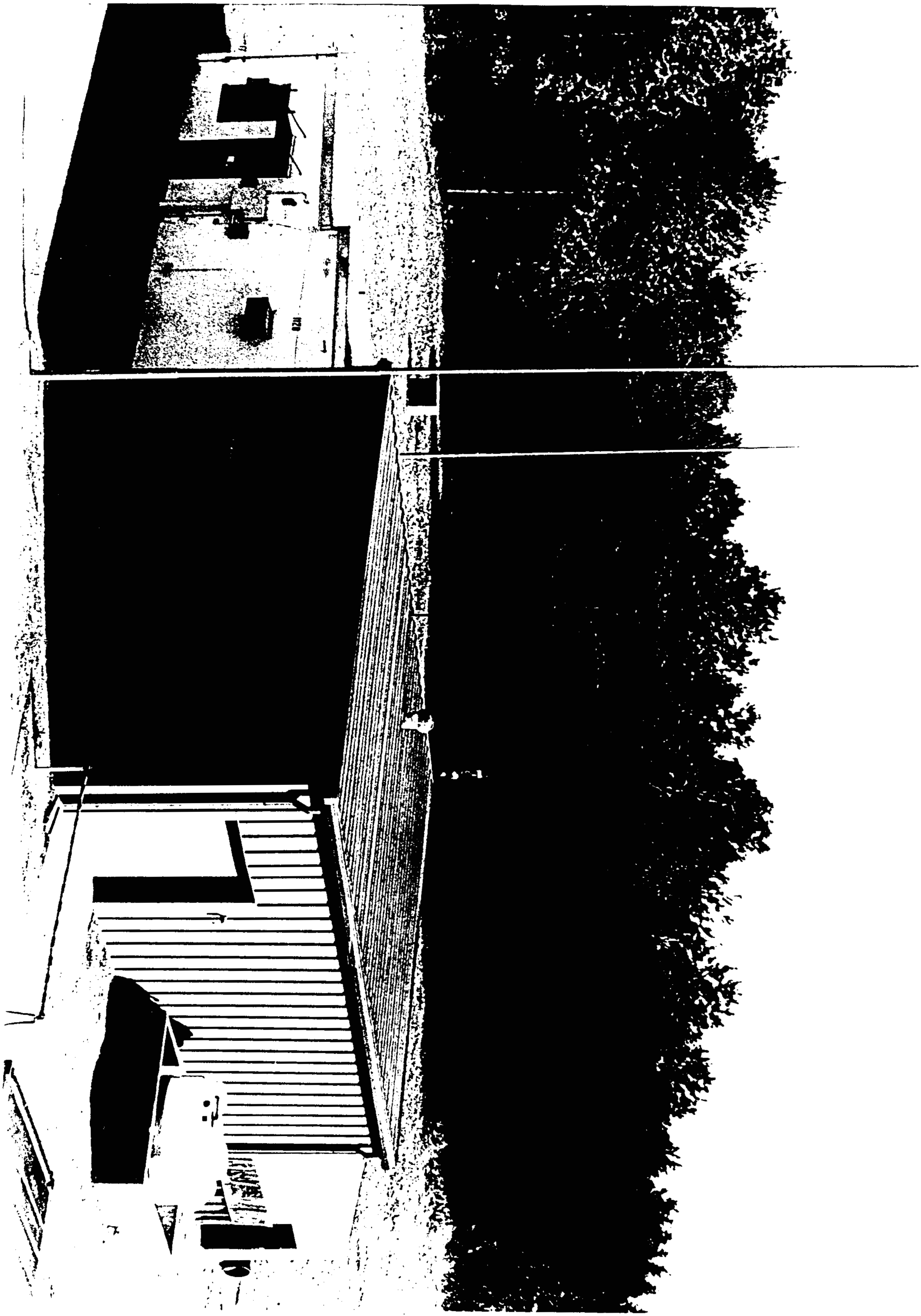
14. What is the approximate number of personnel needed to maintain the equipment?

No dedicated personnel are required to maintain the equipment. Maintenance, if required, is supplied from service support contracts.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.

PULSED POWER TECHNOLOGY COMPLEX
TAB B, SECTION II, DAHLGREN
PAGE 71A OF 90
UIC: N00178



SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Chem-Bio Sciences Complex**

1. State the primary purpose(s) of the facility/equipment.

The purpose of this complex is basic research in the particular fields of biological science that support molecular computing and research into effects of chemicals on various materials. Ths complex includes state-of-the-art science labs: Molecular and Cellular Biology Lab, Molecular Computing Spectroscopy and Photonics Lab, Chem-Bio Instrumentation and Thermal Analysis Labs, and general chemistry labs.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The equipment in the sciences complex has been installed and fixed in place with attendant building modification such as fume hood vents, special gas lines, etc. Like any laboratory equipment, the equipment could be moved at great expense and reinstallation/building modifications.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

The replacement value of the equipment within the complex exclusive of building/utility costs is $1.5M.

4. Provide the gross weight and cube of the facility/equipment.

The cube of the complex is 57,000 cu.ft. Weight of equipment is estimated to be 40,000 lbs.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

No special utility support tequired other than chilled water for lasers and copious amounts of conditioned air from the toxic analysis facility.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

None.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

Facility requires special temperature and humidity control. Laser equipment requires chilled water.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The equipment can be relocated to another site at considerable expense due to laboratory nature of equipment. Loss of the facility and equipment would result in loss of the Navy's reserach efforts in defense of new toxic agents; loss of the only research efforts in the field of molecular computing, and the generic chemistry facilities required to support Navy CBW defense technology efforts.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

Facility equipment was transported to the site by contractors and installed by contractors and NSWCDD personnel. Facility equipment upgrading has been robust over the years with the recent addition of state-of-the-art biotechnology capability.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1.2 Aircraft
4.2 Coastal/Special Warfare Support
5.3 Special Sensors

10.6.3 Surface Ship
11.1 Computers

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

The facility has been in daily use (8 hours per day) for the last five fiscal years. The new molecular biology portion of the complex came online in July 1993 and has been utilized in excess of 10 hours per day.

12. Provide the projected utilization data out to FY1997.

Project utilization of the facility should remain 50 hours per week over the next three years.

13. What is the approximate number of personnel used to operate the facility/equipment?

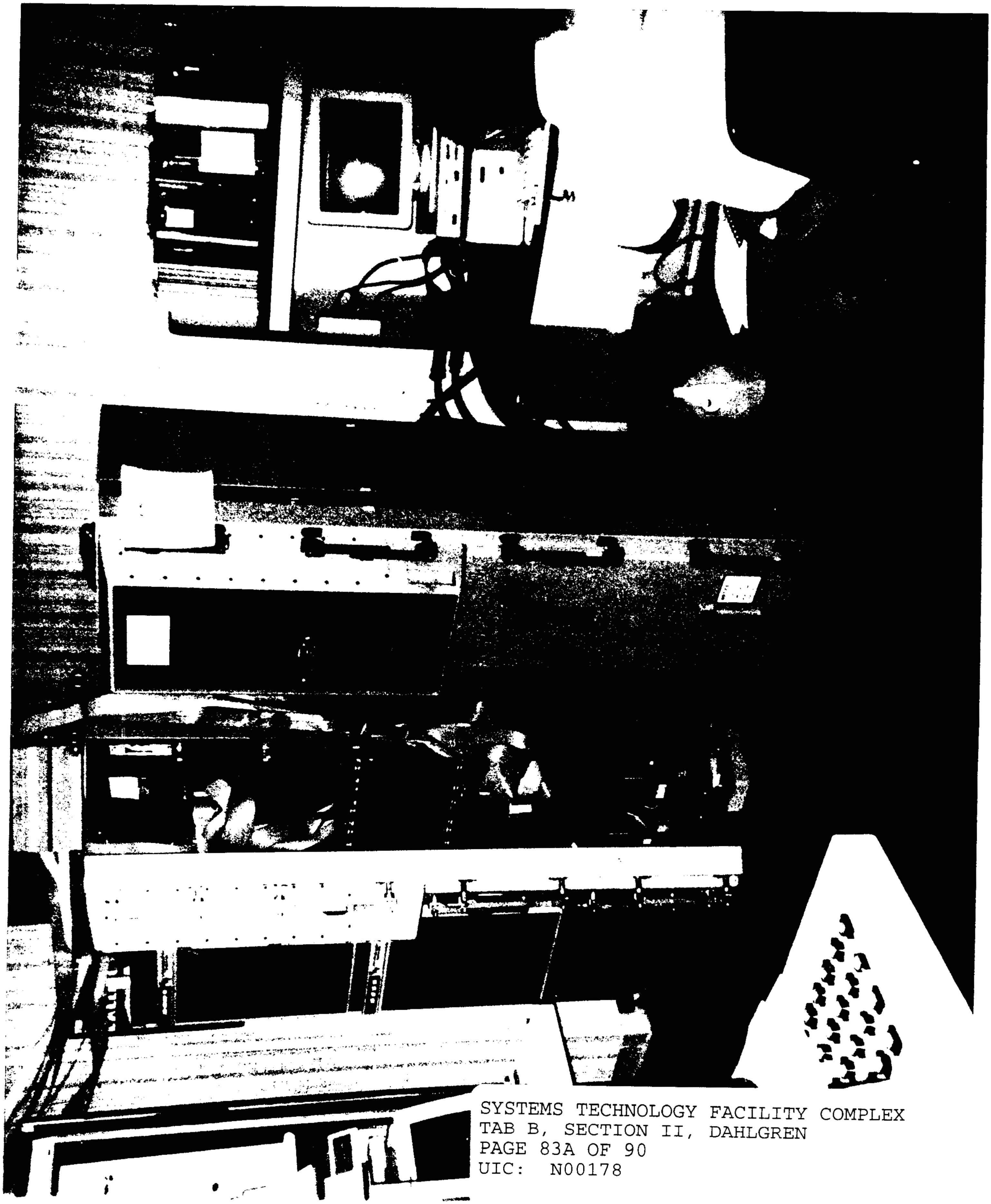
Six people use the complex on a daily basis.

14. What is the approximate number of personnel needed to maintain the equipment?

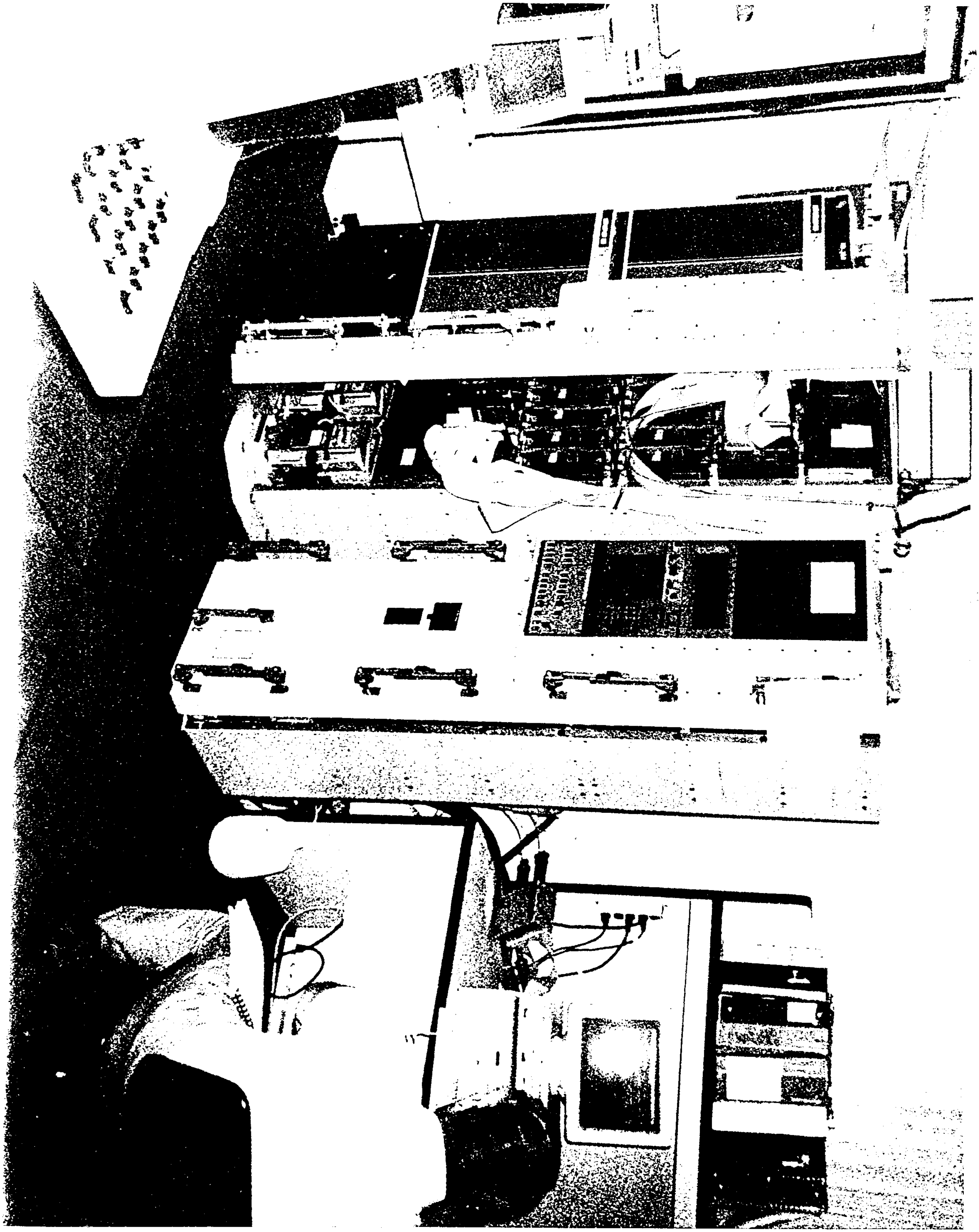
No dedicated support personnel are required to maintain the complex's equipment. By the very nature of the work, the personnel utilizing the equipment are highly skilled chemists/biologists/geneticists at the PhD level.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.



SYSTEMS TECHNOLOGY FACILITY COMPLEX
TAB B, SECTION II, DAHLGREN
PAGE 83A OF 90
UIC: N00178



SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Facility/Equipment Nomenclature or Title	**Visualization/Computational Statistics Laboratory**

1. State the primary purpose(s) of the facility/equipment.

The Visualization/Computational Statistics Laboratory supports the Scientific Visualization (SCIVIS), Virtual Reality (VR), and Computational Statistics efforts for investigating and utilizing VR technology as it applies to solving problems relating to Navy surface warfare activities. This lab supports basic real time animated visualizations with a video recording capability and low end stereo viewing. Beacause no single technology will solve all the problems, three fundamental advanced technologies are supported: CAVE concept, Head Mounted Display, and the stereo Boom technology.

It also enables investigation and contributions in areas such as: mission planning, multi-sensor data fusion, wargaming, abstract modeling, object/object interaction, analysis of complex systems, training, image segmentation, and pattern recognition.

The programs that support this facility are broad based. Realistic training, component interaction analysis, console development, product improvement, and affordable situational analysis.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The facilities/equipment are primarily considered "fixed" in that they are condsidered integral to the facility that houses them.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

Facility: $300K
Facility/Equipment: $2,550K

4. Provide the gross weight and cube of the facility/equipment.

Gross Weight: 3500 lbs
Cubic Feet: 1513

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

Electrical: High performance computing equipment used in the control rooms and software development cells require 20 amp 120 volt dedicated circuits (i.e., one plus per circuit breaker). In addition to the dedicated circuits, multiple general 15/20 amp 120 volt outlets are also required.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

The ceiling in the viewing room is required to support an overhead projector weighing approximately 100 pounds. The ceilings in the isolation rooms require suspension of 50 to 100 pound objects. The floor of the isolation room requires support capability of equipment with laods of 20 to 30 pounds per square foot. The facility requires wiring for a local subnet with connection of this subnet to the Division's NSWCNET. Capability for a second, secure computer network is required. Phones are required in the software development cells and control rooms. All windows in the walls of the isolation room require safety glass in case the test subject accidentally impacts the glass. The padded walls are required in the isolation room to avoid injury if the test subject impacts the walls.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

HVAC: HVAC demands vary from room to room in the facility, therefore, individual room controls are required. In the control rooms and software development cells, year round air conditioning is required in addition to winter heating (some rooms with large computer heat loads may require air conditioning in the winter while other rooms with no computers will require heating--the configuration of each room will change on a continuing basis). The viewing rooms, isolation rooms, etc. require normal HVAC. The airflow in the large software development area is impeded due to six foot high isolation screens, thus ceiling HVAC distribution is desirable.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

Considering the special requirements, this facility would be difficult to replicate or relocate at another site. If this facility/equipment were lost to the Department of the Navy, the ability to support the following programs and sponsors would be lost: Standard Missile, Terminal Defense Round, Close-In Weapon System, Target Vulnerabilty, JTCG/Me, Ship Self Defense, AEGIS, SLWT, Block Program, TOMAHAWK, Coastal Systems, IR/IED, ONR, NAVWAC, Seed/Venture. Basic real time animated visualizations capability would be lost. Capablity to investigate and contribute in areas such as: mission planning, multi-senor data fusion, wargaming, abstract modeling, object/object interaction, analysis of complex systems, training, image segmentation, and pattern recognition would be lost. Centralized use of three fundamental advanced technologies in the realm of SciVis/VR (CAVE concept, HMD technologies, and stereo Boom technology) would be lost. Allffo these technologies have the potential of solving various problems existing in the Navy. With ever shirinking budgets, it is reasonable to concentrate efforts in exploring these technologies in a centralized lab environment.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

Ongoing, evolutionary process since 1987.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

11.2 Software

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

7 MY per year

12. Provide the projected utilization data out to FY1997.

9 - 10 MY per year

13. What is the approximate number of personnel used to operate the facility/equipment?

7

14. What is the approximate number of personnel needed to maintain the equipment?

No support personnel required. Maintenance provided by basewide contract.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.

TAB B

SECTION II

WHITE OAK SITE

SPECIAL FACILITIES/EQUIPMENTS

TAB B SECTION II WHITE OAK

INDEX TO WHITE OAK SPECIAL FACILITIES/EQUIPMENT

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**White Oak Site**
Facility/Equipment Nomenclature or Title	**MBE Laboratory**

1. State the primary purpose(s) of the facility/equipment.

R&T on semiconductors electronic and photon devices for systems application.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The facility is a Class 2 Installed equipment requiring special utility support and component assembly. It is moveable but with significant costs to move. It will be moved to Dahlgren due to BRAC 93.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

Replacement Value: $2M for equipment, $0.8M for building and utilities.

4. Provide the gross weight and cube of the facility/equipment.

Total Weight: 30,000 lb; Volume: 15,000 cu.ft.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

(a) Recirculating de-ionized water system, chilled at inlet temperature lower than 45F and flow rate of 20 GPM

(b) 208 V electrical supply.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

A Class 10,000 Clean room of min dimension 25'x30'x9' on a reinforced concrete

slab.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

Room listed in Item 6 above requires 24 hour temperature (72F) and humidity (45% RD) control.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The facility is extremely difficult to replicate since it is a dedicated system for a specific technological program. Replicating its use in another government or industrial institution would require a redirection of their technical programs.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The facility/equipment requires dissemble/re-assembly, packing/unpacking, and transportation by the equipment manufacturer. Fully operational since 1992.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

5.3 Special Sensors
8.3 Electronic Warfare (EW) Systems
11.4 Electronic Devices
11.5 Materials and Processes

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

Utilization average since 1992 (when facility became fully functional):

60% for Functional support areas 11.4 and 11.5.
10% for Functional support areas 5.3 and 8.3.
30% equipment service time.

12. Provide the projected utilization data out to FY1997.

Projected utilization:

60% for support areas 11.4 and 11.5.
10% for support areas 5.3 and 8.3.
30% equipment service time.

13. What is the approximate number of personnel used to operate the facility/equipment?

5

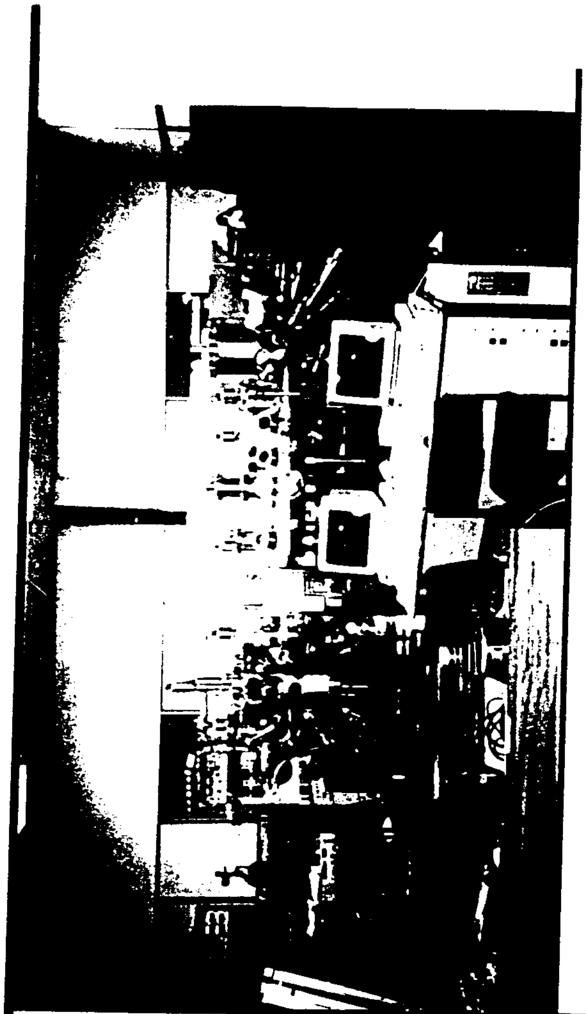
14. What is the approximate number of personnel needed to maintain the equipment?

2

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.

MBE FACILITY



MBE LABORATORY
TAB B, SECTION II, WHITE OAK
PAGE 3A OF 72
UIC: N60921

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**White Oak Site**
Facility/Equipment Nomenclature or Title	**Magnetic Silencing Complex**

1. State the primary purpose(s) of the facility/equipment.

The Magnetic Silencing Complex at White Oak consists of three complementary magnetic test facilities: Magnetic Ship Models Laboratory (B206), Magnetic Structures Test Facility (B203), and the Long Coil Facility (B204). Each facility is constructed of non-magnetic materials and has the ability to modify the magnetic environment by an integral three axis coil system. This complex is used to conduct magnetic research in the areas of Magnetic Silencing, magnetic sensor development, and weapons development. B203 and B206 have large coil systems which are an integral part of the facilities. The coil systems are roughly 35 feet on a side. B206 has a physical model track on which we develop magnetic silencing processes and procedures. We have approximately 50 magnetic models which include the DD963, TRIDENT, SSN21, DDG51 and are planning to build a model of the LPD-17. (See attached sketches and pictures to obtain a better understanding of the Magnetic Silencing Complex).

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

This complex is fixed because the coil systems that are essential to the conduct of the research are integral to the buildings. In addition, the siting of these facilities is critical because they must be located in an area of low magnetic gradient and relatively free of magnetic disturbances (e.g., can not be located in an industrial environment). This is one of the unique facilities that will remain at White Oak after BRAC 93 is implemented.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

There could be two approaches taken to replace these facilities--reconstruct them or try to incorporate the capabilities of these facilities at an existing facility. Estimated replacement costs are the following:

a. Completely replicate the capabilities - $30M.

b. Build one new facility and eliminate the existing capability to perform more than one test simultaneously - $15-20M.

c. Enhance the capabilities of existing facilities without the construction of a new facility - $2 to $10M (see paragraph 8).

4. Provide the gross weight and cube of the facility/equipment.

Internal Equipment (Test Equipment - does not include coils):

Bldg 206 - 150 cu.ft. and 4,000 lbs
Bldg 203 - 150 cu.ft. and 4,000 lbs
Bldg 204 - 100 cu.ft. and 2,500 lbs

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

No special utility support required.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

The siting of these facilities is critical because they must be located in an area of low magnetic gradient and relatively free of magnetic disturbances (e.g., cannot be located in an industrial environment). The facilities should be constructed out of non-ferrous and non-conductive materials. In addition, the facilities must be located in an area which would have restricted access during testing and have a "magnetic-free" zone approximately 1800-feet in diameter.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

The facilities must be temperature and humidity controlled.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

All the capabilities of our facilities will be difficult (expensive) to replicate at another site because our facilities' capabilities are unique within the U.S. (government and private). The risk of moving these facilities is that the replacement facilities may not achieve the current performance due to technical and/or funding limitations and if the capabilities are moved, there is a high likelihood that the number of magnetic test facilities would be reduced which would effect our capability to conduct simultaneous experiments. The loss of these facilities would currently impact Navy R&D programs through FY99.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

This complex was functional in 1943 at its current location which at the time was where the Naval Ordnance Laboratory (now NSWCDD/White Oak Detachment) would be constructed in 1946. This complex was located at this site because of the low magnetic gradient environment. The basic structure and coil systems have not been changed since they were constructed but there have been continual improvements to the facility measurement equipment as the technology has improved.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

2.5 Mines
5.5 Ocean Surveillance
8.2 Countermeasures (CM)
11.10 Other Technology Base Programs

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

FY	BLDG 204	BLDG 206	BLDG 203
1989	10%	100%	50%
1990	10%	90%	50%
1991	75%	85%	60%
1992	100%	100%	80%
1993	100%	100%	100%

12. Provide the projected utilization data out to FY1997.

FY	BLDG 204	BLDG 206	BLDG 203
1994	100%	100%	80%
1995	100%	75%	80%

1996	**75%**	**80%**	**80%**
1997	**75%**	**80%**	**80%**

13. What is the approximate number of personnel used to operate the facility/equipment?

Personnel required to operate the current facilities at White Oak: 4 (2 technicians/2 engineers)

These numbers are typical and are based upon an assumption that these are the only personnel at the site familiar with the facilities. There are times when additional personnel would be required to assist in test conduct.

14. What is the approximate number of personnel needed to maintain the equipment?

Personnel required to maintain the facilities: Maintain - 2 (1 engineer/1 technician)

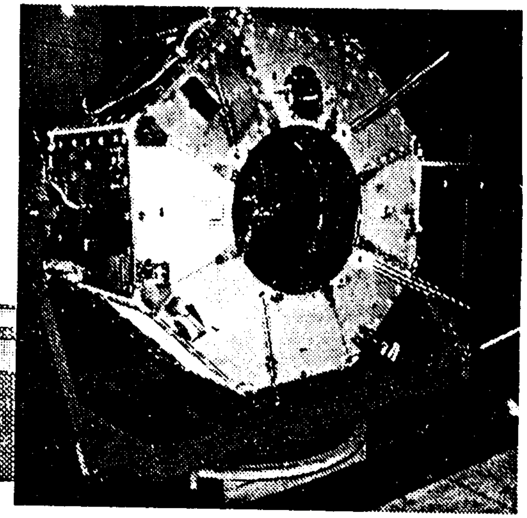
These numbers are based upon an assumption that these are the only personnel at the site familiar with the facilities.

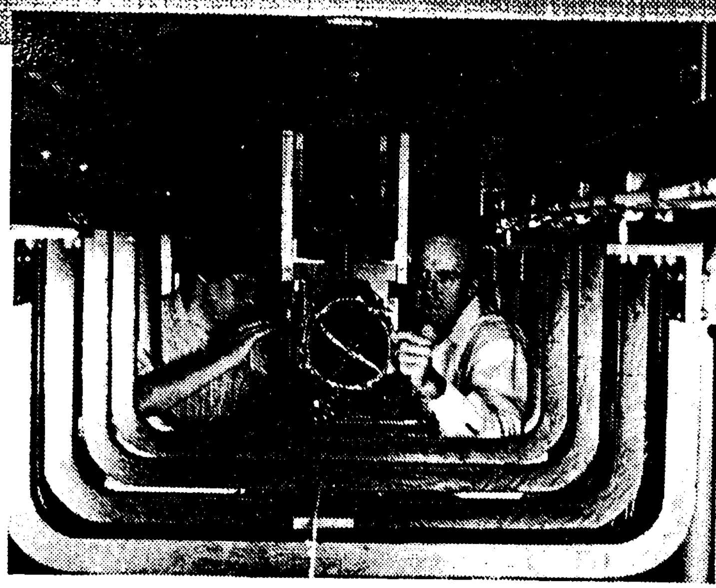
15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

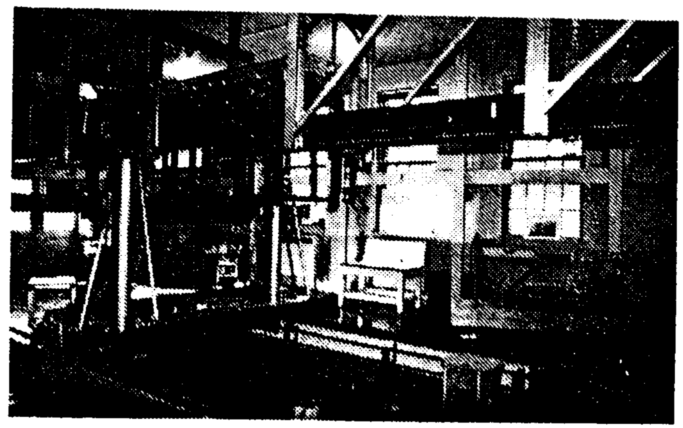
See attached photograph.

MAGNETIC SILENCING COMPLEX

BUILDINGS 202, 203, 204, 206, 210







SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**White Oak Site**
Facility/Equipment Nomenclature or Title	**Nuclear Weapons Radiation Effects Complex**

1. State the primary purpose(s) of the facility/equipment.

The Navy's core technical capability in and survivability against Nuclear Weapon Effects (NWE), with particular emphasis on radiation effects, is located at NSWCDD/White Oak Detachment. The Navy has designated NSWCDD as the lead activity for defense against NWE, and is the primary, unique, in-house core technical capability in nuclear effects expertise (over 200 man-years), survivability, hardening, R&D, T&E, validation, and state-of-the-art effects simulation. This capability supports and is funded by the Navy, DoD, DNA, other government agencies, and contractors in defining readiness, vulnerabilities, hardening equipment, and program office "smart-buyer" acquisition of survivable systems, both ours and foreign. This is the majority of Navy effort in these areas.

Major facilities include some of the world's largest nuclear weapons radiation effects simulators operating with the latest spectral, test environment, and effects capabilities. Facilities include a complete range and spectrum of unique flash x-ray, gamma ray, pulsed electron beam, and pulse injection machines and the recognized expertise to develop, improve, operate, maintain, and analyze both the simulation fidelity and experimental test data. The Defense Nuclear Agency (DNA) (which is the NWE Reliance lead) is currently consolidating more of the DoD nuclear hardening R&D within the White Oak complex, and acknowledges that under Reliance, capabilities should be retained in-house in order to meet the needs and requirements of all Services.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The major facilities are sufficiently large and integral to the buildings which house them that major demolition and construction would be required to relocate them, and therefore should be considered "fixed". Since most of the large technical items are steel, in

principle they could be cut up, transported and then welded back together, although this would be a major undertaking. This is one of the unique facilities which will remain at White Oak after BRAC 93 is implemented.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

The cost to move the facility complex, including dismantling, packing, shipping, unpacking, and getting the facilities operational again is estimated to be $25M excluding new site construction. The special building(s) required with the special utilities, seismic pier, support, environmental, and safety items is estimated to be $12M to $15M.

4. Provide the gross weight and cube of the facility/equipment.

The gross weight of the facilities equipment which could be moved is estimated to be 2200 tons. This does not include the weight of facilities/equipments which must be demolished and/or reconstructed at the new site.

The estimated cube of the facility complex is 1,600,000 cubic feet.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

The following are several facility required special utilities/equipments:

(a) An 85 foot span bridge crane with a minimum clear lift height of 35 feet and a minimum capacity of 20 tons.

(b) A moveable 10 foot lifting capability with a capacity of 80 tons.

(c) A below main floor storage capacity for 220,000 gallons of transformer oil. Requires continuous oil filtering, coalescer, transfer pumps and plumbing.

(d) Main de-ionized water storage of 48,000 gallons with transfer pumps and plumbing. Requires continuous de-ionizer, carbon filter, and de-aeration to maintain 18 meg-ohm-cm resistance.

(e) Secondary de-ionized water storage of 20,000 gallons, with de-ionizer, carbon filtering, and de-aeration to maintain 18 meg-ohm-cm resistance.

(f) Oil/water separator.

(g) Water chillers with circulation pumps to cool water, cool equipment such as diffusion vacuum pumps.

(h) Special fire detections, alarm, and extinguishing systems for main oil use areas and for shielded data acquisition rooms.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

The following are several special budget design characteristics required of the facility:

(a) High density, low radiation concrete to be used for shielding construction of approximately 3 foot concrete shielding walls, moveable shielding, and roof shielding.

(b) High floor loading design of high bay floor areas.

(c) Very heavy foundations/sub-flooring to support machines and heavy radiation shielding (environmentally sealed and approximately 6 feet thick).

(d) Facility location specially selected to enable construction of a seismic pier located in the middle of the main blockhouses for the main facilities.

(e) Construction of a special seismic pier.

(f) Three large radio frequency (rf) and radiation shielded blockhouses (largest approximately by 25x42 feet and 22 feet high) each containing a 5 ton full span bridge crane.

(g) Special below grade copper grounding/shielding connected into special grounding system.

(h) Counterpoised ground plane and low resistance ground rods driven approximately 20 feet into earth below each simulator and data acquisition location, with provision for ground rod watering.

(i) Building framing all electrically interconnected and grounded.

(j) Below floor large instrumentation conduits with rf shielding removable connections to radio frequency shield rooms.

(k) Four rf shielded control and data acquisition rooms.

(l) Special environmental trenching system internal to building around perimeter to transfer oil spills to oil spill containment areas.

(m) Custom heavy duty grating covers over trenching to allow heavy materials handling on trenching.

(n) Oil spill containment area located below main floor area and sealed to handle 200,000 gallon oil spill combined with a 70,000 gallon water/oil mix spill.

(o) Sub-basement environmentally sealed to prevent ground water contamination with oil from building leaks.

(p) Class 100 clean room with temperature and humidity control.

(q) Special absolute filtering capable of drawing negative pressure on blockhouses.

(r) Venting capability for machines spark gaps and hardware (e.g, sulfur hexasulfied, fluorine, etc.).

(s) 440 VAC electrical service.

(t) Instrumentation power isolation using special motor generator set and isolation transformers.

(u) Three radiation shielded rooms approximately 17x30 feet, with adjacent rf shielded room approximately 12x30, interconnected with below floor shielded instrumentation conduits or trenches.

(v) Special access control and warning systems (lights, signs, horns, announcing, etc. systems) on buildings, high bay areas, and each radiation simulator for radiation safety.

(w) Security vaults capable of storing large classified test objects.

(x) Decontamination shower and eyewash facilities.

(y) Special carriage tracking on floors for machine maintenance movement.

(z) Machine and contoured large steel shielding plates 12 inches thick.

(aa) Accommodations for temporarily housing two large instrumentation trailers adjacent to main blockhouses.

(ab) Capability of moving 16 foot diameter test objects into main blockhouse using internal building capabilities and moveable portions of blockhouses.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

The following are several special environmental control requirements for the facility:

(a) Humidity control for high voltage (multiple mega-volt) machines.

(b) Temperature control for machines, surroundings, and their fluids.

(c) Air scrubbing for clean room input.

(d) Special environmental containments for radiation, oil, and hazmats.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

NSWCDD/White Oak is designated as the Navy's lead R&D laboratory for nuclear weapon effects (NWE). The White Oak Facility has a core of experienced, capable people working on nuclear weapons radiation effects, simulation, nuclear hardening design, analysis, testing, evaluation, facility improvement, instrumentation, diagnostics and computer analysis. Many of these are unique to the Navy and its warfare and communication systems. Currently no other Navy activities have significant efforts in these areas.

The White Oak Facilities are the Navy's only major capability to support defense against nuclear weapons radiation effects. If this capability is not retained, the Navy loses its expertise in NWE and integrated nuclear survivability of components through systems. The DoD Services will also lose the large majority of its government expertise in x-ray and gamma-ray simulation, testing, and evaluation, since these facilities are the lead Project Reliance x-ray test facilities.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The facility complex was specially designed and constructed mostly on-site to house radiation effects simulators. A number of nuclear effects simulators and major facility modifications have been constructed with most construction on-site, and some parts transported to site. Most of the special utility support (item 5) and special budget requirements (item 6) were designed into the facility complex and constructed on-site.

Some were added/modified later. Most of the large facility items have been constructed on-site. Some of the large steel machined items were transported to this site from large steel fabricators as special oversize, overweight objects since they could not be machined on-site. Also, some of the large holding tanks were transported to site as special oversize objects.

The original facility/equipment constructed in the 1970s was extensively modified and the simulation capability was mostly replaced with a wider range and larger capability in the mid-1980s. A major new capability for generating a plasma radiation source was initiated in 1992/93 and is currently being developed and coming on-line this year.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

The main functional area is 9.2, Nuclear Weapons and Effects; with development, evaluation, and testing of equipments and systems primarily in areas:

1.1 Undersea
1.2 Aircraft
1.3 Surface Ship
1.4 Space Satellites
1.5 Ground Vehicles
2.1 Gun Systems
2.2 Guided Missiles
2.3 Free Fall Weapons and Rockets
2.4 Torpedoes
2.5 Mines
2.6 Directed Energy Systems
2.7 Explosives
2.8 Launchers
2.9 Fire Control
2.10 Weapons Data Link
2.11 Weapons Fuzing

2.12 Weapons Propulsion
2.13 Other Ordnance
2.14 Explosive Ordnance Disposal
5.1 Sonar Systems
5.2 Radar Systems
5.3 Special Sensors
5.4 Space Sensor/Surveillance Systems
5.5 Ocean Surveillance
6.1 Submarine Navigation Systems
6.2 Aircraft Navigation Systems
6.3 Surface Ship Navigation Systems
6.4 Weapons Navigation systems
6.5 Satellite Navigation Systems
7.1 Submarine
7.2 Airborne
7.3 Shipboard
7.4 Landed-Based
7.5 Space Communications Systems
7.6 Non-Tactical Data Systems
7.7 Air Traffic Control systems
7.8 Intelligence Information Systems
8.1 Ballistic Missile Defense
8.2 Countermeasures (CM)
8.3 Electronic Warfare System
9.1 Navy Strategic Systems
11.4 Electronic Devices

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

The facility complex is primarily used for development, evaluation, and testing. The historical utilization average for the facility complex has ranged from approximately 65% to 80%. Utilization is the percent of facility use days compared to available use days. The historical mix of time for the facility is approximately 20-30% maintenance, 50-60% development, and 20-30% test and evaluation.

12. Provide the projected utilization data out to FY1997.

The projected utilization average out to FY1997 is 65% to 85%. Estimated mix of

time for the facility is approximately 20-30% maintenance, 50-60% development, and 20-30% test and evaluation .

13. What is the approximate number of personnel used to operate the facility/equipment?

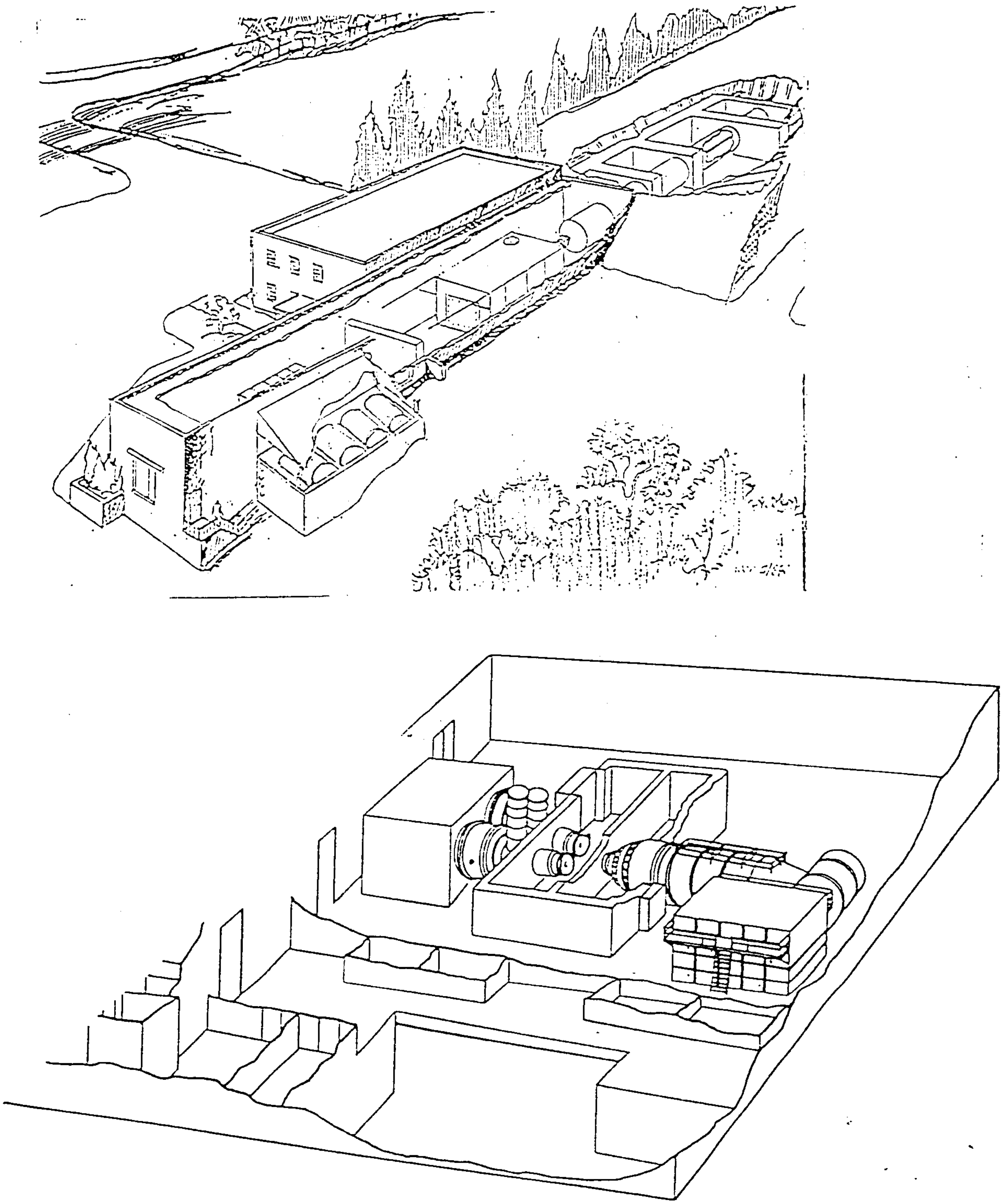
The operation and maintenance of the facility/equipment complex requires a large number of specialized skills and technical disciplines, and is therefore matrixed over approximately 24 individuals. Approximately 9 - 11 manyears of government personnel and 4-8 manyears of contractor personnel are used. The operation and maintenance tasks are integrated and matrixed with the same personnel. This does not include normal building operation and maintenance (e.g., heating, lighting, plumbing, etc.).

14. What is the approximate number of personnel needed to maintain the equipment?

The operation and maintenance of the facility/equipment complex requires a large number of specialized skills and technical disciplines, and is therefore matrixed over approximately 24 individuals. Approximately 9-11 manyears of government personnel and 4-8 manyears of contractor personnel are used. The operation and maintenance tasks are integrated and matrixed with the same personnel. This does not include normal building operation and maintenance (e.g., heating, lighting, plumbing, etc.).

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.



NSWC WHITE OAK NUCLEAR EFFECTS
AND DIRECTED ENERGY FACILITY COMPLEX

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**White Oak Site**
Facility/Equipment Nomenclature or Title	**Advanced Weapons Materials Complex**

1. State the primary purpose(s) of the facility/equipment.

The Advanced Weapons Materials Complex is used to conduct full spectrum RDT&E from basic research through Fleet support in advanced materials for application to ordnance and weapons systems. The RDT&E performed is directed particularly towards the creation, characterization, evaluation, and demonstration of new and improved materials possessing physical and chemical properties capable of high performance and of operating in harsh environments required of advanced Naval weapon systems. The area of S&T emphasis is placed on various core technologies such as advanced ceramics for radomes and high temperature applications; carbon-carbon composites and graphite for re-entry nosetips and rocket nozzles; metal matrix composites for enhanced structural stiffness; nanoscale composites for optoelectrical devices, biotechnology for preventing materials fouling and degradation; warhead materials for torpedoes, missiles and Special Forces devices; corrosion prevention for shipboard weapons systems; plastics technologies for lightweight materials; polymeric materials for ship and submarine acoustics; thermal management materials for satellites, nonlinear optical materials, electronics and avionics; and finally, surface science for batteries, explosives, space materials and molecular computing. Spin-off technologies for dual use (commercial) considerations and applications are also actively pursued. Emphasis is also placed on the other end of the RDT&E spectrum, that is for Fleet support, where strong efforts exist in the areas of environmental bioremediation, survivability, nondestructive evaluation technologies, plastics design and fabrication, support of Special Forces, process troubleshooting, failure analysis and consultation.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The equipment associated with this complex is approximately 50% portable, 30% moveable, and 20% fixed. The moveable equipment would be very expensive to move and relocate. This is one of the numerous facilities which will remain at White Oak after BRAC 93 is implemented.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost

separate from any building and utilities that may be integral to the facility/equipment.

Replacement cost of the equipment associated with this facility is approximately $15.2M.

4. Provide the gross weight and cube of the facility/equipment.

Gross weight and cube of facility/equipment:

440,000 lbs; 44,000 cubic feet

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

Much of the laboratory instrumentation requires cooling water, 240 Volt 3 Phase power, compressed air, and controlled temperature/humidity environments. The facility also has need for safety warning lights and door interlocks.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

Two radiation shielded vaults are required for radiography operations. Approximately 40,000 square feet of heavy duty floors are required for materials processing/fabrication equipment as well as several extremely heavy magnets for characterizing magnetic materials.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

Temperature and humidity control is required for many of the laboratories containing precision materials analysis instrumentation. Fume hood ventilation is required for many of the laboratories in which chemicals are used.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

Movement of this complex to another site would cost a minimum of several million dollars. This is under the assumption that such a move would involve only modification of existing buildings as opposed to new building construction.

Loss of the complex would result in the disruption and/or cessation of many activities, some which directly impact the fleet and others which support Dahlgren Division RDT&E programs. A sampling of such activities is as follows:

- **Development of advanced VLS launcher materials capable of withstanding blast from the next generation of rocket motors,**
- **Development of high penetration warhead materials,**
- **Investigations of advanced leading edge concepts for future aerospace vehicles,**
- **Development of all-weather missile radome materials,**
- **In-house resolution of assorted weapons systems failures,**
- **Development of magnetostrictive materials for high performance sonar transducers, sensors, actuators, and active vibration,**
- **Development of testing technology for composite radomes, masts, and ship superstructures,**
- **Radiographic surveillance of TRIDENT rocket motors,**
- **Materials for molecular computing devices,**
- **Advanced aluminum alloys for torpedoes,**
- **Thermal management materials for heat dissipation in high density electronics,**
- **Acoustic quieting materials for submarines,**
- **Carbon-carbon and advanced graphite materials for rocket nozzles and reentry vehicles, and**
- **Biotechnology for corrosion control and environmental remediation.**

The complex is comprised of a number of extremely sensitive instruments. Great care must be taken to move, realign, and calibrate the devices.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The equipment associated with this facility has been continuously updated and modernized since the establishment of the White Oak Laboratory. Most of the equipment was simply transported to the site when purchased; however, many of the larger items required specialized building construction/modification to house them.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1.1 Undersea
1.3 Surface Ship
1.4 Space Satellites
2.1 Gun Systems
2.2 Guided Missiles
2.4 Torpedoes
2.5 Mines
2.7 Explosives
2.8 Launchers
2.11 Weapons Fuzing

2.12 Weapons Propulsion
7.3 Shipboard Communications
8.1 Ballistic Missile Defense
8.2 Countermeasures (CM)
8.3 Electronic Warfare System
9.1 Navy Strategic Systems
10.5 Environmental Description, Prediction and Effects
11.5 Materials and Processes

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

The complex as a whole has been in continuous use for its entire existence. Each facility within the complex is typically used each day. Utilization of individual pieces of equipment within each facility varies as the nature of specific materials RDT&E tasks dictate.

12. Provide the projected utilization data out to FY1997.

Utilization of the complex as a whole is not expected to change significantly from present values. As always, future utilization of particular facilities and specific equipment within the complex depends heavily on which RDT&E proposals submitted by organizations the Navy will choose to fund.

13. What is the approximate number of personnel used to operate the facility/equipment?

59 Manyears

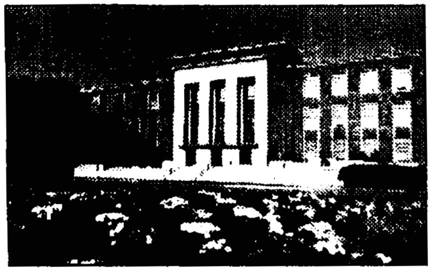
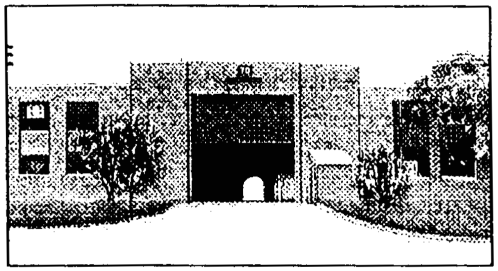
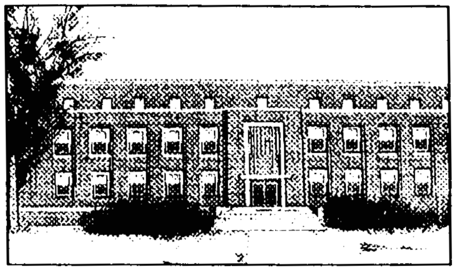
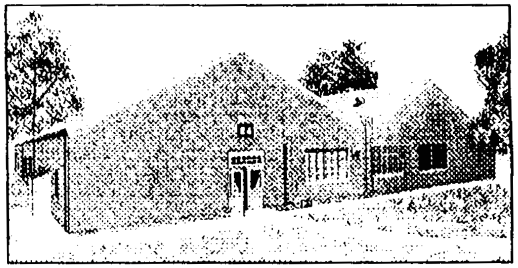
14. What is the approximate number of personnel needed to maintain the equipment?

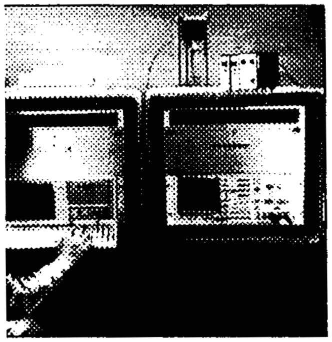
6 Manyears

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.

ADVANCED WEAPONS MATERIALS COMPLEX



MERIC MATERIALS
RACTERIZATION
FACILITY

PLASTICS PROTOTYPING/
ADVANCE CERAMICS
FACILITY

SURFACE EVALUATION
FACILITY

METALLURGICAL R &D

ADVANCED WEAPONS MATERIALS COMPLEX
TAB B, SECTION II, WHITE OAK
PAGE 19A OF 72
UIC: N60921

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**White Oak Site**
Facility/Equipment Nomenclature or Title	**Electrochemistry RDT&E Complex**

1. State the primary purpose(s) of the facility/equipment.

The Electrochemistry RDT&E Complex is used to conduct technical work in the full range from research through Fleet support in support of Navy needs. The complex consists of three interrelated facilities. The Corrosion Test and Analysis Facility is used to study the corrosion of materials in naval weapons systems and to evaluate methods to prevent this corrosion in order to reduce acquisition costs, improve operational reliability, increase the useful life of weapons systems, and reduce requirements for maintenance. Technical efforts include research to develop new methods to assess the susceptibility of materials to corrosion, research to develop new methods of assessing the effectiveness of techniques for preventing corrosion, and the use of these methods to evaluate new materials and coatings. The primary thrust of these efforts is in support of the AEGIS Combat System including radars, missile launching systems, masts and antennas, electrical equipment and cables, and auxiliary equipment such as cooling systems. The facility is also used to support other naval systems including guns and ammunition, countermeasures, and ship self defense.

The Battery RDT&E Facility is used for research, development, design and evaluation of advanced batteries for naval use. S&T efforts are focused on the study of new materials (anodes, cathodes, separators, electrolytes, etc.) for use in power systems and on the development of advanced batteries incorporating these materials. Advanced development and design efforts are designed to provide appropriate (reliable, cost effective, safe, etc.) batteries for specific naval systems. Test and evaluation studies are to confirm that batteries which have been developed for a specific device will meet the system's requirements. Current S&T efforts include advanced rechargeable batteries for underwater vehicles, high power batteries for new sonobuoys, and high energy batteries for mines. Advanced development, test and evaluation projects support a wide variety of programs including mines; projectiles; tactical and ballistic missiles; countermeasures against mines, torpedoes, and missiles; underwater and air vehicles; communication equipment; etc. The major thrust of the thermal analysis facility is the study of the

purity and stability of battery materials such as cathodes and of the stability of materials used to prevent corrosion. This facility is also used to study the purity, stability, thermal characteristics, etc. of other materials of interest to the Navy such as diamonds, polymers, cements, etc.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The complex consists of 40 laboratories located on the White Oak site of NSWCDD and a laboratory and field site located at Ft. Lauderdale, Florida. The White Oak laboratories are concentrated in the main building but they are spread over more than a dozen buildings. The equipment associated with the complex is approximately 60% portable 30% moveable, and 10% fixed. The portion of the complex at Ft. Lauderdale is moveable, but its function requires that it be located on an "ocean front" site. The White Oak laboratories will be moved to Dahlgren as part of BRAC 93.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

The replacement value of this complex is approximately $3M.

4. Provide the gross weight and cube of the facility/equipment.

Estimated at 450,000 pounds; 45,000 cubic feet.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

Approximately 15 chemical laboratory "bays" require plumbing (hot and cold water and drains), steam and compressed air. The dry room requires extra electrical power to operate its dedicated air treatment equipment. Six laboratories require additional electrical power. The facility at Ft. Lauderdale requires extra electrical power.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

Several (approximately 8) laboratories must be located in separate, isolated buildings as a safety measure. The facility at Ft. Lauderdale requires access to ocean water and a marine environment.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

All of the complex requires standard heating, ventilation and air conditioning. All chemical laboratories require ventilation to accommodate chemical fume hoods; these requirements include special ducting, increased heating and air conditioning capacity, and appropriate air filtering and scrubbing. Four chemical laboratories require additional air conditioning capacity to accommodate electronic equipment. The eight isolated laboratories require exhaust ventilation with appropriate filtering and scrubbing.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

Movement of this complex to another site could be accomplished at a cost consistent with the relocation of laboratories. Site requirements include access to a marine environment (including ocean water) for the Ft. Lauderdale facility and isolated sites for eight small laboratories.

Loss of this complex would result in the disruption and/or cessation of many activities, some of which directly impact the fleet and others of which support Dahlgren Division RDT&E programs. A sampling of such activities includes the following: AEGIS Combat System corrosion prevention and control which includes laboratory studies and fleet support; similar VLS corrosion prevention and control work; corrosion studies on ammunition and gun systems; almost all of ONR's 6.2 efforts in battery development; new batteries for mines and mine countermeasures; new batteries for projectile fuzes; batteries for ASW and special warfare systems; etc.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

Most of the equipment associated with this facility has been continuously updated and modernized since the establishment of the White Oak Laboratory; the facility at Ft. Lauderdale was established in the late 1980's and continues to be updated. Most of the equipment was transported to the site when purchased; some of the larger items (such as the dry room and several test chambers) required specialized building construction/modification to house them.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1.1 Undersea
1.2 Aircraft
1.3 Surface Ship
2.1 Gun Systems
2.2 Guided Missiles
2.4 Torpedoes
2.5 Mines
2.7 Explosives
2.8 Launchers
2.9 Fire Control
2.11 Weapons Fuzing
4.2 Coastal/Special Warfare Support
5.2 Radar Systems
5. 3 Special Sensors
5.5 Ocean Surveillance
7.1 Submarine C3I
8.2 Countermeasures (CM)
8.3 Electronic Warfare (EW) Systems
9.1 Navy Strategic Systems
10.8 Other Subsidiary Systems or Components for General Mission Support
11.6 General Technology Base--Energy Storage

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

The complex as a whole has been in continuous use for its entire existence. Each facility within the complex is used each day. Utilization of individual pieces of equipment within each facility varies as the nature of specific electrochemistry RDT&E tasks dictate.

12. Provide the projected utilization data out to FY1997.

Utilization of the complex as a whole is not expected to change significantly from present values. Although specific projects will be completed and others started, the level of usage is expected to remain very high.

13. What is the approximate number of personnel used to operate the facility/equipment?

25 Workyears

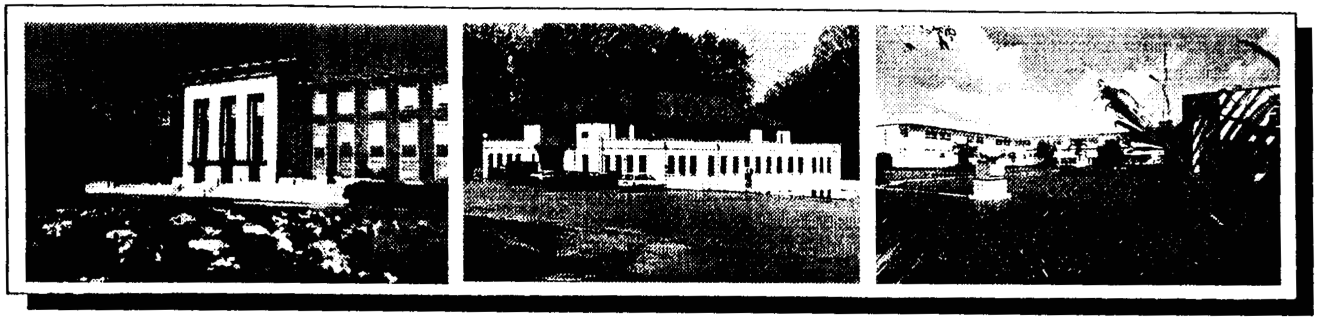
14. What is the approximate number of personnel needed to maintain the equipment?

3 Workyears

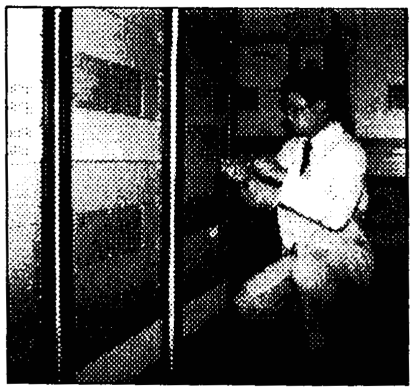
15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.

ELECTROCHEMISTRY RDT&E COMPLEX



POWER SOURCES DEVELOPMENT
DRY ROOM FACILITY



COMPUTERIZED BATTERY
TESTING LAB

COMBAT SYSTEMS
CORROSION FIELD
TESTING FACILITY

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**White Oak Site**
Facility/Equipment Nomenclature or Title	**Radiation Technology Complex**

1. State the primary purpose(s) of the facility/equipment.

The Radiation Technology Complex is used to conduct full spectrum RDT&E from basic research through Fleet support. It provides for experimental and theoretical research in the general field of basic and applied radiation and solid state physics with emphasis on the adaption of new ideas to Navy applications. All aspects of radiation - its sources, transport, interaction and detection - are stressed. The complex is designated Lead Laboratory and Technical Direction Agent for RADIAC development and for the Navy's personnel dosimetry system supporting 200 Commands and serving 65,000 Naval personnel. A new rapid laser heated thermoluminescent dosimetry system is being developed and calibration, standardization and quality assurance is supplied for the present system. It also provides radiation control for all nuclear weapons systems including warheads, missiles, launchers and ships. Without the technical support services this complex provides, no ballistic submarine, attack submarine, nuclear powered cruiser or nuclear powered aircraft carrier could sail. Experimental and theoretical efforts are performed in support of radar systems technology, electromagnetic sources, electro-optical systems technology, electronic warfare technology, x-ray source development, x-ray lithography and charged particle beam diagnostics.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The equipment associated with this complex is approximately 50% portable, 10% moveable and 40% fixed. The Positive-Ion Accelerator Facility and the Primary Irradiation Ranges would require major construction to relocate them. Due to safety requirements, the radiation shielded vaults which house these devices must be 1 foot thick concrete to reduce the radiation levels outside these facilities to within legal limits. This is one of the unique facilities which will remain at White Oak after BRAC 93 is implemented.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

Replacement cost of the equipment associated with this facility is approximately $4.4M.

4. Provide the gross weight and cube of the facility/equipment.

The gross weight of the equipment associated with this complex is approximately 210,175 lbs and a volume of 21,017 cubic feet.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

This complex contains a significant number of laboratories which will require cooling water, 240V 3 Phase power, compressed air, safety warning lights, door interlocks and controlled temperature and humidity environments.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

Special shielding requirements are needed for the Primary Irradiation Ranges and the Positive-Ion Accelerator. Safety concerns require that the facilities which house these devices must be constructed of 1 foot thick concrete walls to reduce radiation levels outside these facilities to within legal limits. Reinforced floors are required for the larger equipment, some of which contains significant amounts of lead for radiation shielding.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

Temperature and humidity control is required for a number of the laboratories which contain precision optical instruments and sensitive electronic equipment. Fume hoods are required in several laboratories in which chemicals are handled and phosphors are prepared.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

It is extremely difficult and costly to replicate or relocate radiation facilities. This comes about because of the legal requirements that must be followed when dealing with radiation. The radiation producing devices must be located in a radiation shielded vault such that exposure to individuals outside of this vault are below the legally specified levels. Secondly, regulatory approval must be obtained before work can commence at any radiation facility. Obtaining such approval is a very lengthy process which requires the installation of the radiation sources before the process can even begin.

This complex provides Fleet support in the form of calibration, standardization and quality assurance for the Navy's personnel dosimetry system. It serves some 200 Commands and over 65, 000 individuals. All personnel who work around nuclear reactors or weapons are required to wear dosimetry for their safety and to protect the Navy from future litigation. Thus, without the technical support services this complex provides, no ballistic submarine, attack submarine, nuclear powered cruiser or nuclear powered aircraft carrier could sail. The work load and delivery schedule is established by NAVSEA in order to minimize disruption to ship movement.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The equipment associated with this complex has been continuously updated and modernized since the establishment of the White Oak Laboratory. New equipment has been added as new programs have been undertaken by the complex. Most of this equipment has been delivered to White Oak by the vendor. The radiation shielded vaults which house the sources were constructed over twenty years ago prior to the start of the Navy's personnel protection dosimetry program.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1.4 Space Satellites
2.1 Gun Systems
2.2 Guided Missiles
2.4 Torpedoes
2.5 Mines
2.6 Directed Energy Systems
2.8 Launchers
2.9 Fire Control
2.11 Weapons Fuzing
2.14 Explosive Ordnance Disposal
3.3 Surface
4.1 Landing Force Equipment and Systems
4.2 Coastal/Special Warfare Support
5.1 Sonar Systems
5.2 Radar Systems
5.3 Special Sensors
5.4 Space Sensor/Surveillance Systems
8.1 Ballistic Missile Defense

8.2 Countermeasures (CM)
8.3 Electronic Warfare (EW) Systems
9.1 Navy Strategic Systems
9.2 Nuclear Weapons and Effects
10.5 Environmental Description,
Prediction, and Effects
10.6.3 Surface Ship
10/7 Major Range Development and
Operations
10.8 Other Subsidiary Systems or
Components
11.2 Software
11.4 Electronic Devices
11.5 Materials and Processes
11.6 Energy Storage

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

The majority of the complex has been in continuous use for the five year period. Some additional capabilities have been added during this time to strengthen on-going programs and attract new ones. Each laboratory within the complex is typically used on a daily basis.

12. Provide the projected utilization data out to FY1997.

Utilization of the complex is not expected to change significantly from present levels. The anticipated downsizing of the Fleet will be countered by the requirements to perform dosimetry with ever increasing accuracy and the necessity to measure and record smaller exposure levels. However, future utilization of specific equipment within the complex will as always depend upon which proposals submitted by the organization the Navy chooses to fund.

13. What is the approximate number of personnel used to operate the facility/equipment?

22 Manyears

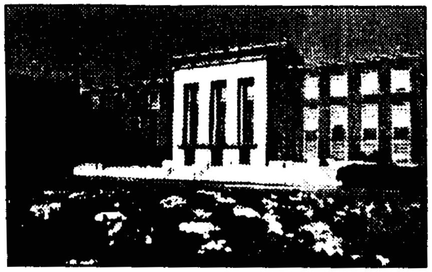
14. What is the approximate number of personnel needed to maintain the equipment?

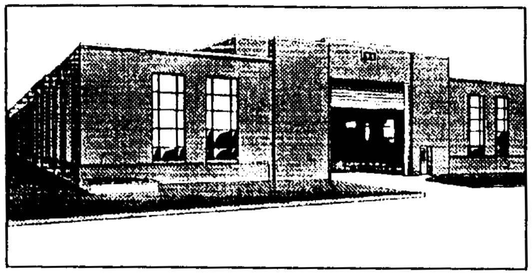
2 Manyears

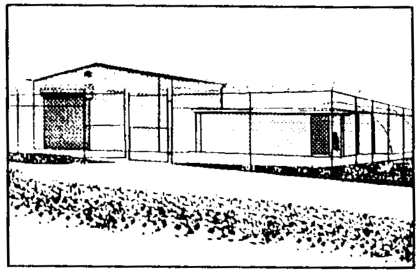
15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

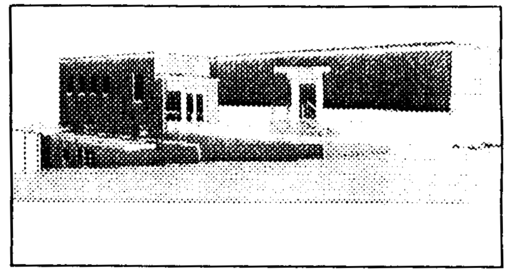
See attached photograph.

RADIATION TECHNOLOGY COMPLEX

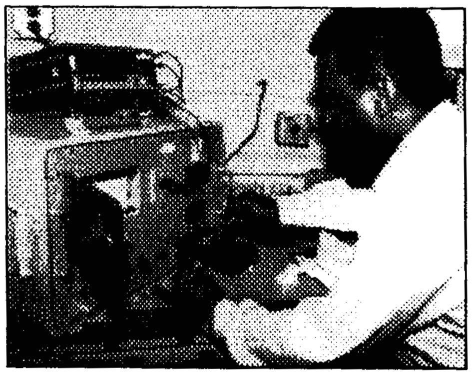






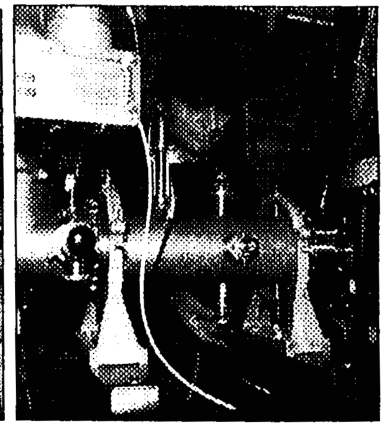


NESCENT MATERIALS
EPARATION AND
ARACTERIZATION
LABORATORY



PRIMARY IRRADIATION
RANGES

PRIMARY
IRRADIATION
RANGES



POSITIVE - ION
ACCELERATOR
FACILITY

RADIATION TECHNOLOGY COMPLEX
TAB B, SECTION II, WHITE OAK
PAGE 29A OF 72
UIC: N60921

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**White Oak Site**
Facility/Equipment Nomenclature or Title	**Multi-Warfare Assessment and Research Facility (MARS)**

1. State the primary purpose(s) of the facility/equipment.

The facility is used in the development of the MARS architecture and associated models. The primary uses of MARS are the analysis of multi-warfare force level problems and the support of Distributed Interactive Simulations. The former is sponsored by N812/SPAWAR 31 and the Warfare Systems Architecture and Engineering project and the later has been sponsored by ARPA in the Warbreaker effort and PEO TAD in efforts.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The equipment is portable and will be moved to Dahlgren due to the BRAC 93 decision.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

The replacement value of the equipment is approximately $1.M.

4. Provide the gross weight and cube of the facility/equipment.

The gross weight of the equipment is approximately 3,000 lbs and the gross volume is approximately 410 cubic feet.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

The equipment requires 25 amp 120 volt service.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

There are no special budget requirements for the facility.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

The facility needs special air conditioning to accommodate the heat created by the monitors, CPUs disk drives and printers.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The equipment is all commercial workstation hardware. Equivalent hardware could be acquired if the dollars were available. There are equivalent workstations available at most Navy Centers which could be used to reconstitute the facility. However, workstations are generally devoted to a single purpose; use on another job would preclude using them for MARS. The impact of the disestablishment of the facility would be that the model which is being used to support the Navy's Joint Littoral Warfare Joint Mission Assessment would not be available.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The equipment has been procured over a period of three years through in-house capital equipment funds and direct project funds.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

2.1 Gun Systems
2.2 Guided Missiles
2.3 Free Fall Weapons and Rockets
2.4 Torpedoes
2.5 Mines
2.6 Directed Energy Systems
2.7 Explosives
2.8 Launchers
2.9 Fire Control
2.10 Weapons Data Link
2.11 Weapons Fuzing
2.12 Weapons Propulsion
2.13 Other Ordnance
2.14 Explosive Ordnance Disposal
3.3 Surface
3.4 Multiplatform

4.1 Landing Force Equipment and Systems
4.2 Coastal/Special Warfare Support
8.1 Ballistic Missile Defense
8.2 Countermeasures (CM)
8.3 Electronic Warfare (EW) Systems

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

Historical utilization measured in terms of workyears provided by users of the facility is as follows:

FY	WY
92	2
93	6
94	9

12. Provide the projected utilization data out to FY1997.

Projected utilization measured in terms of workyears is as follows:

FY	WY
95	11
96	14
97	15

13. What is the approximate number of personnel used to operate the facility/equipment?

Personnel used to operate the facility depend on the number of projects being worked at the time. People work in the facility as needed to develop models or conduct analyses. The workyears shown in items 11 and 12 are primarily for developers and analysts.

14. What is the approximate number of personnel needed to maintain the equipment?

Approximately 0.5 workyears support is needed to maintain the equipment.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

No picture available.

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**White Oak Site**
Facility/Equipment Nomenclature or Title	**ASW Systems Development Facility**

1. State the primary purpose(s) of the facility/equipment.

To provide an environment for conducting engineering, design, development, test, evaluation, software life cycle engineering, and technology-based research for all Surface Ship Anti-Submarine Warfare Combat Control Systems. In addition, provide a facility to allow development, prototype, and test of the interface of surface ASW equipment to other warfare areas/surface ship equipment and systems.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The ASW Facilities are considered moveable. The majority of the equipment consists of militarized computers and ancillary subsystems which require a great amount of effort to de-install, remove, pack and ship. This facility will be moved and relocated to Dahlgren as part of implementing BRAC 91.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

The estimated cost of all equipment, tactical and commercial, cables, furniture, and support systems is $56M. Some of the equipment utilized is unique to some surface ship variants and can no longer be procured.

4. Provide the gross weight and cube of the facility/equipment.

The estimated gross weight of all facility equipment is 308,000 lbs. The cubic space of the equipment area is approximately 165,000 cubic feet.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

The power required by all systems must be conditioned to filter voltage surges, spikes, sags, brownouts, and harmonics. The majority of the tactical systems require 400 Hz, 115 Volt Delta distributed in aluminum conduit and 60 Hz 115 Volt Delta power and

water cooling. The water cooling must be de-ionized, demineralized, filtered (to 0.5 micron particles), and a constant temperature 71 F +/- 1 F. A high capacity (>100 Gallon per minute) water recirculator system with electrical interlocks is required.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

The ASW Facilities must operate in a classified environment with access controlled 24 hours per day. Special alarms for water leaks, high temperatures, unsafe power, heat, smoke, and fire protection are required. Also, all computer areas must have a high capacity (>350 PSF) raised floor and an isolated ground plane built in place to filter high operating frequencies and prevent ground loops harmful to the equipment.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

Constant temperature (68F), constant relative humidity (50%), and minimum dust environment is required. In addition, isolation of high noise equipment from operator consoles is needed. Low lighting conditions must be available in operator console areas.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The highly integrated tactical/commercial environment (hardware and software) and the uniqueness of the configurations required by the mission, make the relocation an extremely difficult task. Specialized technical personnel familiarized with the integration and certification of the systems to produce shipboard-like environments must be available at the site. Geographical relocations always produce an impact in the capability to re-instate the existing operational environment. The possibility for reinstallation delays and unexpected problems will certainly produce an adverse impact in the ASW Program milestones.

Because of the BRAC 91 decision, the ASW Facilities at NSWCDD are the only NAVY site for the software engineering design, development, test and evaluation for all Surface Ship ASW Combat Control Systems. Severe negative impact to the surface fleet would be experienced if the function provided by these facilities is lost. This facility is being relocated to the Dahlgren site.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The ASW equipment was received over a period of five years by special truck deliveries (air-ride vans for electronic equipment) from the manufacturer and other Navy landbased sites. The existing NSWCDD ASW FACILITIES were established in 1989 and have been constantly modified and upgraded.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1.3 Surface Ships
2.4 Torpodoes
2.8 Launchers
2.9 Fire Control
3.3 Surface
5.1 Sonar Systems
10.1.3 Surface Ship-Related Training Systems
11.9 Human Systems Interface

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

The ASW Facilities have been operated 20 hours per day, 5 days a week and additional hours as required.

12. Provide the projected utilization data out to FY1997.

Continue covering a period of 20 hours per day, 5 days a week and additional times as needed.

13. What is the approximate number of personnel used to operate the facility/equipment?

4 In-house
5 Contractor
Number of users in access list: 200

14. What is the approximate number of personnel needed to maintain the equipment?

3 Contractor

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.

ASW FACILITIES
"AEGIS !" SUITE
4/94

ASW SYSTEMS DEVELOPMENT FACILITY
MBE LABORATORY
TAB B, SECTION II, WHITE OAK
PAGE 37A OF 72
UIC: N60921

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**White Oak Site**
Facility/Equipment Nomenclature or Title	**Information Sciences Facility Complex**

1. State the primary purpose(s) of the facility/equipment.

The facility consists of networks of workstations and small mainframes used to support research and development of high performance and parallel/distributed computer based systems engineering, algorithms development for computational fluid dynamics, advanced optical signal processing and computing systems, artificial intelligence technologies, image processing, neural networks, operations research, parallel processing, multi-processing expert systems, artificial neural nets, fuzzy logic, multimedia and signal analysis systems and other related areas. The applications of this technology include advanced weapons systems, improved logistics (training, maintenance and repair), C3I and advanced simulation.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The equipment consists mostly of networked workstations and small mainframes and is moveable. It cannot be considered portable because of the size and weight (some are fully populated five foot high racks) and the special handling considerations which must be taken with computing equipment. The facility itself is fixed; a new facility will need to be established. The facility (temperature/humidity/electrical regulation) is required to operate the equipment. This facility will be relocated at the Dahlgren site as part of the BRAC 91 and 93 implementation.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

The replacement value of the facility/equipment is estimated to be $4.5M.

4. Provide the gross weight and cube of the facility/equipment.

Gross weight and cube: 27,000 pounds; 21,000 cubic feet

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

The sensitivity of the electronic equipment in this facility requires that the electrical power supplied be highly conditioned to remove spikes, low voltage, current surges, and other irregularities. In addition, the plant power must not be volatile and adequate procedures for warning of scheduled power outages must be in place. Optical processing requires Chilled water, compressed air, 208 V AC, 3 Phase, 200 AMP circuit. Facility also requires absence of windows and access to a sink with running water for photographic development type functions.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

A portion of the facility is required to have SECRET processing certification. All construction and access requirements must conform to TEMPEST standards. The facility requires raised floor, high capacity air conditioning, power lines conditioning, and a separate T1 telecommunications link. In addition, a portion of the facility requires a stable foundation for optical experimentation.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

This facility requires temperature control, humidity control, and disaster management (fire, flood) support.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

This facility would not be difficult to replicate or replace (given adequate funds). However, loss of the facility would have an impact on the Navy by crippling the research in Information and System Sciences in addition to the loss to many programs who share the facility and create the necessary synergy between research and application programs. The facility also has certain unique capabilities for development of diffractive optics, computer generated holograms, and optical signal processing systems that should be

maintained at some location. Some of these capabilities do not exist elsewhere in government or industry.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

Construction of the facility with raised floor for computer spaces, breakdown, move, and stand-up and integration of the network and workstations. The Facility has been built up by successive acquisition of equipment over several years. Certain very unique equipment was obtained through research and development contracts.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1.1 Undersea
1.2 Aircraft
1.3 Surface Ship
2.2 Guided Missiles
2.5 Mines
3.4 Multiplatform
5.1 Sonar Systems
5.2 Radar Systems
5. 3 Special Sensors
5.4 Space Sensor/Surveillance Systems
5.5 Ocean Surveillance
7.3 Shipboard
7.5 Space Communications Systems
7.8 Intelligence Information Systems
8.1 Ballistic Missile Defense
10.2 Logistics Planning and Implementation
10.6.2 Aircraft
11.1 Computers
11.2 Software
11.3 Communicarions Network
11.5 Materials and Processes
11.8 Design Automation
11.9 Human-Systems Interfaces
11.10 Other Technology Base Programs

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

Historically, the ACSAD facility has provided diverse computing resources for many research and application program users, so the use of any given machine was not as important as its availability. Up to 1992, the VAX CPUs were at full daytime capacity and supported nighttime batch runs. The other workstations were more important in availability than total usage.

Since 1992, the research atmosphere has changed in that software is more portable and a hetergeneous processing hardware base is not as important. Hence, most of the daytime use exceeds the capacity in terms of processing power. These computers are in use 24 hours per day, every day, except for brief interruptions for hardware maintenance, file backup, and power outages. Some are used to capacity all the time while others have periods (such as late at night) when they are mostly idle. Some jobs run for days.

12. Provide the projected utilization data out to FY1997.

No change is expected in utilization data. Two facts make this the case: (a) although many additions have taken place, obsolescence of older technology is redefined in additions to replacements; and (b) although the computing capability of machines is greater than before, so are the demands of the software tools and prototypes (in any measure: disk, memory, speed, communication, etc.).

13. What is the approximate number of personnel used to operate the facility/equipment?

The approximate number of personnel required for operation: 30.

14. What is the approximate number of personnel needed to maintain the equipment?

The approximate number of personnel required for maintenance: 6.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.

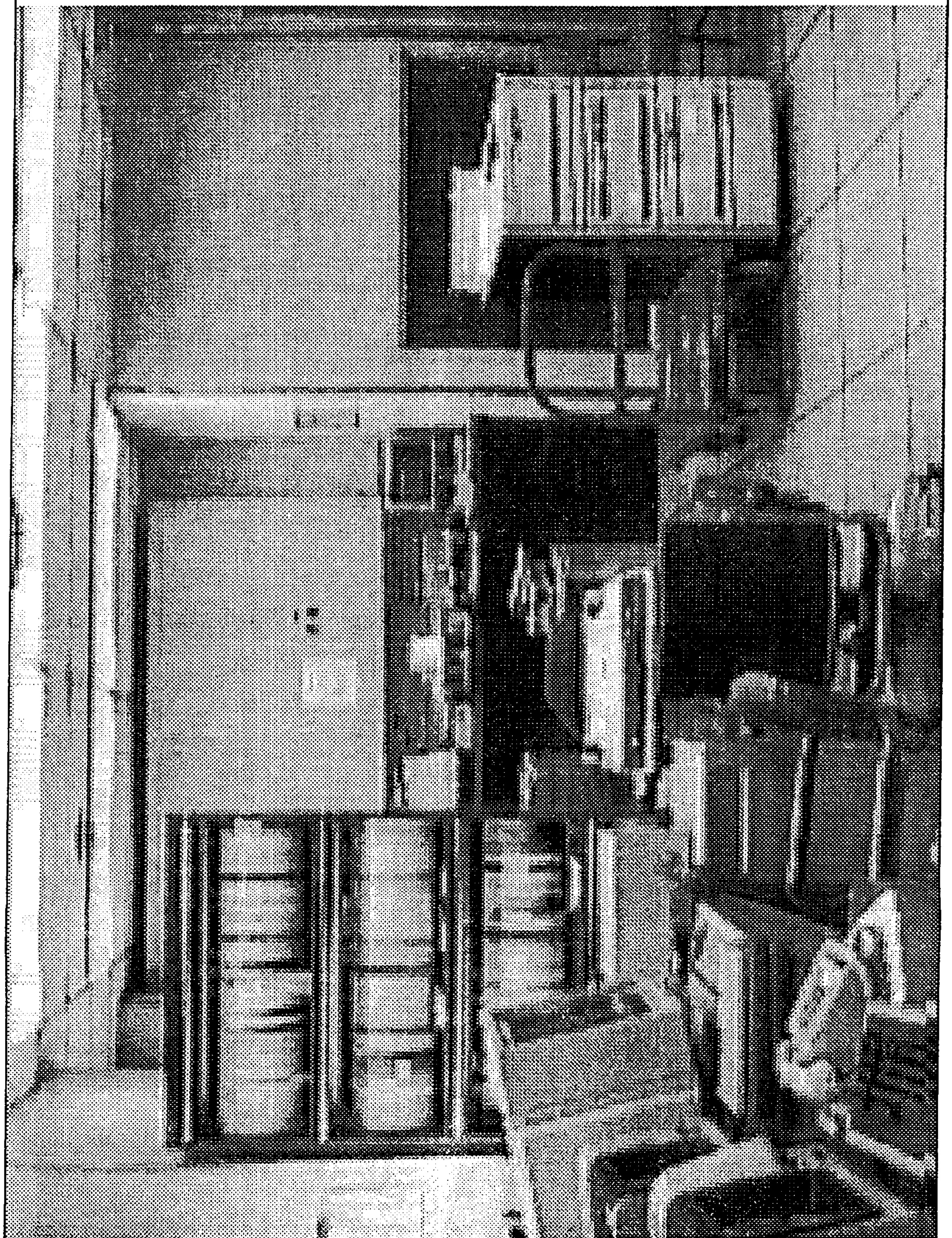


Figure 1 Computer room

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**White Oak Site**
Facility/Equipment Nomenclature or Title	**Infrared Measurement and Modeling Program (IRAMMP)**

1. State the primary purpose(s) of the facility/equipment.

The facility supports the Infrared Measurement and Modeling Program (IRAMMP), a Technology Program which provides critical technology needed for passive detection of targets at extended ranges and for defense against anti-ship missiles and to perform experiments and measurements relating to non-linear optical materials, spectroscopy, sensors, photonics, and opto-electronics applications.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The facility is basically moveable requiring careful disassembly, packing, crating, and may then be reassembled at another location. This facility will be relocated at the Dahlgren site during the implementation of BRAC 93.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

Replacement cost: $4.5M

4. Provide the gross weight and cube of the facility/equipment.

Gross weight of the IRAMMP Facility equipment is estimated to be approximately 18,000 lbs consisting of: Sensor head, electronic racks, Afocal telescope, HP 710 workstation, Blackbody reference source, Optical benches plus several cabinets of optical and electronic components.

Gross volume of the equipment is estimated to be 12,000 cubic feet.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

Special utility support includes 440 V 3 Phase, 220 V, as well as 120 V electrical service with 50 AMP per phase service.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

The facility requires a stable foundation for the pneumatic optical tables which are required for holographic type experiments.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

Environmental Control Requirements for the facility include: Cooling water for lasers, temperature, relative humidity, least 100,000 Clean room and voice control less than 60 dbA.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The research radiometer cannot be replaced with any off the shelf items. The IRAMMP sensor is a one of a kind sensor capable of taking simultaneous polarized radiometric data in both the 8 to 12 and the 3 to 5 micron region. It is also capable of collecting data in simultaneous subbands of the 8 to 12 and 3 to 5 microns (these items are designed portable for field test). The Laser Labs could be replicated or relocated at another site; however, this must be done with extreme care and caution because fragile optical equipment and components are involved. If this Laser Lab were to be replicated, additional time would be required to order, specify, and negotiate contracts for the purchase of this equipment which has not been figured into the replacement cost for this facility.

The impact to the Department of the Navy/Department of Defense if this Laser Lab Facility and Equipment were lost would be that a viable, state-of-the-art optical materials and photonics research laboratory facility would not be available for important research pursuits. Since this research work is expected to have a great impact for future applications and devices both in the defense establishment and also in the international

economic markets where the United States is competing with other nations in a sort of "economic war", loss of this facility could be critical.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

Shipped by air ride trucks. The Laser Lab and the associated equipment were constructed over a period of 8 - 10 years in support of Electro Optics research.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1.1 Undersea
1.2 Aircraft
1.3 Surface Ship
1.4 Space Satelites
1.5 Ground Vehicles
2.1 Gun Systems
2.2 Guided Missiles
2.3 Free Fall Weapons and Rockets
2.4 Torpedoes
2.5 Mines
2.6 Directed Energy Systems
2.7 Explosives
2.8 Launchers
2.9 Fire Control
2.10 Weapons Data Links
2.11 Weapons Fuzing
2.12 Weapons Propulsion
2.13 Other Ordnance
2.14 Explosive Ordnance Disposal
3.1 Subsurface
3.2 Air
3.3 Surface
3.4 Multiplatform
4.1 Landing Force Equipment and Systems
4.2 Coastal/Special Warfare Support
5.1 Sonar Systems
5.2 Radar Systems
5. 3 Special Sensors
5.4 Space Sensor/Surveillance Systems
5.5 Ocean Surveillance
6.1 Submarine Navigation Systems
6.2 Aircraft Navigation Systems
6.3 Surface Ship Navigation Systems
6.4 Weapons Navigation systems
6.5 Satellite Navigation Systems
7.1 Submarine
7.2 Airborne
7.3 Shipboard
7.4 Landed-Based
7.5 Space Communications Systems
7.6 Non-Tactical Data Systems
7.7 Air Traffic Control systems
7.8 Intelligence Information Systems
8.1 Ballistic Missile Defense
8.2 Countermeasures (CM)
8.3 Electronic Warfare System
9.1 Navy Strategic Systems10.2 Logistics Planning and Implementation
9.2 Nuclear Weapons and Effects
10.1 Personnnel and Training
10.1.1 Submarine-Related Training Systems
10.1.2 Aircraft-Related Training Systems

10.1.3 Surface Ship-Related Training Systems
10.1. Weapons-Related Training Systems
10.1.5 Human Resources Research and Development
10.2 Logistics Planning and Implementation
10.3 Facilities Engineering
10.4 Diving, Salvage and Ocean Engineering
10.5 Environmental Description, Prediction , and Effects
10.6 Crew Equipment and Life Support
10.6.1 Submarine
10.6.2 Aircraft
10.6.3 Surface Ship
10.6.4 Medical Research and Combat Casualty Care
10.6.5 Clothing and Textiles
10.7 Major Range Development and Operation
10.8 Other Subsidiary Systems or Components
10.9 Activity Mission and Function Support
11.1 Computers
11.2 Software
11.3 Communicarions Network
11.4 Electronic Devices
11.5 Materials and Processes
11.6 Energy Storage
11.7 Propulsion and Energy Conversion
11.8 Design Automation
11.9 Human-Systems Interfaces
11.10 Other Technology Base Programs

Thus, the materials which are developed and on which experiments are performed in this Laser Lab Facility impact in all of the BRAC functional support areas.

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

The historical utilization average for this Laser Lab for the past five fiscal years is 85%. The IRAMMP sensor has been used for two to three field tests per year since 1989. Four of the field test were airborne. In the course of the 3, 672 scenes the IRAMMP has gathered, it has collected the only dual band simultaneous radiometric data in an open ocean environment, along with the only simultaneous radiometric polarized infrared data. Two unique field tests are planned in FY94. IRAMMP data has been used in the development of working IRSTs. IRAMMP data and models were used to predict the performance of ONR's new dual band IRST. IRAMMP has been utilized by 94 different DoD and contractor organizations, and is one of the Navy's most important resources for infrared data and infrared background models.

12. Provide the projected utilization data out to FY1997.

The facility will be upgraded and used at about the same rate through FY96. From FY97 to FY98, field tests will be reduced to one per year.

13. What is the approximate number of personnel used to operate the facility/equipment?

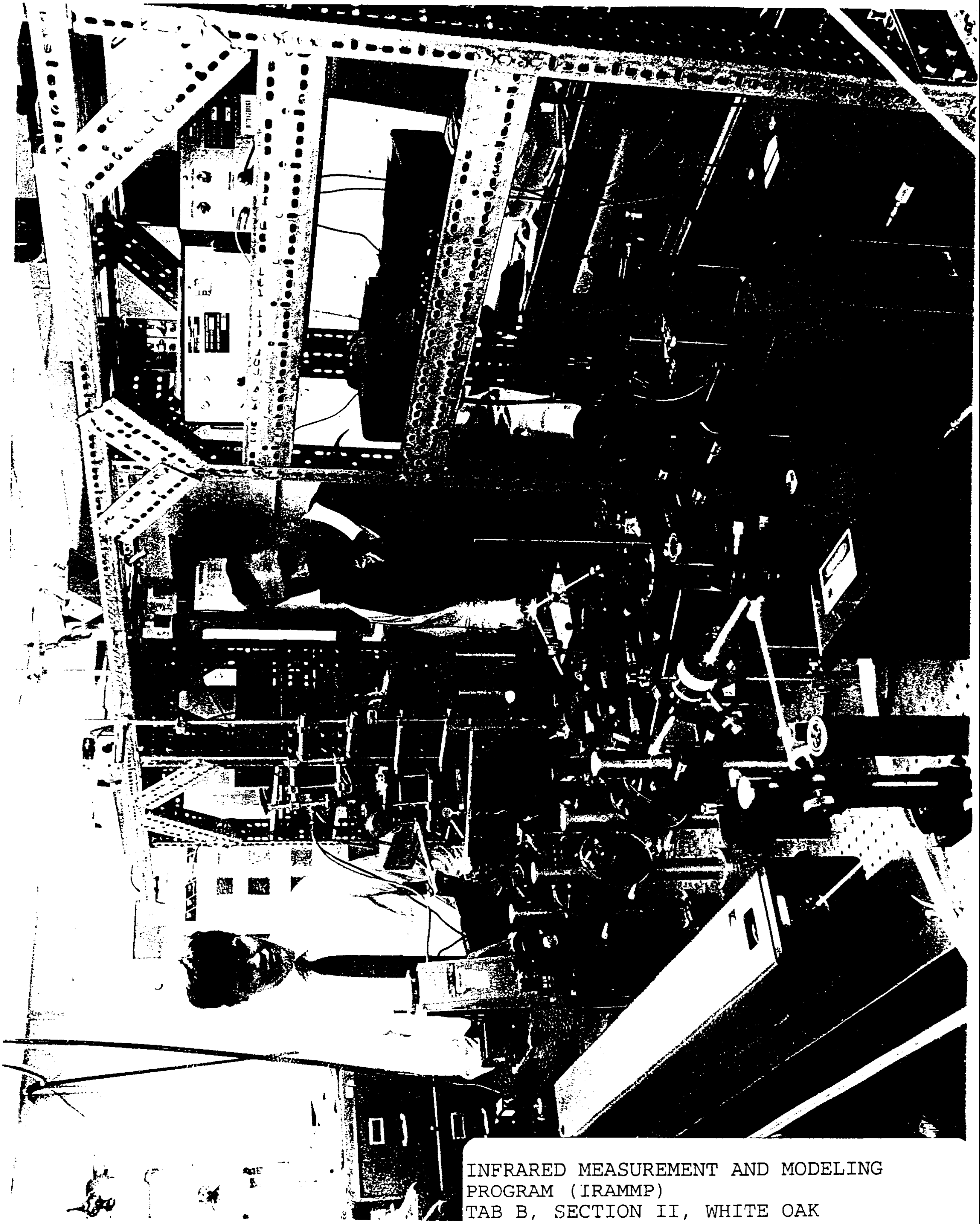
6

14. What is the approximate number of personnel needed to maintain the equipment?

2

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.



INFRARED MEASUREMENT AND MODELING PROGRAM (IRAMMP)
TAB B, SECTION II, WHITE OAK
PAGE 46A OF 72
UIC: N60921

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**White Oak Site**
Facility/Equipment Nomenclature or Title	**Hydroballistics Facility**

1. State the primary purpose(s) of the facility/equipment.

The Hydroballistics Facility consists of two buildings. Building 427 houses a large indoor instrumented water tank primarily for studying the hydroballistics of water/entry exit. The tank measures 100 ft long x 35 ft wide with a water depth variable to 60 ft. Water is maintained at extreme clarity for high speed photography. It includes a variety of torpedo and gas gun launchers for both full and subscale testing. Unique attributes include high speed water entry and water exit testing, enhanced cavitation studies via surface air evaluation, explosion bubble testing, and ocean current simulation.

Building 409 is the Undersea Weapons Tank. The tank is 50 ft in diameter and 100 ft deep. It also contains crystal clear water for high speed photography. Unique attributes include a 100 ft range for either drop testing or buoyancy rise testing, an elevating floor for installing and retrieving hardware at different depths and a wave simulator. It is used for studying full scale mine case deployment, mine acoustic array deployment and underwater stability.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

This facility is an integral part of the buildings in which it is housed. It cannot be moved. This facility in one of the unique facilities which will remain operational at White Oak after BRAC 93 is implemented.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

Replacement cost of the hydroballistics tank is $30M. The weapons tank would cost $12M to replace.

4. Provide the gross weight and cube of the facility/equipment.

Each of the two water tanks constitutes a large multi-story structure. A third tank of equivalent size is also available for temporary water storage.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

Both tanks require the plumbing and filtration capability to maintain extreme water clarity for high speed photography. Both tanks require capability to quickly remove, store, and refill the entire water volume. A high intensity (95KW) lighting system is also used for underwater illumination.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

Due to the unique construction issues associated with this facility, one would have to view the entire facility as representing a unique requirement.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

Maintaining water clarity is critical. This requires a special purpose filtration system.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The facility consists of permanent structures which cannot be moved. Loss of the facility would result in the disruption and/or cessation of many activities, some which directly impact the fleet and others which support Dahlgren Division RDT&E programs and those of other Government agencies. A sampling of such activities is as follows:

(a) Prototype testing and lot acceptance of sonobuoys for proper underwater deployment.
(b) Evaluation of surf zone mine clearance device deployment.
(c) Missile/Projectile water entry studies for DOE and other agencies.
(d) Modified MK 83 bomb water entry studies.

(e) Evaluation of underwater equipment for Special Forces.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The facility was constructed on-site in the mid 1960s.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1.1 Undersea Platforms
2.2 Guided Missiles
2.4 Torpedoes
2.5 Mines
2.8 Launchers
2.3 Free Fall Weapons
2.7 Explosives
4.2 Coastal/Special Warfare Support
5.1 Sonar Systems
9.1 Navy Strategic Systems
10.4 Diving, Salvage and Ocean Engineering

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

Over the past six years, tests have been conducted in the facility an average of 119.6 days per year. This does not include days used for test set-up, test break-down and facility maintenance. Customer receipts have matched expenditures for the past six years.

12. Provide the projected utilization data out to FY1997.

Customers rarely know their utilization beyond the immediate year, but past utilization has been relatively level, so it would be reasonable to assume that utilization is likely to continue at roughly the same level to FY97.

13. What is the approximate number of personnel used to operate the facility/equipment?

The facility is maintained and operated by 5 individuals.

14. What is the approximate number of personnel needed to maintain the equipment?

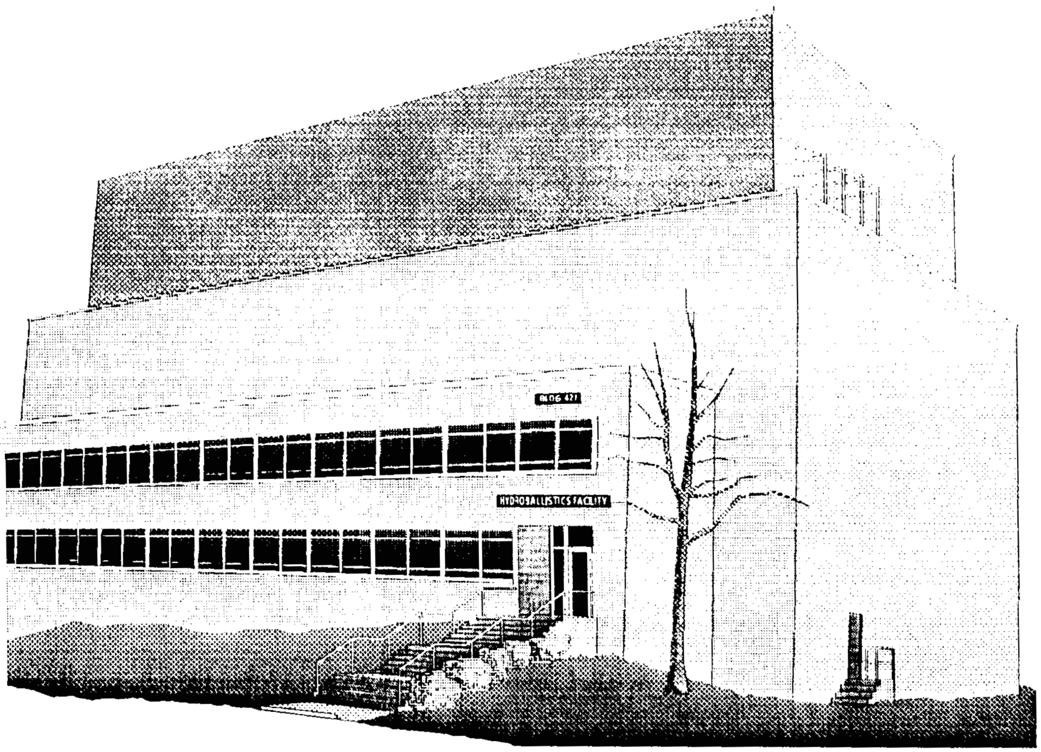
The facility is maintained and operated by 5 individuals.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

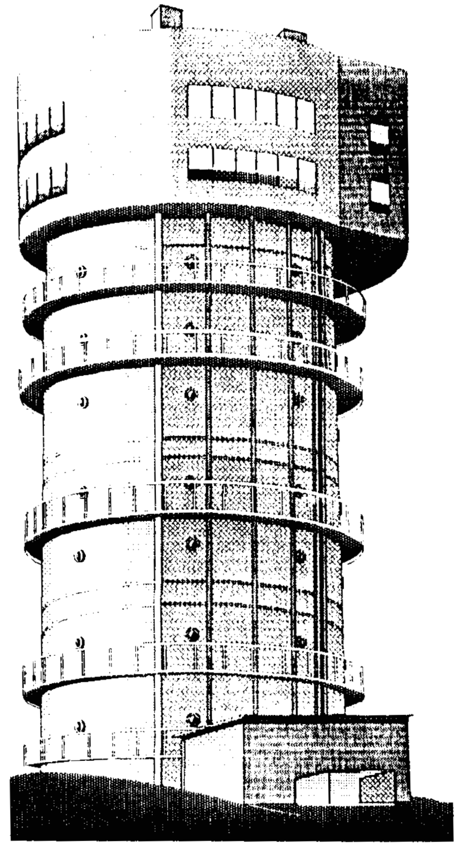
See attached photograph.

HYDROBALLISTICS FACILITY

HYDROBALLISTICS FACILITY
TAB B, SECTION II, WHITE OAK
PAGE 50A OF 72
UIC: N60921



BLDG 427
HYDROBALLISTICS TANK



BLDG 409
UNDERSEA WEAPONS TANK

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**White Oak Site**
Facility/Equipment Nomenclature or Title	**Energetic Research and Development Complex**

1. State the primary purpose(s) of the facility/equipment.

This complex of interrelated facilities, buildings, and equipment is used as the Navy's principal RDT&E facility for explosives, explosive components, warheads, explosives and warheads technology from basic research through in-fleet support. This effort includes the synthesis of new energetic materials, the formulation and testing of new explosive compositions, the development of new technology for explosives safety and performance, the conception and proof-of-principle of new warhead designs, the development of new, more efficient and safe detonators and initiation trains, the development and validation of new processes for the production of explosives and warheads using advanced mathematical and physical techniques and the solution of in-service problems of safety and reliability. Test facilities range from those utilizing gram quantities of material to those in excess of 20 kilograms and synthesis and formulation equipment scaled from gram to 5 kilograms. Also includes storage facilities for in excess of 20,000 kg of explosives. Advanced analytical facilities include those for both chemistry and physics and allow the detection of materials in the subpicogram range. While the principal focus of the activities are for Navy programs, the complex is also used by the other services and civilian agencies.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The facilities are permanent and cannot be moved. The equipment within the faciities is about 20% portable and 80% moveable. This facility complex will be relocated at Indian Head when BRAC 93 is implemented.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

The combined cost of facilities and equipment is $42M.

4. Provide the gross weight and cube of the facility/equipment.

The cube of the facilities is 646,000 cu.ft.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

A large portion of the facilities requires special explosive safety features, such as blow-out walls, 240 Volt 3 Phase power, compressed air, and controlled temperature and humidity environment. In addition, a small portion of the facilities requires explosion-proof wiring. Chemistry laboratories require OSHA approved armored fume hoods.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

All of the explosive test chambers require special foundations which will reduce the transmission of shocks from the chamber to the ground. In addition, extra sturdy foundations are required for gas gun mounts Special heavy duty construction is required for all facilities to prevent accidental explosions from propagating to adjacent bays and buildings. All explosive storage magazines require specialized construction to meet Navy regulations. All facilities need deluge systems which are triggered by remote sensing equipment.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

Extra large capacity HVAC systems with heat exchanges are required for the facilities.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

It was decided under the BRAC 93 process to move the entire Energetics Research and Development Center from the White Oak Site to Indian Head, Maryland. The cost of the move is between $40M and $50M.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The facilities were constructed between 1945 and 1985 and have continuously been updated and modernized.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1.1 Undersea
2.2 Guided Missile
2.3 Free Fall Weapons and Rockets
2.4 Torpedoes
2.5 Mines
2.6 Directed Energy Systems
2.7 Explosives
2.11 Weapons Fuzing
2.13 Other Ordnance
4.2 Coastal/Special Warfare Support
8.1 Ballistic Missile Defense
8.2 Countermeasures (CM)
9.1 Navy Strategic Systems
9.1 Nuclear Weapons & Effects
11.2 Software
11.7 Propulsion and Energy Conversion

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

The complex as a whole has been in continuous use for its entire existence. Each facility within the complex is typically used every day. The direct workyear loading of this complex was as follows:

FY89 200 WYR
FY90 196 WYR
FY91 175 WYR
FY92 155 WYR
FY93 140 WYR

12. Provide the projected utilization data out to FY1997.

The projected utilization data in direct workyears for the outyears are:

FY94 105 WYR
FY95 100 WYR
FY96 66 WYR (mandated reduction through BRAC 93 move to Indian Head)
FY97 33 WYR (mandated reduction through BRAC 93 move to Indian Head)
FY98 0 WYR (mandated reduction through BRAC 93 move to Indian Head)

13. What is the approximate number of personnel used to operate the facility/equipment?

105 Workyears

14. What is the approximate number of personnel needed to maintain the equipment?

4 Workyears

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

Not available.

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**White Oak Site**
Facility/Equipment Nomenclature or Title	**Fuze Development Laboratory**

1. State the primary purpose(s) of the facility/equipment.

To provide the Navy with full spectrum support for fuzes. The Fuze Development Laboratory consists of the following:

(1) Electronics Radio Frequency (RF) Laboratory, consisting of secure RF shielded space containing various RF test chambers and associated equipment;
(2) Open Air RF Test Site with ground plane, consisting of various Navy unique standardized equipment;
(3) Electronics and Countermeasures Laboratory, consisting of a variety of electronics design, fabrication, and test equipment;
(4) Fuze and Ordnance Laboratory, consisting of mechanical design, fabrication, and test equipment, spin equipment, spin fire equipment, very high G shock equipment, a 2" and 5" air gun internal ballistics simulator, and classified explosive storage, handling, and testing facilities;
(5) Infrared (IR) Laboratory, consisting of IR fuze spinners, radiometers, optical rails, IR viewer, and a variety of targets.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

Moveable (except Open Air Test Site). This laboratory will be moved to the Dahlgren site during the implementation of BRAC 91.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

$3M (estimate).

4. Provide the gross weight and cube of the facility/equipment.

10 tons (estimate).

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

220 Volts

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

Explosive and flammables certified per OP-5, and benign RF environment inside and out. Foundation of air guns.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

Special temperature and humidity control.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

Difficult, but not impossible. This facliity is currently being moved to Dahlgren as part of BRAC 91. Most equipment exists elsewhere in industry or government, except for air guns and VHG shock machine which are uniquely qualified for simulating gun shock. The impact of losing the fuze development laboratory is severe to the Navy. This facility is used to uniquely perform:

- **Navy fuze malfunction investigations,**
- **government verification of Navy fuze designs, and**
- **Navy fuze research and development.**

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

Most of the facilities were brought in on truck or constructed using ordinary means over the past 30 years. The air guns required major construction to install.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

2.11 Weapons Fuzing

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

100%

12. Provide the projected utilization data out to FY1997.

100%

13. What is the approximate number of personnel used to operate the facility/equipment?

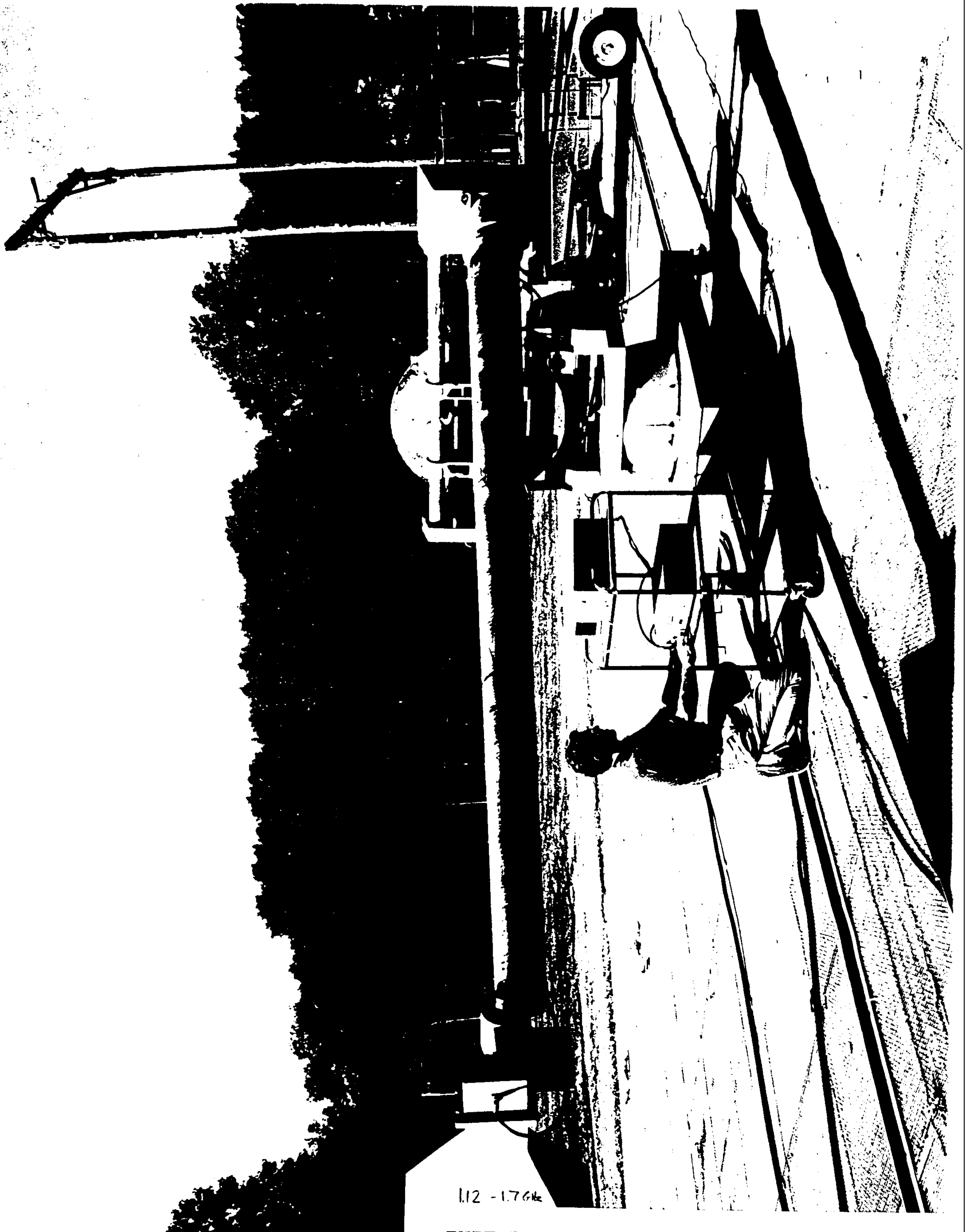
35

14. What is the approximate number of personnel needed to maintain the equipment?

2

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.



FUZE DEVELOPMENT LAB
TAB B, SECTION II, WHITE OAK
PAGE 57A OF 72
UIC: N60921

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**White Oak Site**
Facility/Equipment Nomenclature or Title	**Shock Laboratory**

1. State the primary purpose(s) of the facility/equipment.

To provide the Navy with full spectrum environmental shock simulation support. The Shock Laboratory consists of the following:

(1) High Shock Test Complex, consisting of several gas launchers, a 26" air gun, a Light Weight Shock Machine (LWSM901), and the WOX7B shock machine;
(2) Shock Instrumentation/Analysis Facility, consisting of high volume high frequency digital and analog data acquisition equipment, analog to digital converters, electronic conditioners, a variety of transducers, and a computer complex.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

Moveable. The majority of this laboratory is being relocated to the Panama City site as BRAC 91 and BRAC 93 are implemented.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

$1.6M (estimate).

4. Provide the gross weight and cube of the facility/equipment.

352 tons (estimate).

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

10,000 psi air supply.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

Special foundations.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

Special temperature and humidity control.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

Difficult, but not impossible to move. Most equipment exists elsewhere in industry, except for air gun, launchers, and shock machines which are uniquely qualified for simulating Navy shock. The impact of losing the shock laboratory is severe to the Navy. This facility is used to uniquely perform:

- **Navy malfunction investigations,**
- **government verification of Navy designs, and**
- **Navy research and development.**

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

Most of the facilities were brought in on truck and constructed using ordinary means over the past 45 years. The air gun, launchers, and shock machines required major construction to install.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

10.5 Environmental Description, Prediction, and Effects

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

100%

12. Provide the projected utilization data out to FY1997.

100%

13. What is the approximate number of personnel used to operate the facility/equipment?

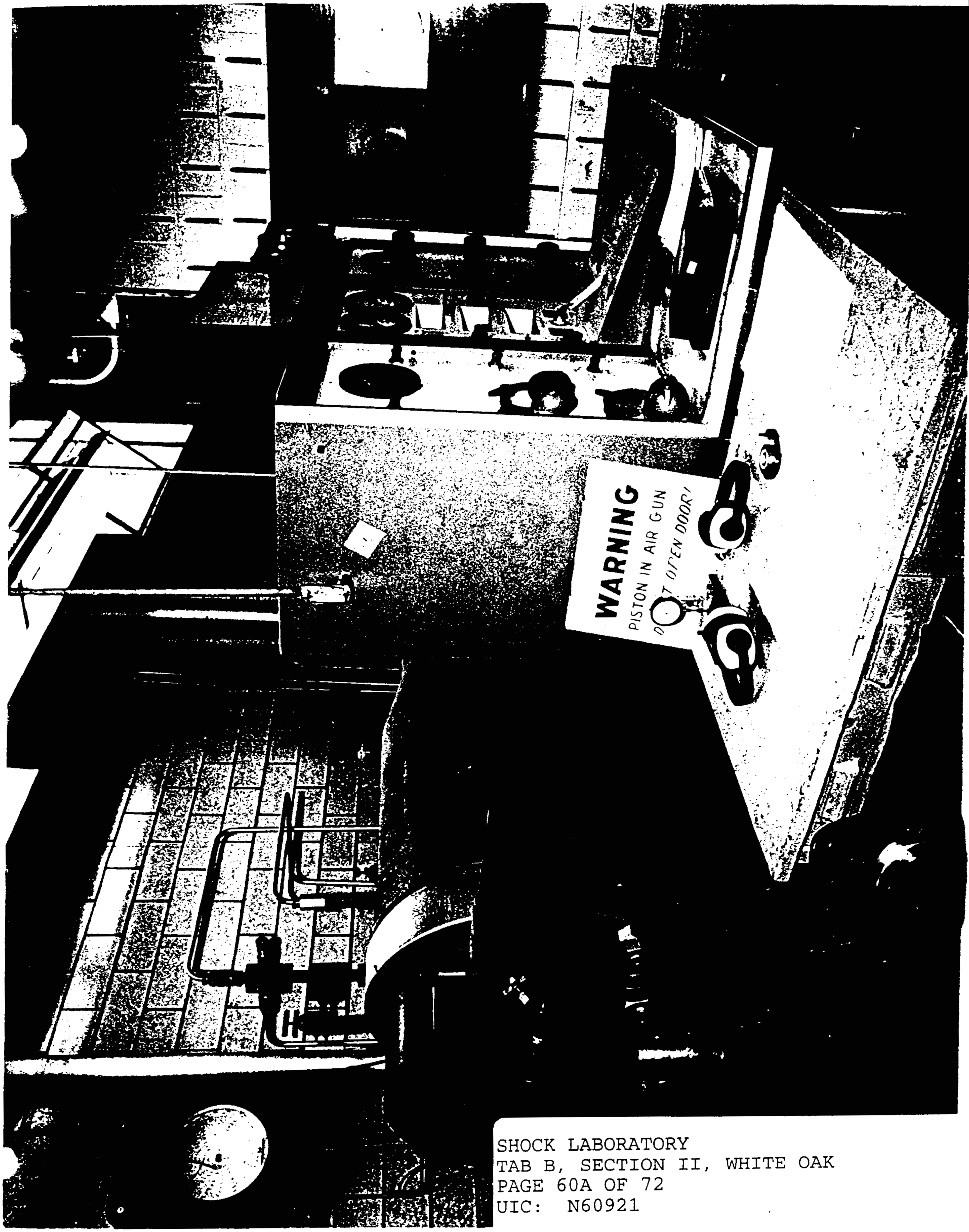
6

14. What is the approximate number of personnel needed to maintain the equipment?

2

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.



SHOCK LABORATORY
TAB B, SECTION II, WHITE OAK
PAGE 60A OF 72
UIC: N60921

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**White Oak Site**
Facility/Equipment Nomenclature or Title	**Hypervelocity Wind Tunnel Complex**

1. State the primary purpose(s) of the facility/equipment.

NSWCDD maintains and operates DoD's primary hypervelocity wind tunnel at its White Oak site. The large Hypervelocity Wind Tunnel No. 9 (Tunnel 9) is truly unique and must be maintained for DoD, NASA and aerospace industry use. This facility provides the nation's primary high Mach number aerodynamic and aerothermal wind tunnel testing capabilities which are critical for the design and performance evaluation of strategic re-entry bodies and decoys, tactical missiles, theater missile defense interceptors and hypervelocity flight vehicles like the Space Shuttle and the National Aerospace Plane.

Tunnel 9 provides testing at Mach numbers of 7, 8, 10, 14, and 16.5 for altitudes ranging from sea level to 180,000 feet. This aerodynamic simulation is in the critical altitude regime experienced by strategic offensive missile systems, advanced defensive interceptor systems and hypersonic transport vehicles. The combination of Mach number and altitude simulation, long run times (0.25 to 15 seconds), and large size (5-foot diameter test section) make this facility unique and critical to the nation. There is no Navy, DoD, NASA or industry facility, existing or planned, which can approach Tunnel 9's capability.

Tunnel 9 is a tri-service facility. It was "Relianced" in 1977 by the Joint Logistic Commanders in a "Consolidation of Functions and Facilities Study" which led to the closing of a less capable Air Force facility at the Arnold Engineering Development Center, TN and the identification of the Navy's Tunnel 9 as the primary hypervelocity wind tunnel facility for DoD. Historical utilization of the facility is almost equally divided between the three Services. NASA and private aerospace contractors also utilize the facility to a lesser degree.

The facility provides unique test capabilities for shroud removal, jet interaction testing, sensor window aero/thermal testing, and pulsed reaction control jet testing for Ballistic Missile and Theater Missile Defense Programs. The facility is the prime high Mach number, high Reynolds number test facility for the National Aerospace Plane and provides unique aerodynamic stability and scramjet inlet testing capabilities (ability to test variable geometry inlet configurations). Various re-entry technology programs which

address modifications to existing re-entry systems for both the Navy and Air Force have requirements for testing in Tunnel 9, as would any new re-entry body development by the Navy or Air Force.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

Class 2, Fixed Assets. Moving or replicating a complex like Tunnel 9 would be very difficult. Components are large. The building which houses the facility must be on a firm bedrock foundation or a massive man-made footing system and must allow for several stories of excavation to contain the high pressure vertical heater vessels. The seven high pressure vessels weigh 70 tons each and have to be moved on accurate rails within the building. The large 72-foot diameter vacuum sphere and the compressor plant complex would also have to be rebuilt at any new site. This facility complex is one of the unique facilities which will remain at White Oak after BRAC 91 and BRAC 93 are implemented.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

The Tunnel 9 complex includes the following major components and replacement costs:

TUNNEL COMPLEX BUILDINGS	
Tunnel 9 Building (46,000 sq.ft.)	**$30.0M**
Vacuum Compressor Plant Building	**15.0M**
FACILITY/EQUIPMENT	
High Pressure Vessels (7 @ $1.5M each)	**10.5M**
Nozzles (3 @ $1M each)	**3.0M**
Test Cells (2 @ $6M)	**12.0M**
72 Ft. Dia. Vacuum Sphere	**5.0M**
Vacuum Valves & Piping	**2.0M**
High Press. Servo Valves & Manifold	**3.0M**
Liquid Nitrogen Supply System/Bottle Field	**2.5M**
High Pressure Gas Compressors (4 @ $1M)	**4.0M**
Schlieren Optical System	**3.0M**
Control System	**3.0M**

Data System	3.0M
Balances, Calib. Stand & Transducers	2.0M
Vacuum Compressors	25.0M
Assembly & Recertification (5 yrs @ $4M/yr)	20.0M

The total building cost is $45M and the total facility/equipment cost (including assembly and recertification) is $98M. The total replacement cost is $143M.

4. Provide the gross weight and cube of the facility/equipment.

COMPONENT	Qty.	Wt. (tons ea.)	Cube (l*w*h ft. ea.)
TUNNEL COMPLEX BUILDINGS			
Tunnel 9 Building (46,000 sq.ft.)	1	N/A	190*140*50
Vacuum Compressor Plant Building	1	N/A	100*150*65
FACILITY/EQUIPMENT			
High Pressure Vessels	7	70.0	7*25*7
Nozzles	4	16.0	10*45*9
Test Cells	2	30.0	10*21*33
72 Ft. Dia. Vacuum Sphere	1	450.0	80*73*80
Vacuum Valves	3	8.0	3*7*24
& Piping	7	15.0	50*6*6
High Press. Servo Valves	10	1.0	7*3*3
& Manifold	2	8.0	2*15*2
Nitrogen Supply System	1	30.0	36*12*14
High Pressure Bottle Field	19	16.0	32*3*3
High Pressure Gas Compressors	4	5.0	10*5*6
Schlieren Optical System	2	5.0	8*13*9
Control System	1	5.0	20*25*7
Data System	1	7.0	20*25*7
Balance Calibration Stand	1	1.0	20*20*10
Vacuum Compressors--Large	2	20.0	12*20*10
Vacuum Compressors--Small	2	10.0	8*6*6
Misc. valves. plumbing, equipment	50	0.5	4*4*4
Misc. cabinets, benches, consoles	50	0.5	4*8*8

The tunnel complex buildings comprise 2,305,000 cubic feet. The facility/equipment weigh

1706 tons and occupy a volume of 567,665 cubic feet.

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

The Vacuum Compressor Plant requires electrical service at 4,160 volts due to the four large motors that power the centrifugal vacuum compressors. The compressor plant has an approximate maximum electrical power consumption of 1 megawatt. The Tunnel 9 facility requires electrical service at 480 volts. Due to the gas storage and supply heaters, the facility has an approximate maximum electrical power consumption of 1 megawatt.

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

Due to the many pieces of heavy equipment, the Tunnel 9 building has dozens of special support footers and piers. These specialized foundations have been constructed down to the local bedrock. Due to the high pressure equipment within the building, the walls and roof have been especially constructed for overpressure protection. The building walls are reinforced concrete 18 inches thick. The roof has been constructed so as to lift up in the event of overpressure. A 40-ton capacity overhead crane is supported by the building walls and piers.

In the Vacuum Compressor Plant each of the four compressor systems is supported by special elevated concrete foundations in order to minimize the vibration of the large rotating equipment. The Compressor Plant building walls are constructed to support a 20-ton capacity overhead crane.

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

The Tunnel 9 control and data acquisition systems are computerized and located in a separate room. The temperature and humidity must be controlled. In the Vacuum Compressor Plant the four vacuum compressor systems are powered by large electric motors and high voltage switch gear. In order to maintain high resistance-to-ground levels, the humidity within the building must be controlled. The building is equipped with special heaters and exhaust fans for this purpose. The Compressor Plant must also be fitted with a large Carbon Dioxide or similar type fire suppression system.

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment

were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

Replication of this wind tunnel complex would be very difficult and expensive. Size constraints are discussed above. Some savings could be realized if some of the major components could be relocated rather than replicated, however, the cost of relocation is still estimated to be over $100M. Relocation would likely be to another government site, either DoD or NASA. From a practical standpoint, private industry does not own national facilities of this type due to factors such as the large capital investments and economic and safety risks. Maintenance of national facility assets like Tunnel 9 is inherently governmental and supports DoD weapon systems RDT&E.

Moving of major components also requires that the facility be down for an unacceptable period of time--estimated to be seven years for reconstruction or relocation and recertification. Note that the facility operating conditions include high pressure (40,000 psi) and high temperature (3000 deg. F) which require extensive checkout of components and procedures for safety recertification. This downtime would be unacceptable to major national development programs such as Strategic Re-entry (Navy TRIDENT II), Ballistic Missile Defense (BMDO advanced interceptor technology), Theater Missile Defense (Army THAAD and Navy TBMD) and the National Aerospace Plane. The facility is needed through all phases of the weapon system development cycle from research and technology through the evaluation of flight test anomalies. In particular, one of the prime uses for Tunnel 9 is in risk reduction for costly flight testing.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The wind tunnel complex at White Oak became operational in the late 1940s after the Navy obtained its first supersonic wind tunnel from Germany after World War II. The Compressor Plant System currently in use was brought on line in 1953. The large Tunnel 9 facility complex was constructed on site between 1969 and 1975, making it the newest hypervelocity wind tunnel facility in the nation. The building was designed to accommodate heavy facility components like the 70-ton pressure vessels, which were brought in by special multi-axle truck trailers. Other large components like the 72-foot Diameter Vacuum Sphere were transported in pieces and welded in place.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

1.2 Aircraft
2.2 Guided Missiles
2.11 Weapons Fuzing

2.12 Weapons Propulsion
5.3 Special Sensors
8.1 Ballistic Missile Defense
8.2 Countermeasures (CM)
9.1 Navy Strategic Systems
10.7 Major Range Development and Operation
11.10 Other Technology Base Programs

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

The Wind Tunnel Complex is currently operated as a Service Cost Center (SCC) with no institutional funding. The bottom line to the utilization of a complex like the Wind Tunnel SCC is the total sponsor funding which supports the facility. Over the past five years program support has included testing and major facility/equipment upgrades funded by programs to meet specific needs. The minimum annual budget required to support the Wind Tunnel SCC is nominally $3.5M (low activity, not mothballed). Overflow testing years have resulted in annual budgets as high as $7.0M. The five year average budget average (1989 through 1993) was $4.9M.

12. Provide the projected utilization data out to FY1997.

The projected utilization of the Tunnel 9 Complex is expected to remain level with major testing support coming from Theater Missile Defense for the Army and Navy, as well as testing for the Navy's Strategic System Program (SSP), Air Force Ballistic Missile Organization (BMO) and the National Aerospace Plane Joint Program Office (NASP JPO). Work for these major programs is expected to be supplemented by smaller R&D technology programs. Projected utilization in total yearly income is as follows:

FY94	FY95	FY96	FY97
$5.2M	**$5.0M**	**$5.0M**	**$5.0M**

13. What is the approximate number of personnel used to operate the facility/equipment?

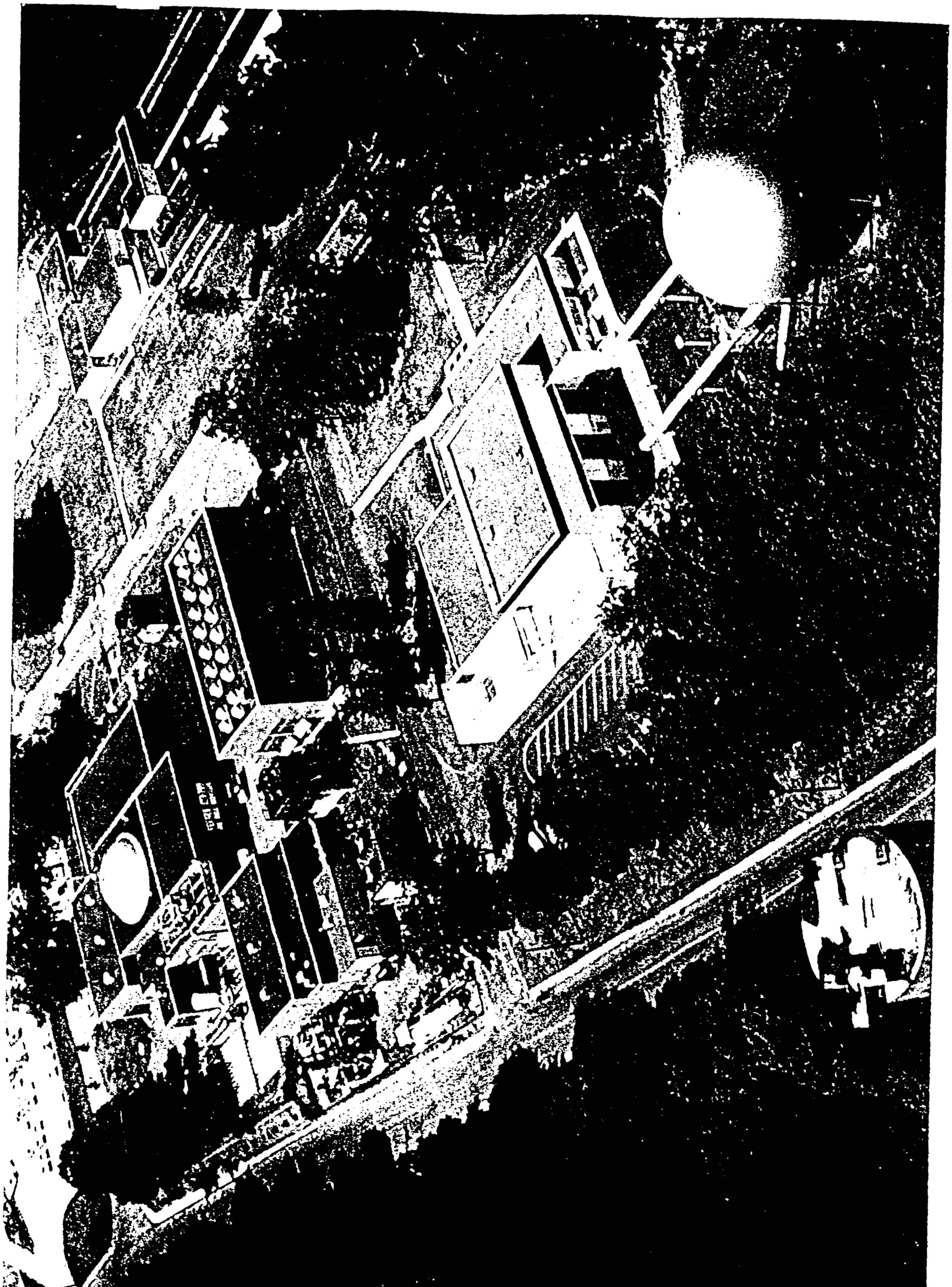
The Wind Tunnel SCC has approximately 46 people associated with its total operation which includes both testing for customers and maintenance of a test-ready facility. Many people split their time between operations and maintenance of the facility. Historically, direct operations support to customer programs averages 45% of the total manpower--20 people.

14. What is the approximate number of personnel needed to maintain the equipment?

The Wind Tunnel SCC has approximately 46 people associated with its total operation which includes both testing for customers and maintenance of a test-ready facility. Many people split their time between operations and maintenance of the facility. Historically, maintenance of the facility requires 55% of the total manpower--26 people.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.



HYPERVELOCITY WIND TUNNEL COMPLEX

SPECIAL FACILITIES AND EQUIPMENT
FACILITIES/EQUIPMENT CAPABILITY FORM

Technical Center Site	**White Oak Site**
Facility/Equipment Nomenclature or Title	**Underwater Warhead Analysis Facility**

1. State the primary purpose(s) of the facility/equipment.

The Naval Surface Warfare Center has principal responsibility for research, development, testing, and evaluation (RDT&E) of underwater warheads for use in such weapons as torpedoes, mines, mine neutralization charges, Swimmer Weapons, and depth bombs. The Underwater Warhead Analysis Facility supports this mission in both the Warhead Development and Energetic Materials Research Technical Capabilities.

In the past, the approach to warhead design and damage assessment was based mostly on hardware fabrication and testing. New warhead designs were built and detonated at great expense in order to make design improvements. Iterations continued until a satisfactory design was achieved. Damage assessments consisted of testing the warhead designs against expensive scale model or live fire targets, and then building a database from which empirical damage rules were formulated. This approach was accepted as necessary until computer aided software developments and deeper understanding of dynamics became available to handle the complex warhead design and also the target structure complexity and the new formulae for damage to these structures by enhanced warhead effects.

The Underwater Warhead Analysis Facility is providing much needed computing capabilities for decision making. State of the art computer codes have recently included new algorithms which require massive computer time. Utilization of these new general purpose codes and database development systems in a classified environment is needed to provide the answers to complex questions of warhead design effectivness, safety, and lethality.

2. Indicate whether the facility/equipment is portable, moveable or fixed as defined by paragraph 6, page 12 of this data call.

The Underwater Warhead Analysis Facility is moveable, but does require a SECRET

secure location due to information security requirements. By BRAC definition, this system is considered to be Class 2.

3. Provide the replacement value of the facility/equipment. Report the facility/equipment cost separate from any building and utilities that may be integral to the facility/equipment.

$2.7 Million in Computer Equipment and Firmware.
$1.0 Million in Building and Utility Requirements.
$1.0 Million in Software Development.

The existing facility has supported current warhead efforts to produce new data previously unattainable with over twenty manyears assigned to this warhead analytical development. This number is expected to increase to forty manyears by 1997 with the inclusion of new software development thrusts. The system, able to complete these problems, was expected to cost five million dollars. New technology and equipment cost reductions have reduced the facilitiy development costs and the realized gains of excellence in analysis have already paid for this system.

The intangible benefits realized during the MK 50 Torpedo Program enabled an increase of personnel safety during explosive operations. This is due directly to simulation efforts developed at the Facility in the Insensitive Munitions Advanced Development Programs Efforts. Better understanding of complex explosive component information has been shown to have a direct relationship to accidental prevention.

4. Provide the gross weight and cube of the facility/equipment.

Floor Space: 2132 Square Feet
Volume: 25,584 Cubic Feet (Estimated Total Volume)
10,000 Cubic Feet (Estimated Equipment Volume)
Weight: 15 tons (estimated, including Air Conditioning and Power Units)

5. Indicate any "special" utility support required by this facility/equipment other than normal electrical power.

100 KVA 208v 3 Phase AC power
10 tons Air Conditioning with humidity control
Security/Fire Alrarms
Special Access Ramps
Raised Floors Security Penetration Resistant Walls, Ceiling and Floors

6. Indicate any special budget requirements for the facility/equipment (i.e., special foundations, non-ferrous materials, shielding, hardening, etc.).

1/4" Steel Penetration Resistant Wall Coverings (Information Security Requirement)
Shielded Power Supply (100 KVA 208v 3 Phase AC) (Security Requirement)
Raised Floors
Special Access Ramps (Handicapped)
Security Vault Doors (Security Requirement)
Security Vault Combinations & Locks (Security Requirement)

7. State any environmental control requirements for the facility/equipment (i.e., temperature, humidity, air scrubbing).

Temperature: A/C to between 65 and 75 degrees.
Humidity: 20% to 40% Relative (Both De- and Humidification Cycles Required)

8. Indicate if this facility/equipment would be extremely difficult or impossible to replicate or relocate at another site and the impact to the Department of the Navy if this facility/equipment were lost. Consider existing Government-wide and commercial capabilities as the replication and impact statements are formulated.

The Underwater Warhead Analysis Facility has been moved previously from one on-station location to another. The only difficulty in moving the equipment off station will be the backup and transportation of secure data from one site to another. Loss of the facility would result in loss of a Navy capability as reported by DoE/DoD Joint panel in 1983.

9. Indicate how and when the facility/equipment was transported and or constructed at the site.

The Underwater Warhead Analysis Facility is currently located in Building 29, IHDIVNSWCWODET. The building was reconditioned in 1987 to have adequate space, environmental control, and power resources for running this system as secure computational facility. The Facility is completely self contained and is configured to meet all existing and applicable security requirements needed to process classified data up to and includeing the Secret level. Computer equipment was transported from its previous secure location (Building 90) by moving trucks contracted by Digital Equipment Corporation. Estimated 1987 moving costs was (including damaged equipment, excluding building preparation) $50,000.00.

10. List the functional support areas (previously provided in Tab A) that this facility/equipment support. Refer to Appendix A for the list of functional support areas.

2.2 Guided Missiles
2.3 Free Fall Weapons and Rockets
2.4 Torpedoes
2.7 Explosives
2.8 Launchers
2.11 Weapons Fuzing
2.13 Other Ordnance
8.2 Countermeasures (CM)
9.2 Nuclear Weapons and Effects
11.1 Computers
11.2 Software
11.5 Materials and Processes
11.6 Energy Storage
11.8 Design Automation
11.10 Other Technology Base Programs

11. Provide the historical utilization average for the past five fiscal years (1989-1993). Define the unit of measure used.

5 year Funding (est) $1.3M
5 year Program Costs Avoided (est) $10M

Average task requires thirty CPU days of run time, equating to approximately $30.00 per CPU hour in a secure environment. Cost avoidance is measured by estimating the equivalent number of tests and costs per test to duplicate the information obtained from a single analytical effort. However, these are only subjective estimates and are directly related to sponsor funding of the facility and tasks.

12. Provide the projected utilization data out to FY1997.

4 YR Facility Cost (Est) $.64M
4 YR Program Costs Avoided (Est) $6M.

13. What is the approximate number of personnel used to operate the facility/equipment?

The facility has one operator and approximately forty users.

14. What is the approximate number of personnel needed to maintain the equipment?

The facility is maintained by one in-house employee and numerous hardware and software maintenance contracts.

15. Provide one 8 1/2 x 11 black and white photo of the facility/equipment.

See attached photograph.

TAB C

RANGE RESOURCES

RANGE CAPABILITY FORM

RANGE RESOURCES
RANGE CAPABILITY FORM

Technical Center Site	**Dahlgren Site**
Range Nomenclature or Title	**Potomac River Test Range**

1. List all the ranges that your activity maintains and operates. Provide the following information on each range:
Technical Center Site:

a. A brief statement of what the range is used for:

The complex of test facilities at the Dahlgren site consists of the following:

- Potomac River Test Range (PRTR) (Open Air Range)
- Explosive Experimental Area (EEA) (Measurement Facility)
- Warheads Research Test Facility (WRTF) (Measurement Facility)
- Electromagnetic Vulnerability Assessment Facility (EMVAF) (Measurement Facility)
- Electromagnetic Pulse Test Facilities (EMPF) (Measurement Facility)
- Search and Track Sensor Test Site (STSTS) (Measurement Facility)

This complex of facilities was established at NSWCDD to allow us to conduct our mission of weapons systems research and development for the Navy. This complex of unique and interdependent facilities is used for testing weapons systems and components throughout their life cycle; however, the prime purpose of this complex is to fulfill our research and development mission.

As part of past T&E Reliance Studies, an MOU was signed by the Service Acquisition Executives declaring that all Naval Gun Testing was to be consolidated at Dahlgren. The finding of the most recent Reliance consolidation study found that the technical requirements for fuze and sensor testing as well as the spectrum of EMV testing could not be accomplished at any other DoD range. In addition, the study found that even if technical capabilities were to taken into account the cost of moving would never be paid back by operational savings.

The majority of the Dahlgren test facilities are unique within the United States. The Potomac River Test Range is unique in that it combines the best aspects of land and sea ranges to provide a controlled maritime environment bounded by land allowing accurate measurements without onboard instrumentation. There is no other range in the US capable of conducting the required scope of testing of Naval Guns.

The Electromagnetic Vulnerability Assessment Facility (EMVAF) is the only complete test facility able to simulate the high-power full-threat operational electromagnetic environment (EME) in which the DoD must operate. These multipurpose test facilities are designed to generate the complex, modulated, high-power, radiated environments required for far-field evaluation of medium to large scale electronic and weapon systems. NSWCDD is the only organization within DoD that currently maintains all of these facilities at one site.

The combination of the STSTS and PRTR provides an 80,000 yard land free horizon coupled with a littoral environment and extensive infrastructure and ground truth both at the STSTS and downrange. It is the only instrumented overwater range where routine operations involving inbound and outbound aircraft at any altitude and supersonic speed, drones, gun launched projectiles that emulate low altitude, low observable anit-ship cruise missiles and surface craft can track. The STSTS is the only overwater facility developed for large scale multi-sensor system testing.

The effect of closing any one of these interdependent testing facilities would have a direct effect on the operation of the other facilities and, in some cases, would prevent the continued operation of others. All explosive operations are controlled through the PRTR, this includes all the measurement facilities. The STSTS uses the same air space as the PRTR and depends on the PRTR for target control and ground truth tracking. Real time data collection for the Explosive Experimental Area is passed over fiber optic link to PRTR. Also, there are direct connections with two non-range facilities (the Warhead Development Facility and the Weapons Systems Safety Analysis and Evaluation Facility) and the Explosvie Experimental Area which, if closed, would eliminate our capability to perform our weapons development mission. All of our test facilities are an essential part of our R&D mission and cannot be moved without significantly depleting our research and development capability or, in some cases, eliminating that capability.

b. Geographic location of the range.

Dahlgren, King George County, Virginia

c. Distance from the range to the activity's headquarters facility (main site):

NSWCDD headquarters is co-located with the PRTR. The PRTR is approximately 50 miles southeast of NSWC headquarters in Arlington, VA.

d. Range size in square miles:

The water range is approximately three miles wide and sixteen miles long.

e. Scheduling authority:

Range scheduling is controlled by the NSWCDD Range Scheduling Office and is normally on a first-come, first-served basis.

f. Air space available/restrictions.

Restricted Areas R-6611 and R-6613 provide restricted airspace above the PRTR to an altitude of 60,000 feet.

g. Maximum water depth available/restrictions:

No underwater testing is conducted at the PRTR. The Potomac River is approximately 25 to 30 feet deep in the channel.

h. Instrumentation capability:

A full range of instrumentation for testing gun systems, including pressure gauges, telemetry devices, high speed photography and video, meteorology, irig timing, velocimeters, optical and radar tracking devices, as well as general instrumentation, such as oscilloscopes, strip chart recorders, analog and digital recorders are available.

i. Accuracy of tracking:

5" projectiles can be tracked in flight to an accuracy of approximately .5m from a distance of 3 km.

j. Data collection/replay capability.

Data may be collected at various points along the flight of a test object and transmitted via fiber-optic link to a central location where it may be recorded and replayed in near real-time.

k. What are the maximum hours per year that this range is available to support activities? Provide the actual hours that the range was up and capable of providing services. Do not count "down time" due to maintenance, reconfiguration, or administrative activities (i.e. Holiday shutdowns).

The PRTR is available for testing approximately 1800 hours per year. This time does not include weekends or holidays and it takes into account down time due to weather, darkness, maintenance and training requirements.

l. What were the actual hours this range was utilized per year for the last five years (FY89-93).

FY89	**1264**
FY90	**1048**
FY91	**1112**
FY92	**1080**
FY93	**968**

m. What were the actual hours that this range was utilized in FY 1993?

968

n. Who are the customers of the range?

(1) Single Manager for Conventional Ammunition-Army
(2) Naval Sea Systems Command
(3) Naval Surface Warfare Center Divisions including Crane Division and Indian Head Division

o. Of the actual hours utilized what percentage of utilization time was provided to which customers?

(1) Single Manager for Conventional Ammunition-Army	**40%**
(2) Naval Sea Systems Command	**5%**

(3) NSWC Crane Division **10%**
(4) NSWC Indian Head Division **5%**
(5) NSWC Dahlgren Division **30%**

p. Provide a sketch, drawing or map of the range:

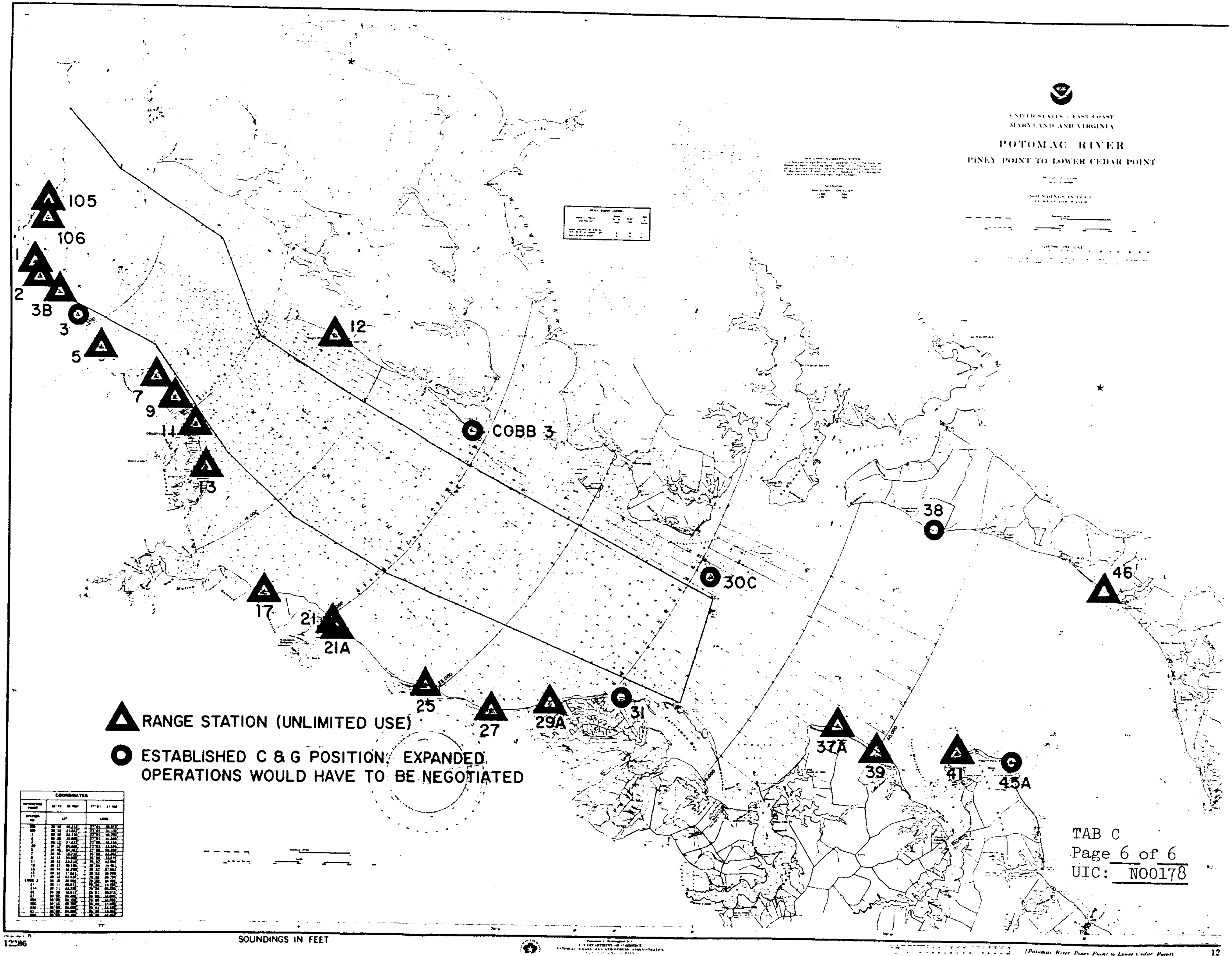
Sketch attached.

2. Are any of your ranges part of the DoD Major Range and Test Facility Base (MRTFB)? (Yes/No) If yes, which ones?

No. The PRTR is not a member of the MRTFB.

3. Are they any limiting (current or future) environmental and/or encroachment characteristics that are associated with this range?

The PRTR uses the Potomac River as the impact area for gun fired projectiles. Civilian population resides on both sides of the river. PRTR performs atmospheric sampling and calculations and adjusts firing schedules in order to mitigate disturbance due to noise resulting from testing activities. This policy results in test delays but has only cancelled 5 tests over the last two years.



TAB C
Page 6 of 6
UIC: N00178

NSWC DAHLGREN, DAHLGREN

DATA CALL #5

JL
SEA 09X
5/13/94

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

NEXT ECHELON LEVEL (if applicable)

N. S. SCOTT, CAPT. USN
NAME (Please type or print)

Signature

COMMANDER
Title

10 May 94
Date

NAVAL SURFACE WARFARE CENTER

DAHLGREN DIVISION

Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

NEXT ECHELON LEVEL (if applicable)

RADM (SEL) D. P. SARGENT, JR.
NAME (Please type or print)

Signature

COMMANDER
Title

5/11/94
Date

NAVAL SURFACE WARFARE CENTER
Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

MAJOR CLAIMANT LEVEL

G. R. STERNER
NAME (Please type or print)

Signature

Commander
Naval Sea Systems Command
Title

5-13-94
Date

Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

DEPUTY CHIEF OF NAVAL OPERATIONS (LOGISTICS)

DEPUTY CHIEF OF STAFF (INSTALLATIONS & LOGISTICS)

J.B. GREENE JR.
NAME (Please type or print)

Signature

ACTING
Title

23 MAY 1994
Date

NSWC DAHLGREN, DAHLGREN
DATA CALL #5

JL
SEA 09X
5/13/94

BRAC-95 CERTIFICATION

Reference: SECNAVNOTE 11000 of 08 December 1993

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I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

ACTIVITY COMMANDER

N. S. SCOTT, CAPT, USN
NAME (Please type or print)

Signature

COMMANDER
Title

10 May 94
Date

NAVAL SURFACE WARFARE CENTER
DAHLGREN DIVISION
Activity

203

ERRATA PAGE
for
Data Call #5
Naval Surface Warfare Center
Dahlgren Division
Dahlgren Site
UIC: N00178

1. **Page 103-R** includes further explanation of crime rate under "Note:." This explanation identifies the reason for the seemingly large crime rates for the Dahlgren Site.

2. **TAB A is being resubmitted in its entirety so that it can be substituted for the original TAB A. Pages which have been changed are denoted with an "-R" after the page number. Below are the explanations for the changes to TAB A.**

75-76, 78 MLP NSWC-033 7-19-94

a. **Pages 6-8, 10-14, 16-34, 42, 45, 48, 63-65, ~~75-78~~, 81-82, 94, 98, 108, 111, 114, 122, 125-129, and 130 "-R's"** have been resubmitted. This resubmission is the result of a mathematical error in the computing the Out-of-House Expenditures (paragraph 2.b). The mathematical error resulted because the financial systems entries were allowed to be proportioned between two or more Function Support Area/Life Cycle Work Area intersections where appropriate. However, in developing the Out-of-House Expenditures for TAB A this proportioning was not applied. Thus, Out-of-House Expenditures were overstated.

b. **Page 34A-R** is a new page. This page was accidentally omitted in the original submission and not discovered in review.

c. **Pages 35-41-R's** have been resubmitted due to an omission error which caused sequencing problems in the Life Cycle Work Area. This resulted in the wrong values in paragraphs 1. and 2. for all of these pages.

d. **Pages 46-R and 116-R** have been resubmitted due to errors in transcribing data to TAB A. Paragraphs 1, 2.a., b., and c. are in error.

e. **Pages 47-R and 51-R** have been resubmitted due to errors in transcribing data to TAB A. Paragraphs 2.a. and b. are in error.

f. **Pages 52-R and 120-R** have been resubmitted due to errors in transcribing data to TAB A. Paragraph 2.a. are in error.

~~g. **Page 83-R** has been resubmitted to correct a typographical error in the title box.~~ MLP NSWC-033 7-19-94

h. **Pages 53-R, 119-R, and 121-R** have been intentionally left blank due to page numbering error in original submissions which omitted these page numbers.

i. **Page 117-R** is a replacement page for a blank page numbered 117, which was left out of the original submission due to printing error.

Revision pg 103R + TAB A

Data Call #5, Naval Surface Warfare Center, Dahlgren Division,
Dahlgren Site

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

NEXT ECHELON LEVEL (if applicable)

N. S. SCOTT, CAPT, USN
NAME (Please type or print)

Signature

COMMANDER
Title

1 June 94
Date

NAVAL SURFACE WARFARE CENTER
DAHLGREN DIVISION
Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

NEXT ECHELON LEVEL (if applicable)

RADM (SEL) D. P. SARGENT, JR.
NAME (Please type or print)

Signature

COMMANDER
Title

6/3/94
Date

NAVAL SURFACE WARFARE CENTER
Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

MAJOR CLAIMANT LEVEL

G. R. STERNER
NAME (Please type or print)

Signature

Title

7-1-94
Date

Commander
Naval Sea Systems Command
Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

DEPUTY CHIEF OF NAVAL OPERATIONS (LOGISTICS)
DEPUTY CHIEF OF STAFF (INSTALLATIONS & LOGISTICS)

W. A. EARNER
NAME (Please type or print)

Signature

Title

7/26/94
Date

Data Call #5, Naval Surface Warfare Center, Dahlgren Division, Dahlgren Site

BRAC-95 CERTIFICATION

Reference: SECNAVNOTE 11000 of 08 December 1993

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I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

ACTIVITY COMMANDER

N. S. SCOTT, CAPT, USN
NAME (Please type or print)

Signature

COMMANDER
Title

NAVAL SURFACE WARFARE CENTER
DAHLGREN DIVISION
Activity

Date: June 24

Footnote:
Revision to the Dahlgren Division, Dahlgren Site BRAC-95 Data Call #5, pages 103R and Tab A. Additional details of changes described on attached Errata sheets.

pg 14

Data Call #5, Revision 8/22/94 for the Dahlgren Site

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

NEXT ECHELON LEVEL (if applicable)

J. C. OVERTON, CAPT, USN
NAME (Please type or print)

Signature

COMMANDER
Title

22 Aug 94
Date

NAVAL SURFACE WARFARE CENTER
DAHLGREN DIVISION
Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

NEXT ECHELON LEVEL (if applicable)

RADM (SEL) D. P. SARGENT, JR.
NAME (Please type or print)

Signature

COMMANDER
Title

8/23/94
Date

NAVAL SURFACE WARFARE CENTER
Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

MAJOR CLAIMANT LEVEL

NAME (Please type or print)

Signature

~~G. R. STERNER~~
Title
Commander
Naval Sea Systems Command
Activity

8/27/94
Date

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

DEPUTY CHIEF OF NAVAL OPERATIONS (LOGISTICS)
DEPUTY CHIEF OF STAFF (INSTALLATIONS & LOGISTICS)

W. A. EARNER
NAME (Please type or print)

Signature

9/1/94

Title

Date

Pg 14

Data Call #5, Revision 8/22/94 for the Dahlgren Site

BRAC-95 CERTIFICATION

Reference: SECNAVNOTE 11000 of 08 December 1993

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ACTIVITY COMMANDER

J. C. OVERTON, CAPT, USN
NAME (Please type or print)

Signature

COMMANDER
Title

22 Aug 94
Date

NAVAL SURFACE WARFARE CENTER
DAHLGREN DIVISION
Activity

Data Call #5, Tab A, Second Revision for the Dahlgren Site

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

NEXT ECHELON LEVEL (if applicable)

N. S. SCOTT, CAPT, USN
NAME (Please type or print)

Signature

COMMANDER
Title

4 Aug 94
Date

NAVAL SURFACE WARFARE CENTER

DAHLGREN DIVISION

Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

NEXT ECHELON LEVEL (if applicable)

RADM (SEL) D. P. SARGENT, JR.
NAME (Please type or print)

Signature

COMMANDER
Title

8/10/94
Date

NAVAL SURFACE WARFARE CENTER
Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

MAJOR CLAIMANT LEVEL

E.S. MCGINLEY, II, ACTING
NAME (Please type or print)

Signature

Title

8/14/94
Date

Naval Sea Systems Comman
Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

DEPUTY CHIEF OF NAVAL OPERATIONS (LOGISTICS)

DEPUTY CHIEF OF STAFF (INSTALLATIONS & LOGISTICS)

W. A. EARNER
NAME (Please type or print)

Signature

Title

8/25/94
Date

Data Call #5, Tab A, Second Revision for the Dahlgren Site

BRAC-95 CERTIFICATION

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ACTIVITY COMMANDER

N. S. SCOTT, CAPT, USN
NAME (Please type or print)

Signature

COMMANDER
Title

4 Aug 94
Date

NAVAL SURFACE WARFARE CENTER
DAHLGREN DIVISION
Activity

R crime rates
203

Submission of clarification, Data Call #5 (9/9/94), Naval Surface Warfare Center, Dahlgren Division, Dahlgren Site

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

NEXT ECHELON LEVEL (if applicable)

J. C. OVERTON, CAPT, USN
NAME (Please type or print)

Signature

COMMANDER
Title

9/9/94
Date

NAVAL SURFACE WARFARE CENTER
DAHLGREN DIVISION
Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

NEXT ECHELON LEVEL (if applicable)

RADM (SEL) D. P. SARGENT, JR.
NAME (Please type or print)

Signature

COMMANDER
Title

9/14/94
Date

NAVAL SURFACE WARFARE CENTER
Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

MAJOR CLAIMANT LEVEL

G. R. STERNER
NAME (Please type or print)

Signature

Commander
Naval Sea Systems Command
Title

9-19-94
Date

Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief.

DEPUTY CHIEF OF NAVAL OPERATIONS (LOGISTICS)
DEPUTY CHIEF OF STAFF (INSTALLATIONS & LOGISTICS)

NAME (Please type or print)

Signature

Title

10/1/94
Date

BRAC-95 CERTIFICATION

Submission of clarification for Data Call #5 (9/9/94), Naval Surface Warfare Center, Dahlgren Division, Dahlgren Site

Reference: SECNAVNOTE 11000 of 08 December 1993

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ACTIVITY COMMANDER

J. C. OVERTON, CAPT, USN
NAME (Please type or print)

Signature

COMMANDER
Title

9/9/94
Date

NAVAL SURFACE WARFARE CENTER
DAHLGREN DIVISION
Activity

Footnote:

This is theclarification for Data Call #5 in response to the further guidance provided by the BSAT facsimile of 9 September 1994.