

UNCLASSIFIED

EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N

PROGRAM ELEMENT TITLE: HARM Improvement

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
E1780 HARM Improvement	4,893	7,148	11,323	9,577	5,205	4,054	2,177	2,265	0	52,038
E2185 Advanced Anti-Radiation Guided Missile (AARGM)	32,813	22,428*	10,843	7,873	0	0	0	0	0	106,596**
E2211 Joint Advanced Weapons System (JAWS) (Army Lead)	934	956	1,476	2,950	3,937	3,923	3,930	3,927	0	22,033
TOTAL	38,640	30,532	23,642	20,400	9,142	7,977	6,107	6,192	0	180,667

*FY99 estimate reflects a \$12.0M Congressional Add for AARGM(W2661/E2661).

**Funding prior to FY97 for this project is under PE 0603217N. E1780, E2185,E2211 were previously executed under W1780, W2185, W2211 respectively.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

(U) E1780/HIGH-SPEED ANTI-RADIATION (HARM) IMPROVEMENT: The HARM Improvement Program consists of two improvement efforts: a tactical software upgrade (Block V) to the missile, and the International HARM Upgrade Program (Block VI). Block VI is a tri-national cooperative program consisting of a tactical software upgrade in conjunction with a hardware upgrade which includes the installation of an Inertial Measurement Unit (IMU) closely coupled with a Global Positioning System (GPS) receiver. This will provide a much improved guidance capability for the current AGM-88B missile (in German and Italian inventories) and AGM-88C missile (in U.S. inventory). This IMU/GPS system will be retrofitted into existing missiles, as a kit, at the depot.

(U) E2185/ADVANCED ANTI-RADIATION GUIDED MISSILE (AARGM) and W2166/AARGM (Congressional Add): AARGM is a Phase III Small Business Innovative Research (SBIR) program designed to demonstrate an advanced dual-mode seeker on an existing High speed Anti-Radiation Missile (HARM) airframe. Project Unit W2166 is used to track congressional adds to the program.

(U) E2211/JOINT ADVANCED WEAPONS SYSTEM (JAWS): JAWS is a proposed joint service program which will fulfill Army and Marine Corps Mission Needs Statement requirements for the program. The Navy is participating with the Army in joint trade studies and development of Milestone 0 support documentation including a FY 2000 new start decision and joint Analysis of Alternatives (AOA).

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PROGRAM ELEMENT TITLE: HARM Improvement

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

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**PROGRAM ELEMENT: 0205601N
PROGRAM ELEMENT TITLE: HARM Improvement**

**PROJECT NUMBER: E1780
PROJECT TITLE: HARM Improvement**

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
E1780 HARM Improvement *	4,893	7,148	11,323	9,577	5,205	4,054	2,177	2,265	0	52,038
TOTAL	4,893	7,148	11,323	9,577	5,205	4,054	2,177	2,265	0	52,038

Quantity of RDT&E Articles: N/A

* Project Unit W1780 changed to Project Unit E1780 to reflect proper major claimant.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The High-speed Anti-Radiation Missile (HARM) is a joint service program with the Air Force (NAVY lead). The program has been in full production since FY 1983. Program Element 0205601N was used until FY 1990 to develop and test one hardware and two software upgrades to the HARM as Engineering Change Proposals (ECPs). Another ECP software program (Block V) is under development that modifies HARM software in order to meet expanding requirements. This joint service upgrade is being developed with Air Force funds under Raytheon TI Systems, Inc. contract N0001993G0179. The Air Force funds cover all contractor development and contractor Test and Evaluation (T&E) cost. The Navy funds cover all government costs related to development and T&E. The tactical software upgrade will give HARM a Home-On-Jam (HOJ) capability, improved geographic specificity, and improved capability against advanced waveforms. Studies to address corrective actions for documented deficiencies will be conducted.

The Block VI HARM Upgrade Program is a tri-national (U.S., Italy, and Germany) cooperative program designed to improve the HARM's effectiveness by enhancing the missile's probability of kill and reducing the potential for fratricide while making the missile easier to employ. The Program consists of significant hardware and software modifications to the missile's control and guidance sections. The three nations involved have agreed to jointly fund the design, development, testing and production of hardware kits to be installed in the missile control section along with an improved software version to be installed in the missile guidance section.

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DATE: FEBRUARY 1999

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**PROGRAM ELEMENT: 0205601N
PROGRAM ELEMENT TITLE: HARM Improvement**

**PROJECT NUMBER: E1780
PROJECT TITLE: HARM Improvements**

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) (\$1,832) Began execution of the joint service combined Development Test/Operations Test (DT/OT) program for the Block V upgrade at the Naval Air Warfare Center - Weapons Division (NAWC-WD), China Lake. Continued government development of Electronic Intelligence (ELINT), Tactical Aircraft Mission Planning System (TAMPS), and avionics update required for the Block V Upgrade.
- (U) (\$683) Developed capability to verify and test missiles while installing software developed under Block IIIA/V program.
- (U) (\$153) Continued weapons system upgrade studies assessing weapon service life, missile performance, deficiencies, and logistics requirements.
- (U) (\$862) Initiated Engineering and Project Management Services in support of the HARM Upgrade Program (Block VI). Contract will require incremental funding from all three co-development partners (U.S. Navy, Italy, and Germany) from FY 1998-2002.
- (U) (\$403) Initiated Government engineering support including system performance definition, specification requirements and design analysis for the International HARM Upgrade Program (Block VI).
- (U) (\$240) Initiated Contractor engineering support including system performance definition, specification requirements and design analysis for the International HARM Upgrade Program (Block VI).
- (U) (\$24) Initiated Government test planning, including development of the Test and Evaluation Master Plan and DT/OT test plans for Block VI.
- (U) (\$696) Initiated Government participation in defining HARM Upgrade Program (Block VI) aircraft integration requirements, including the HARM Mission Planning Module modifications for TAMPS; software requirements for the HARM Command Launch Computer (CLC); as well as the initial development of the interface control documents and support for the F/A-18 Operational Flight Program (OFP).

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PROGRAM ELEMENT TITLE: HARM Improvement**

**PROJECT NUMBER: E1780
PROJECT TITLE: HARM Improvements**

2. FY 1999 PLAN:

- (U) (\$1,842) Complete the NAWCWD China Lake Block V joint service support of the combined DT/OT program. Complete government development of ELINT, TAMPS, and avionics updates required for the Block V Upgrade. Conduct the Functional Configuration Audit/Physical Configuration Audit and development of the Engineering Change Proposal to incorporate the Block V software into the HARM inventory.
- (U) (\$199) Provide HARM Block V system engineering support of development and systems integration efforts. Continue weapon system upgrade studies assessing weapons service life, missile performance, deficiencies, and logistics requirements.
- (U) (\$1,009) Provide logistic support by Government personnel of Block V Software Upgrade to HARM missiles at field sites.
- (U) (\$500) Initiate Contractor development of Block VI USN unique software subroutines.
- (U) (\$723) Continue Engineering and Project Management Services in support of the HARM Upgrade Program (Block VI) contract.
- (U) (\$561) Continue Government engineering support of the HARM Upgrade Program (Block VI) including preparation for a Preliminary Design Review; support for the Interface Control Working group in defining interface requirements; supporting contractor sub-system design, analysis and testing.
- (U) (\$370) Continue Government support of contractor testing including evaluation of test plans, reports, and preparation of detailed test planning documentation.
- (U) (\$208) Initiate Government logistic support including logistics support analyses and evaluating contractor designs for Block VI.
- (U) (\$1,708) Continue Government and contractor participation in developing the aircraft avionics updates required by the HARM Upgrade Program (Block VI) in addition to CLC/TAMPS upgrade efforts and ELINT development.
- (U) (\$28) Portion of the extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

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**PROGRAM ELEMENT: 0205601N
PROGRAM ELEMENT TITLE: HARM Improvement**

**PROJECT NUMBER: E1780
PROJECT TITLE: HARM Improvements**

3. FY 2000 PLAN:

- (U) (\$1,230) Continue design/development of Inertial Measurement sub-systems and development of hardware and software associated with Block VI.
- (U) (\$500) Continue development of Block VI USN unique software sub-routines.
- (U) (\$1,395) Continue Engineering and Project Management Services in support of the HARM Upgrade Program (Block VI) contract.
- (U) (\$1,920) Continue Government engineering support of the HARM Upgrade Program (Block VI) including preparation for Critical Design Review of Block VI software/hardware design. Effort includes further engineering studies, threat analysis, 6 Degrees of Freedom (DOF) analysis, documentation analysis, interface definition, precision navigation engineering, and software quality evaluation.
- (U) (\$1,640) Continue Government support of contractor testing including evaluation of test plans, reports, and preparation of detailed test planning documentation, and captive flight testing.
- (U) (\$620) Continue Government logistic support including logistics support analyses, maintenance engineering, support equipment engineering, and evaluating contractor designs.
- (U) (\$4,018) Continue Government and contractor participation in integration efforts. Continue developing the aircraft avionics updates required by the HARM Upgrade Program (Block VI) in addition to Command Launch Computer (CLC)/TAMPS upgrade efforts and ELINT development. Develop HARM TAMPS/Mission Planning Module (MPM) rehost.

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PROJECT NUMBER: E1780
PROJECT TITLE: HARM Improvements

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	4,926	7,448	11,525
(U) Appropriated Value:	4,958	7,448	
(U) Adjustments from Pres Budget:	-33	-300	-202
(U) FY 2000 President's Budget Submit:	4,893	7,148	11,323

CHANGE SUMMARY EXPLANATION:

(U) Funding:

The FY 1998 decrease of \$33K is due to a TAMPS reprogramming action of +\$125K, a -\$94K SBIR assessment, a +\$1K increase due to a below threshold reprogramming action and a -\$65K decrease for a 1998 update.

The FY 1999 decrease of \$300K is due to a -\$17K civilian personnel underexecution reduction, a -\$266K assessment for contract, advisory and assistance services and a -\$17K FY1998 update.

The FY 2000 decrease of \$202K reflects a balancing adjustment of -\$19K, an inflation adjustment of -\$165K, a Working Capital Fund adjustment of -\$77K and a civilian pay rate correction of +\$59K.

(U) Schedule: No changes

(U) Technical: No changes

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(U) C. OTHER PROGRAM FUNDING SUMMARY

<u>Appn</u>	<u>FY 1998</u> <u>Budget</u>	<u>FY 1999</u> <u>Budget</u>	<u>FY 2000</u> <u>Estimate</u>	<u>FY 2001</u> <u>Estimate</u>	<u>FY 2002</u> <u>Estimate</u>	<u>FY 2003</u> <u>Estimate</u>	<u>FY 2004</u> <u>Estimate</u>	<u>FY 2005</u> <u>Estimate</u>	<u>To</u> <u>Complete</u>
WPN HARM MODS	0	0	0	0	0	10,699	10,964	11,193	16,192

Related RDT&E Not Applicable

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PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT TITLE: HARM Improvements

(U) D. ACQUISITION STRATEGY:

The HARM Block VI Upgrade program is an ACAT III Program and will consist of three separate phases (EMD, Production, and Technology Evaluation and Assessment). The acquisition strategy for the HARM Block VI Program is complete and is based upon a signed international Memorandum of Agreement with Germany, Italy, and the U.S. Navy; a tri-national Cooperative Operational Requirements Document (CORD) details German, Italian, and U.S. Navy common requirements; and a Cooperative Test and Evaluation Master Plan (CTEMP) summarizes all test requirements. These three documents drive the overall acquisition approach to the HARM Block VI project.

Management of the Block VI upgrade will be directed by a trilateral Steering Committee, however, the U.S. Navy Project Manager (in concert with Project Managers from Germany and Italy) is responsible for Program execution. Each partner will share one-third of "common costs," the U.S. Navy will fund Block VI unique costs, and the German and Italian participants will fund Block IIIB unique costs. Each country will pay its own aircraft integration costs.

The acquisition strategy delineates Industry and Government responsibilities. The contract strategy (i.e. hardware and software for missile, upgraded missile sections, contractor team responsibility for missile performance) assigns unique work tasks to each firm. Contract strategy is to issue contracts to Bodenseewerk Geratetechnik GmbH (BGT) (German), Alenia Difesa (Italian), and Raytheon Texas Instruments Systems (RTIS) (U.S.) firms and will maximize use of commercial-off-the-shelf (COTS)/government-off-the-shelf (GOTS)/non-development items (NDI). Each Phase I (EMD) contract type and structure is tailored to the product of each firm.

(U) E. SCHEDULE PROFILE

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>To Complete</u>
(U) Program Milestones		M/S II (1Q)		
(U) Engineering Milestones		PDR (4Q)	CDR(4Q)	TRR(3Q)
(U) T&E Milestones				Combined DT/OT (3Q01 - 1Q02)
(U) Contract Milestones		RTIS, BGT & ALENIA (1Q)*		

* BGT and ALENIA Contracts are not funded with U.S. funds, but are significant milestones in the Block VI contract schedule.

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N

PROJECT NUMBER: E1780

PE TITLE: HARM Improvement

PROJECT TITLE: HARM Improvements

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u>	<u>FY 1999 Cost</u>	<u>FY 1999 Award Date</u>	<u>FY 2000 Cost</u>	<u>FY 2000 Award Date</u>	<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
Product Development										
Block IIIA/V Development	WX	NAWC WD, China Lake	5961	1709	Oct 98	0	0	0	7670	7670
Block IIIA/V Development	WX	NAWC WD, Pt. Mugu	125	0		0		0	125	125
Block VI Development	CPIF	RTIS, Texas	0	500	Dec 98	1730	Dec 98	0	2330	2330
Block VI Eng Analyses	FFP	RTIS, Texas	240	0		0		0	240	240
Block VI Development	WX	NAWC WD, China Lake	1099	2269	Oct 98	5938	Oct 99	7430	16736	16736
Block VI ILS	WX	NAWC WD, Point Mugu	0	208	Oct 98	620	Oct 99	2550	3378	3378
Subtotal Product Development			7425	4686		8288		9980	30379	30379
Remarks: NONE										
Support										
HARM Technical/Integration Studies	WX	NAWC WD, China Lake	110	23	Oct 98	0		277	410	410
Subtotal Support			110	23		0		277	410	410

Remarks: NONE

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EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

**PROGRAM ELEMENT: 0205601N
PE Title: HARM Improvement**

**PROJECT NUMBER: W1780
PROJECT TITLE: HARM IMPROVEMENT**

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total	FY 1999		FY 2000		Cost to Complete	Total Cost	Target Value of Contract
			Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date			
Test and Evaluation										
Block IIIA/V	WX	NAWC WD, China Lake	1524	1142	Oct 98	0		0	2666	2666
Block VI	WX	NAWC WD, China Lake	24	370	Oct 98	1640	Oct 99	8186	10220	10220
Subtotal Test & Evaluation			1548	1512		1640		8186	12886	12886
Remarks: NONE										
Management										
TRAVEL	WX	NAWC AD, Patuxent MD	179	70	Oct 98	50	Oct 99	250	549	549
Technical Assessments/Mgmt Support	RX/LOE	DCS, Alex VA	1092	829	Dec 98	1345	Dec 99	4520	7786	7786
SBIR Assessment				28					28	
Subtotal Management			1271	927		1395		4770	8363	8363
Remarks: NONE										
Total Cost			10354	7148		11323		23213	53038	52038

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DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

**PROGRAM ELEMENT: 0205601N
PROGRAM ELEMENT TITLE: HARM Improvement**

**PROJECT NUMBER: E2185
PROJECT TITLE: Advanced Anti-Radiation Guided
Missile(AARGM)**

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
E2185 Advanced Anti-Radiation Guided Missile (AARGM)*	32,813	22,428***	10,843	7,823	0	0	0	0	0	106,596**

* Project Unit changed from W2185 to E2185 to reflect proper major claimant

** Funding prior to FY97 for this project is under PE 0603217N

*** FY99 estimate reflects a \$12.0M Congressional add for AARGM (W2661/E2661)

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Advanced Anti-Radiation Guided Missile (AARGM) Project is a Phase III Small Business Innovative Research (SBIR) program to develop and demonstrate a dual-mode guidance section on a HARM airframe. The AARGM Phase III technology demonstration program is designed to demonstrate that a Dual-mode (passive Anti-Radiation Homing (ARH)/active Millimeter Wave (MMW) radar) missile can engage and destroy enemy air defenses in the event that these systems “shut-down”, or employ other countermeasures.

The issue of “shut-down” has been a major shortcoming in the suppression of enemy air defenses (SEAD) element of the offensive counter air mission area for the United States Navy and Air Force. Program objectives are to demonstrate an effective and affordable lethal SEAD capability against mobile, relocatable, or fixed air defense threats even in the presence of emitter shutdown or other Anti-Radiation Missile (ARM) countermeasures. The dual-mode technology being developed in the AARGM program has very high potential to solve the problem of “shut-down” not only in the primary weapon for SEAD, the High Speed Anti-Radiation Missile (HARM), but it could be integrated with many other missile airframes.

The AARGM technology demonstration program is an outgrowth of a Phase I and II competitive SBIR program. Phase I and II SBIR efforts successfully demonstrated the feasibility of a dual-mode seeker to address radar “shut-down” issues. Science and Applied Technology (SAT), Inc. (San Diego, CA), was awarded Phase I and II contracts (FY90-93) and was subsequently selected for a Phase III demonstration in FY94. Phase III work is being performed by SAT under NAVAIR contract N00019-94-C-0078. This contractual effort will continue to be incrementally funded, under program element 0205601N, resulting in a cumulative contract value of \$108.2M.

From FY93 through FY98, the AARGM program was a Congressionally mandated program which received its funding as an annual Congressional add. Starting in FY99, AARGM will receive its program funding through the standard DoD budget appropriation process. The FY99 funds added by Congress will be used to perform risk reduction tasks in preparation for a potential Milestone II Decision in FY 2001.

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**BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0205601N
PROGRAM ELEMENT TITLE: HARM Improvement**

**PROJECT NUMBER: E2185
PROJECT TITLE: Advanced Anti-Radiation Guided
Missile(AARGM)**

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) (\$31,051) Contractor integrated brassboard seekers into the SWES and CFT configurations. Commenced Control Test Vehicle (CTV) integration and test execution, prototype seeker fabrication and assembly, prototype seeker tests, and assemble and test Guided Test Vehicles (GTVs).
- (U) (\$700) Government performed technical analyses and directed project management services in support of the AARGM Advanced Technology contract.
- (U) (\$1,062) Field activity monitored the engineering activities of the AARGM Advanced Technology demonstration contractor. Conducted engineering assessments of Guidance Section Design. Provide T&E planning and engineering support to include assessment, availability and acquisition of targets, acquisition of DSM-160, and use of Advanced High Speed Anti-Radiation Missile (HARM) facility to support captive flight and live fire test programs. Provided management, technical engineering, and assembly support for the design, modification, and testing of telemetry sections in support of the AARGM CTV and GTV testing. Performed all-up-round and aircraft integration technical engineering, laboratory test support, aircraft integration, Command Launch Computer (CLC) justification, flight clearance and other activity related to AARGM field testing support. Field activity to provide analysis of alternatives based on approved weapons system scenarios to include an assessment of current Suppression of Enemy Air Defense (SEAD) deficiencies and an assessment of potential weapon system alternatives to mitigate identified deficiencies.

2. (U) FY 1999 PLAN:

- (U) (\$7,040) Contractor to develop software evaluation station, including hardware and software development, subsystems assembly and test, and seeker integration tests. Contractor to perform field tests of the AARGM brassboard seekers, prototype seeker tests, and GTV test execution.
- (U) (\$100) Government to perform technical analyses and continue technical management, engineering support, and coordination of AARGM Program weapons system technology development program.
- (U) (\$2,260) Field activity to provide AARGM system engineering support of development and systems integration efforts. Continue weapon system testing studies to assess weapons technology performance and deficiencies.
- (U) (\$800) Contractor to perform program management and engineering services in support of the AARGM technology demonstration program. Provide technical management support and coordination of AARGM Program weapons system technology studies.
- (U) (\$256) Portion of the extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

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**BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0205601N
PROGRAM ELEMENT TITLE: HARM Improvement**

**PROJECT NUMBER: E2185
PROJECT TITLE: Advanced Anti-Radiation Guided**

- (U) (\$9,800) Contractor to perform risk reduction activities in support of a FY 2001 potential Milestone II Decision to enter EMD. Activities will include ARH antenna array performance and affordability and producibility enhancements, MMW radar transceiver performance and affordability enhancements, EMI enhancements, radome material trade studies and advanced target discrimination algorithm development and validation.
- (U) (\$1,876) Field activity to assist in generating required documentation in support of a FY 2001 potential Milestone II Decision to EMD, including a logistics support analysis, life cycle cost analysis, draft ORD development and aircraft integration definitions. Will also provide system engineering support for prime contractor.
- (U) (\$296) Portion of the extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2000 PLAN:

- (U) (\$7,600) Contractor to conduct chamber tests of the software evaluation station/brassboard. Contractor to complete unique AARGM design and commence captive flight test preparation. contractor to complete control test vehicle integration, testing, and test analysis. Contractor to finalize development of AARGM prototype, to include hardware/software design upgrades, subsystems assembly and test, prototype integration and testing, and prototype captive carry test.
- (U) (\$2,343) Field activity to provide AARGM system engineering support of development and systems integration efforts. Continue weapon system testing studies to assess weapons technology performance and deficiencies.
- (U) (\$800) Contractor to perform program management and engineering services in support of the AARGM technology demonstration program. Provide technical management support and coordination of AARGM Program weapons system technology studies.
- (U) (\$100) Continue Government technical management, engineering support, and coordination of AARGM Program weapons system technology development program.

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PROJECT NUMBER: E2185
PROJECT TITLE: Advanced Anti-Radiation Guided
Missile(AARGM)

(U) B. PROGRAM CHANGE SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	33,962	10,480	11,000
(U) Appropriated Value:	32,813	22,480	
(U) Adjustments from Pres Budget:	-1,149	+11,948	-157
(U) FY 2000 President's Budget Submit:	32,813	22,428	10,843

CHANGE SUMMARY EXPLANATION:

(U) Funding:

The FY 1998 decrease of \$1,149K reflects a Small Business Innovative Research (SBIR) assessment.

The FY 1999 \$11,948 thousand increase reflects a decrease of \$24K for an OSD Update Adjustment, a Congressional add of \$12.0M and an economic assessment reduction of \$28K.

The FY 2000 decrease of \$157K reflects an inflation adjustment

(U) Schedule: No changes

(U) Technical: No changes

(U) C. OTHER PROGRAM FUNDING SUMMARY

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EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0205601N
PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT NUMBER: E2185
PROJECT TITLE: Advanced Anti-Radiation Guided Missile(AARGM)

D. (U) SCHEDULE PROFILE:

The AARGM program is an Advanced Technology Program and therefore does not have a standard detailed Milestone Plan. A list of key actions appears below.

AARGM PROGRAM	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>To Complete</u>
Software Evaluation Station/Brassboard				
Hardware/Software Development	Continue	Continue	Complete 1Q/00	
Subsystems Assembly and Test	Begin 4Q/98	Complete 3Q/99		
Seeker Integration/Test	Begin 4Q/98	Complete 3Q/99		
Chamber Tests		Begin 4Q/99	Complete 1Q/00	
Brassboard Captive Flight Tests (CFTs)				
Unique Design and CFT Preparation	Begin 1Q/98	Continue Complete 1Q/00		
Contractor Managed Testing			1Q/00	
Captive Flight Testing			Begin 2Q/00	Complete 3Q/01
Control Test Vehicles (CTVs)				
Unique Hardware/Software Development	Continue Complete 4Q/99			
Subsystems Assembly and Test	Begin 3Q/98	Complete 3Q/99		
Integration and Test		Begin 1Q/99	Complete 2Q/00	
CTV Flights Test and Analysis			2Q/00	
Prototype				
Hardware/Software Design Upgrades	Begin 2Q/98	Continue Complete 1Q/00		
Subsystems Assembly and Test	Begin 4Q/98	Complete 1Q/99		
Integration and Testing			Begin 2Q/00-Complete 2Q/00	
Captive Carry Test			4Q/00	
Guided Test Vehicles (GTVs)				
Hardware/Software Design Upgrades	Begin 2Q/98	Continue	Continue	Complete 2Q/01
Subsystems Assembly and Test	Begin 4Q/98	Continue	Continue	Complete 4Q/01
Integration and Test				Begin 1Q/01-Complete 4Q/01
GTV Live Fire Test and Analysis				1Q02
Contractor design and trade studies		2Q/99 – 4Q/00		
Milestone II Decision documentation		2Q/99 – 1Q/00		
System engineering support		2Q/99 – 4Q/00		

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DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N
PE Title: HARM Improvement

PROJECT NUMBER: E2185
PROJECT TITLE: Advanced Anti-Radiation Guided
Missile (AARGM)

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u>	<u>FY 1999 Cost</u>	<u>FY 1999 Award Date</u>	<u>FY 2000 Cost</u>	<u>FY 2000 Award Date</u>	<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
Product Development										
AARGM Adv Technology Development	CPIF	SAT, Woodland Hills, CA	59327	7040	Jun 99	7600	Jun 00	4800	73767	78767
AARGM Engineering Support	WX	NAWC WD, China Lake	4505	2260	Oct 98	2343	Oct 99	2200	11308	11308
AARGM Engineering/Tech Assessment	CPIF	JHU/APL, MD	615	0		0		0	615	615
AARGM Risk Reduction	CPIF	SAT, Woodland Hills, CA		9800	Feb 99	0		0	9800	9800
AARGM Engineering Support	WX	NAWC WD		1876	Feb 99	0		0	1876	1876
Subtotal Product Development			64447	20976		9943		7000	102366	102366

Remarks:

Support

Subtotal Support			0	0		0		0	0	0
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Remarks:

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DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 205601N
 PE TITLE: HARM Improvement

PROJECT NUMBER: E2185
 PROJECT TITLE: Advanced Anti-Radiation Guided
 Missile (AARGM)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Test & Evaluation										
Subtotal Test & Evaluation			0	0		0		0	0	0
Remarks:										
Management										
Travel	WX	NAWC AD, Patuxent MD	100	100	Oct 98	100	Oct 99	100	400	400
Technical Assessment/Mgmt Support	RX/LOE	DCS, Alex VA	905	800	Dec 98	800	Dec 99	773	3278	3278
Subtotal Management			1005	900		900		873	3678	3678
Remarks:										
SBIR Assessment				552					522	522
Remarks:										
Total Cost			65452	22428		10843		0	106596	106596

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DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

**PROGRAM ELEMENT: 0205601N
PROGRAM ELEMENT TITLE: HARM Improvement**

**PROJECT NUMBER: E2211
PROJECT TITLE: JAWS**

(U) COST: (Dollars in Thousands)

<u>Project Number & Title</u>	<u>FY 1998 Budget</u>	<u>FY 1999 Budget</u>	<u>FY 2000 Estimate</u>	<u>FY 2001 Estimate</u>	<u>FY 2002 Estimate</u>	<u>FY 2003 Estimate</u>	<u>FY 2004 Estimate</u>	<u>FY 2005 Estimate</u>	<u>To Complete</u>	<u>Total Program</u>
E2211 Joint Advanced Weapons Systems (JAWS) *	934	956	1,476	2,950	3,937	3,923	3,930	3,927	0	22,033
TOTAL	934	956	1,476	2,950	3,937	3,923	3,930	3,927	0	22,033

Quantity of RDT&E Articles

* Project Unit W2211 changed to Project Unit E2211 to reflect proper major claimant.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Joint Attack Weapon System (JAWS) is a proposed joint service program which will fulfill Army and Marine Corps Mission Needs Statement requirements for the post-2000 force structure. The Army (the TOW/HELLFIRE lead service) is proposed as the lead service for the program. To support an FY 2000 new start decision, the Navy is participating with the Army in joint trade studies and development of Milestone 0 support documentation, including a joint Analysis of Alternatives (AOA). The initial basis for trade studies is improvements to the Army HELLFIRE, including alternative seekers and rocket motor improvements. Proposed TOW follow-on are being evaluated including The Army Combined Arms Weapon System (TACAWS) and Advanced Missile System - Heavy (AMS-H). The Navy is participating in the Army's Battlefield Environment Weapon System Simulation (APEX) Test Bed evaluation of the Army's Future Missile Technology Integration (FMTI) advanced developments in guidance, propulsion and warheads. Application of these developments are being assessed simultaneously with the Navy's dual mode seeker technologies in the Advanced Anti-Radiation Guided Missile (AARGM) program. The JAWS Mission Needs Statement requires a state of the art technology solution which counters air and surface threats in the post-2000 battlefield.

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DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N
PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT NUMBER: E2211
PROJECT TITLE: JAWS

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. **FY 1998 ACCOMPLISHMENTS:**

- (U) (\$934) Continued APEX evaluation through introduction of fixed wing, Advanced Short Takeoff and Landing (ASTOL), and lethal/non-lethal mission requirements. Continued structuring Milestone 0 acquisition program start for FY 2000 decision. Conducted mission effectiveness simulations assessments, continued selection of technology candidates, including advanced guided rockets/Hellfire upgrades, to fulfill multi-mission requirements. Completed Flight Demo of IIR Seeker for Hellfire Missile at China Lake, CA. (\$660K Army and \$274K Government In-House)

2. **FY 1999 PLAN:**

- (U) (\$933) APEX Lab evaluation of fixed wing, ASTOL, lethal/non-lethal missions requirements, complete Milestone 0 documentation, complete mission effectiveness assessments, select mission technologies, transition to Pre-Planned Product Improvement or new start program. (\$450K Army and \$483K Government In-House).
- (U) (\$23) Portion of the extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. **FY 2000 PLAN:**

- (U) (\$1,476) Expand APEX evaluation of fixed wing, ASTOL, lethal/non-lethal missions requirements by incorporating fixed wing test bed/weapons simulator into APEX. Evaluation to include Joint Strike Fighter as Modernized Hellfire platform. Continue flight demonstrations/evaluations of advanced guided rockets/Hellfire upgrades. Prove selected technologies meet/fulfill multi-mission requirements. Continue to examine new insertions for motor, warhead, guidance, and control technologies. (\$700K Army and \$776K government in-house).

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BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N
PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT NUMBER: E2211
PROJECT TITLE: JAWS

A. PROGRAM CHANGE SUMMARY:

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
(U) FY 1999 President's Budget:	1,025	993	0
(U) Appropriated Value:	1,080	993	
(U) Adjustment from Pres Budget Submit:	-91	-37	+1,476
(U) FY 2000 President's Budget Submit:	934	956	1,476

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1998 decrease reflects a \$26K reduction for an SBIR and a \$65K reduction for below threshold reprogrammings. The FY 1999 decrease reflects a \$37K reduction of Contractor Advisory and Assistance Services. The FY 2000 increase of \$1,476 thousand reflects an increase of \$1,496 thousand for the expansion of the program to incorporate more studies in the APEX evaluation of fixed-wing aircraft, Advanced Short Take-Off and Landing (ASTOL), and lethal/non-lethal mission requirements and to continue effort for preparation to transition to planned product improvement (P3I) or new Modernized Hellfire (HF) Program as well as -\$21K reduction for Inflation Adjustments.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

B. OTHER PROGRAM FUNDING SUMMARY: Not applicable.

RELATED RDT&E: U.S. Army P.E. 0603313A PROJ D263 Future Missile Technology Insertion (FMTI).

C. ACQUISITION STRATEGY: Not an ACAT program.

D. SCHEDULE PROFILE: Not applicable.

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DATE: February 1999

BUDGET ACTIVITY: 7

**PROGRAM ELEMENT: 0205601N
PROGRAM ELEMENT TITLE: HARM Improvement**

**PROJECT NUMBER: E2211
PROJECT TITLE: JAWS**

<u>Cost Categories:</u>	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior Yrs Cost</u>	<u>FY 1999 Cost</u>	<u>FY 1999 Award Date</u>	<u>FY 2000 Cost</u>	<u>FY 2000 Award Date</u>	<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
Product Development										
APEX	MIPR	MICOM	1761	450	NOV 98	700	NOV 00	6959	9870	
Subtotal Product Development			1761	450		700		6959	9870	
Support										
Engineering Technical Services	C/TMM	DCS Corp	496	215	JAN 99	300	JAN 00	2400	3411	
Subtotal Support			496	215		300		2400	3411	
Test and Evaluation										
Testing	WX	CHINA LAKE	473	241	NOV 98	456	NOV 00	7255	8425	
Phototelesis	MIPR	FORT EUSTIS	29						29	
Subtotal Test & Evaluation			502	241		456		7255	8454	
Management										
Travel	WX	NAVAIR	48	27	NOV 98	20	NOV 00	180	275	
SBIR Assessment				23					23	
Subtotal Management			48	50		20		180	298	
Total Cost			2807	956		1476		16794	22033	

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