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Exhibit R-2, RDT&E Budget Item Justification	Date: February 1999
APPROPRIATION/BUDGET ACTIVITY 1319 BA5	R-1 ITEM NOMENCLATURE Ship Self Defense / 0604755N

COST (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total P.E. Cost	151.868	134.841	96.580	56.909	66.771	76.443	70.346	65.544	Continuing	Continuing
SPS Improvement Prog / 20166/U0166/U2438	9.252	2.633	.506	0	0	0	0	0	0	71.205
5" Rolling AirFrame Missile/20167/U0167	13.215	4.213	6.361	3.883	3.458	3.531	3.617	3.709	Continuing	Continuing
NATO SeaSparrow/ U0173/20173	45.375	49.031*	11.012	9.907	11.910	13.617	8.724	5.098	Continuing	Continuing
Shipboard EW Imp / K/094/U0954	2.099	1.768	0	0	0	0	0	0	0	182.066
QRCC / K2178/U2178/U2440/U2437/U2439	43.904	24.768	20.412	15.180	16.746	12.777	13.044	13.310	Continuing	Continuing
NULKA / K2190/U2190	7.687	2.255	1.435	1.094	.561	1.089	1.116	1.142	Continuing	Continuing
NULKA Ship Sets/U2441/K2441	1.886	1.995	0	0	0	0	0	0	0	3.881
AIEWS / K/2309/U2309	24.678	40.715	43.744	18.184	31.341	40.513	41.389	42.285	Continuing	Continuing
IRST/U2649/22649	0	6.485	13.110	8.661	2.755	4.916	2.456	0		38.383
IRST / K2442/U2442	3.772	.978	0	0	0	0	0	0	0	4.750
Quantity of RDT&E Articles & cost	4									

A. Mission Description and Budget Item Justification

This program element consolidates currently ongoing and planned programmatic efforts related to Ship Self Defense (SSD). The consolidation facilitates effective planning and management of these efforts, exploiting the synergistic relationship inherent in each. Analysis and demonstration have established that surface SSD based on single-sensor detection, point-to-point control architecture performs marginally against current and projected Anti-Ship Cruise Missile (ASCM) threats. The supersonic seaskimming ASCM reduces the effective battle space to the horizon and the available reaction time-line to less than 30 seconds, from first opportunity to detect until the ASCM impacts its target ship. Against such a threat, multi-sensor integration is required for effective detection; parallel processing is essential to reduce reaction time to acceptable levels and to provide vital coordination/integration of hardkill and softkill assets; and improvements in terminal gun system effectiveness and in missile kinematics, control and homing accuracy are required for a successful hardkill engagement. These SSD projects address and coordinate the detect, control, and engage functions necessary to meet the rigorous SSD requirements within a development structure dedicated to systems engineering.

(U) DETECTION: Improved coordinated sensor performance to increase the probability of detecting low altitude, low observable targets is to be achieved through the synergism gained from the integration of dissimilar sensor sources. Multi-sensor integration is being addressed through the efforts of Quick Reaction Combat Capability (QRCC) (U2178), while sensor improvements are addressed through the SPS Improvements (U0166), Infrared Search and Track (U2442), Shipboard Electronic Warfare Improvements (U0954) and Advanced Integrated Electronic Warfare System (U2309) projects. These improvements to both active and passive detection capabilities are complementary to the ship signature reduction technology also being pursued through

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification	Date: February 1999
APPROPRIATION/BUDGET ACTIVITY 1319 BA5	R-1 ITEM NOMENCLATURE Ship Self Defense / 0604755N

project U0954..

(U) CONTROL: Multi-sensor integration, parallel processing and the coordination of hardkill/softkill capabilities in an automated response to the ASCM threat are the cornerstones of Ship Self Defense System (SSDS) being developed through QRCC (U2178) efforts. In addition, that project provides for the central system engineering management of SSD developments, including efforts required to integrate SSDS with the Advanced Combat Direction System (CDS) for those ships having a CDS.

(U) ENGAGEMENT: Both missile and terminal gun system improvements necessary to meet their requirements are being addressed via NATO Seasparrow Missile System (NSSMS) (U0173) and 5" Rolling Airframe Missile (RAM) (U0167). Missile improvements are to include improved kinematic performance plus advanced seeker and low elevation fuzing/warhead capabilities. Gun system improvements address system detection, rate-of-fire, number of rounds on target, first round accuracy, and reliability and maintenance. The offboard Active Decoy (NULKA, K2190) is a joint cooperative program between the United States and Australia to develop and engage an active offboard decoy which utilizes a broadband radio frequency repeater mounted atop a hovering rocket. The Decoy is designed to counter a wide variety of present and future radar guided Anti-Ship Missile (ASM) threats by radiating a large radar cross section signal while flying trajectory.

* Additional funding is reflected in FY 1999 NATO SeaSparrow program (U0173/20173) pending approval of the 1415 reprogramming action. FY1999 1415 reprogramming action is in process to realign \$16.671M from ESSM WPN into ESSM RDT&E,N. This action is reflected in PBD 703.

B. Program Change Summary:

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
FY 1999 President's Budget:	157.971	148.165	174.513
Appropriated Value	163.270	156.665	
Adjustments to FY 1998 Appropriated Value/ FY 1999 President's Budget			
Various Adjustments	-11.402	-21.824	-77.933
FY 2000 PRES Budget Submit:	151.868	134.841	96.580

Funding:

FY98: Change due to decrease for Congressional undistributed reductions (-5.299), 1998 update (-1.275), below threshold reprogramming (-1.003), SBIR reductions (-3.821), and minor pricing adjustments (-.004).

FY99: Program adjustments (+16.672), QRCC decrease for JSIMS development (-1.855), realignment of Multifunction Radar to DD21 (-35.491), economic assumptions (-0.361), Contract and Advisory Assistance Services (-0.748) and minor pricing adjustments (-0.041).

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY 1319 BA5	R-1 ITEM NOMENCLATURE Ship Self Defense / 0604755N	

FY00: Change due to program adjustments (+11.974), offsets for N86 priority items (-4.835), contingency operations (-10.233), acceleration of maritime force protection (-10.130), reduction to Evolved Seaparrow program (-2.000), transfer of funds from AIEWS (-1.000), re alignment of Multifunction Radar to DD21 program (-61.660), and minor pricing adjustments (-0.049)

Schedule: Not applicable.

Technical: Not applicable.

UNCLASSIFIED

UNCLASSIFIED

Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA5	Program Element Name & No. SHIP SELF DEFENSE/0604755N	Project Name and Number. 5" ROLLING AIRFRAME MISSILE/20167/U0167

Cost (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost	13.215	4.213	6.361	3.883	3.458	3.531	3.617	3.709	Continuing	Continuing
RDT&E Articles Qty										

A. Mission Description and Budget Item Justification: The purpose of this program is to develop a surface-to-air self-defense system utilizing a dual mode, passive Radio Frequency/Infrared 5"Rolling Airframe Missile. The baseline system provided a self-defense capability against active radar-guided anti-ship missiles and was developed on an equal cost share basis with the Government of the Federal Republic of Germany. This effort will provide a capability against passive anti-ship missiles, very low altitude missiles, and maneuvering missiles through the incorporation of an infrared all-the-way mode seeker and improved fuze. This system is designed to counter anti-ship cruise missile raids and other threats to provide for ship survivability with accurate terminal guidance, proven lethality, and no shipboard post launch dependence.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) (\$6.513) Conducted DT/OT-IIB.
- (U) (\$1.700) Conducted Tech Eval (DT-IIC).
- (U) (\$1.900) Conducted OPEVAL (OT-IIC).
- (U) (\$1.200) Conducted contractor and government simulation efforts.
- (U) (\$.800) Documentation/evaluation of test results.
- (U) (\$1.102) Continued to support development of system interface adaptations as necessary to provide effective SSD integration.

2. (U) FY 1999 PLAN:

- (U) (\$3.936) Continue Tech Eval (DT-IIC)/OPEVAL (OT-IIC).
- (U) (\$.197) Develop Helo, Air, Surface (HAS) Missile Algorithms, conduct Captive Carry and Simulation Efforts.
- (U) (\$.080) Portion of extramural program is reserved for Small Business Innovative Research Assessment in accordance with 15 USC 638.

3. (U) FY 2000 PLAN:

- (U) (\$5.082) Refine HAS Missile Algorithms and continue Simulation Efforts and Engineering Tests.
- (U) (\$.207) Upgrade the existing RAM/External Designation System Interface for AEGIS.
- (U) (\$1.072) Conduct Block 1 OT-III A FOT&E

UNCLASSIFIED

Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA5	Program Element Name & No. SHIP SELF DEFENSE/0604755N	Project Name and Number. 5" ROLLING AIRFRAME MISSILE/20167/U0167

B. Other Program Funding Summary

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To Complete</u>	<u>Total Cost</u>
OPN LINE 523800 (RAM)	66.249	59.485	39.295	42.980	36.063	27.998	39.355	69.912	CONT	CONT.
WPN LINE 224200 (RAM)	40.999	44.618	45.429	44.170	82.918	91.773	88.966	85.306	CONT.	CONT.

Related RDT&E: Not Applicable.

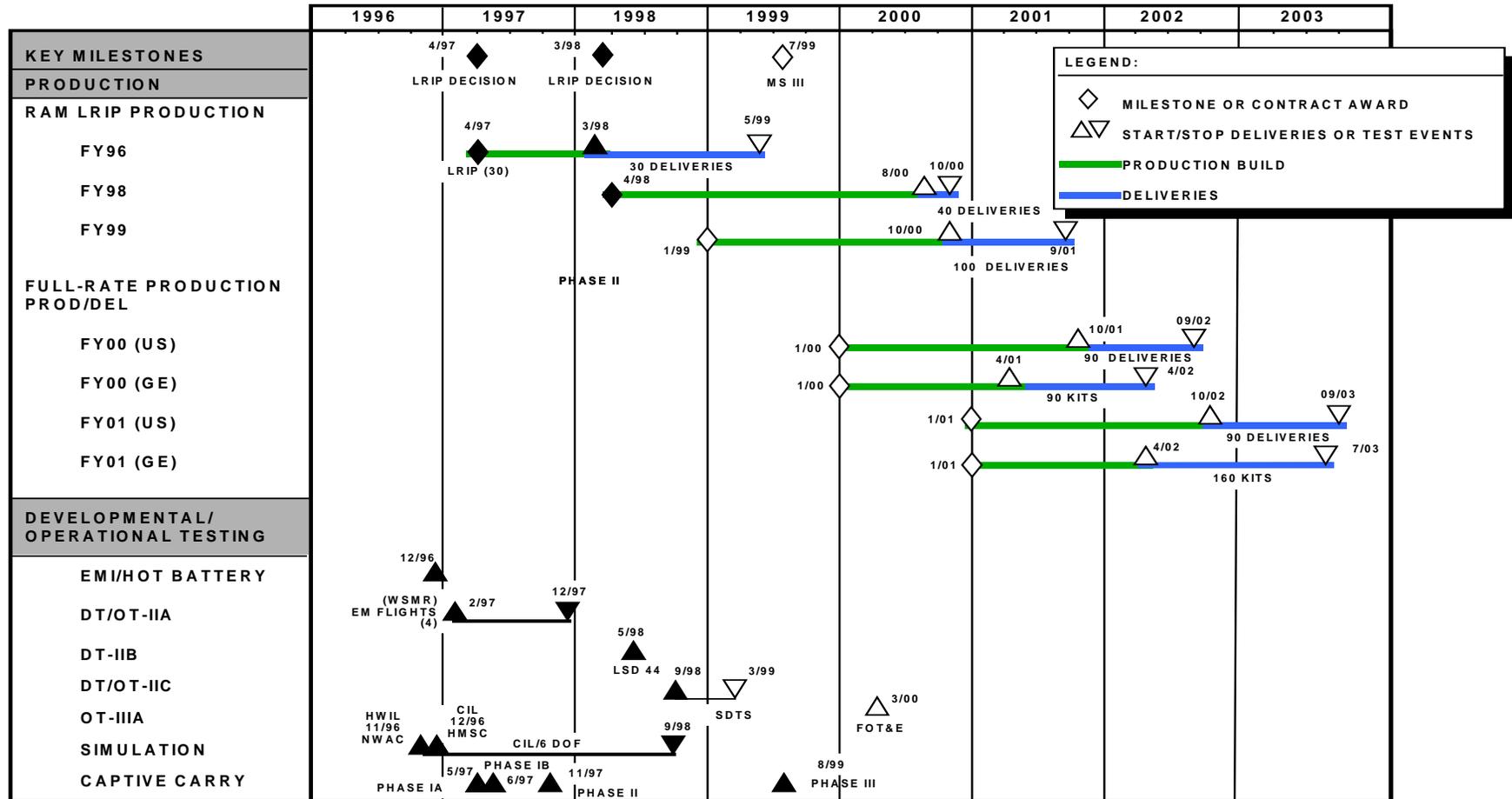
C. Acquisition Strategy: Introduced Helo/Aircraft/Surface (HAS) Mode ECP, development in FY 1998/1999, and integration in FY 2000.

D. Schedule Profile: See attached.

UNCLASSIFIED

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RAM PROGRAM PLAN BLOCK I DEVELOPMENT/PRODUCTION (CY)



R-1 Item No 125 - 6 of 125 - 33

Exhibit R-2a RDT&E Project Justification
(Exhibit R-2a, Page 6 of 33)

UNCLASSIFIED

UNCLASSIFIED

Exhibit R-3 Cost Analysis		February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA5	PROGRAM ELEMENT NAME AND NUMBER SHIP SELF DEFENSE/0604755N	PROJECT NAME AND NUMBER 5" ROLLING AIRFRAME MISSILE/20167/U0167

Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
PRODUCT DEVELOPMENT												
Primary Hardware Development	SS/CPFF	RMSC, Tucson, AZ	58.891	.397	2/99	1.664	11/99			Continuing	CONT.	CONT.
Ancillary Hardware Development	SS/CPFF	JHU/APL, Laurel, MD	4.888	.623	11/98	.450	11/99			Continuing	CONT.	CONT.
Miscellaneous	Various	Various	227.570	1.185	11/98	.905	11/99			Continuing	CONT.	CONT.
Subtotal Product Development			291.349	2.205		3.019				Continuing	CONT.	CONT.
Remarks: Primary Hardware Development transitions into Test & Evaluation.												
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
Subtotal Support			0	0		0				0	0	
Remarks: N/A												

UNCLASSIFIED

UNCLASSIFIED

Exhibit R-3 Cost Analysis		February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA5	PROGRAM ELEMENT NAME AND NUMBER SHIP SELF DEFENSE/0604755N	PROJECT NAME AND NUMBER 5" ROLLING AIRFRAME MISSILE/20167/U0167

Cost Categories TEST AND EVALUATION	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	SS/CPAF	RMSC, Tucson, AZ	1.056	.400	2/99	1.887	11/99			Continuing	CONT.	CONT.
Developmental Test & Evaluation		NAWC, China Lake, CA	0			1.212	10/99			N/A	N/A	N/A
		NSWC, PHD Pt Hueneme, CA	5.000	.350	11/98					N/A	N/A	N/A
Operational Test & Evaluation	SS/CPAF	RMSC, Tucson, AZ	5.570	.200	2/99	0				Continuing	CONT.	CONT.
Operational Test & Evaluation		NSWC, PHD Pt Hueneme, CA	0	.990	2/99	0				N/A	N/A	N/A
Miscellaneous		Various	5.003	.050	1/99	.138	10/99			Continuing	CONT.	CONT.
Subtotal T&E			16.629	1.990		3.237				Continuing	CONT.	CONT.
Remarks:												
Cost Categories MANAGEMENT												
Miscellaneous	Various	Various	3.124	.018	1/99	.105	11/99			Continuing	CONT.	CONT.
Subtotal Management			3.124	.018		.105				Continuing	CONT.	CONT.
Remarks:												
Total Cost			311.102	4.213		6.361				Continuing	CONT.	CONT.
Remarks:												

R-1 Item No 125 - 8 of 125 - 27

Exhibit R-3 Project Cost Analysis
(Exhibit R-3, Page 8 of 33)

UNCLASSIFIED

UNCLASSIFIED

Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E BA-5	Program Element Name & No. SHIP SELF DEFENSE 0604755N	Project Name and Number. NATO SEASPARROW 20173/U0173

Cost (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost	45.375	49.031*	11.012	9.907	11.910	13.617	8.724	5.098	CONT.	CONT.
RDT&E Articles Qty										

Mission Description and Budget Item Justification This program element encompasses three (3) primary efforts to enhance ship self defense.

1. **(U) EVOLVED SEASPARROW MISSILE (ESSM):** A cooperative effort among 10 NATO SeaSparrow Nations, including the U.S., to improve the capability of the SeaSparrow Missile to counter the low altitude, highly maneuverable Anti-Ship Cruise Missile (ASCM) threat. The program consists of evolving the SeaSparrow Missile through development of a new rocket motor with tail control; thrust vector control and ordnance (warhead) upgrade; modifications to the MK41 VLS to fire from a single cell with 4 ESSM (QuadPack); and modifications to NATO SeaSparrow Surface Missile System (NSSMS) to provide ESSM capability.
2. **(U) NATO SEASPARROW – MK91 Rearchitecture/SDSMS:** The MK91 Rearchitecture Program integrates NSSMS into the Ship Self Defense System (SSDS) Architecture to provide an additional layer of ship missile defense. This effort consists of combining the Firing Officer Console and Radar Set Console functionality into a single Advanced Display System Console (AN/UYQ 70); modifying the Signal Data Processor and eliminating the MK157 Computer Signal Data Converter, and System Evaluation and Trainer (SEAT) , which cannot accommodate further upgrade; and redistributing this functionality within SSDS compatible microprocessors. This approach will eliminate the analog, point-to-point architecture, limited input-output channel and computer processing reserve deficiencies resident in the existing MK57 NSSMS, as well as allow for full exploitation of the capabilities of the future ESSM and provide significant reductions (50%) in NSSMS cost of ownership and manning.
3. **(U) SELF-DEFENSE LAUNCHER SYSTEM (SDLS).** FY03 introduces the SDLS to provide designated ships, not having a VLS, with an affordable, lightweight, means of employing the ESSM. The operational requirement responds to the mission areas of Naval Warfare (230), Counter-Air (221), and Anti-Air Warfare (231). The general mission of ships employing the ESSM is to both provide independent forward presence and to operate as an integral part of joint and allied maritime forces. The mission is to achieve a level of force protection by employing a nearly “puncture proof” ship defense capability against all varieties of threats envisioned in a littoral environment. The SDLS will leverage existing technology and current development efforts including the MK25 ESSM QuadPack canister Commercial-Off-The-Shelf/Non-Development Items (COTS/NDI) electronics and SSDS. The system will be applicable to multiple ship classes and will use the Navy support structure either in place or planned for the ESSM and MK25 QuadPack canister. Use of COTS/NDI components and equipment will be maximized.

* **(U) ESSM FY 99 Above Threshold Reprogramming (ATR) Action:** Problems identified in Auto-pilot software and OPEVAL support schedule have delayed US LRIP and OPEVAL by one year and will require additional RDTEN funding to address. The additional funding is reflected in these controls, pending approval of the 1415 reprogramming action. FY 1999 1415 reprogramming action is in process to realign \$16.672M from ESSM WPN into ESSM RDT&E,N. This action is reflected in PBD 703.

FY 1998 ACCOMPLISHMENTS:
ESSM (\$38.280)

- (\$18.0) Incremental funding continued EMD efforts at Raytheon, including the S-Band capability for AEGIS/ESSM uplink. Continued DT-IIA testing, and delivered production representative missiles to support at sea development test and operational assessment (DT-IIA/OT-IIA) .
- (\$.685) Incremental funding for continuation of warhead development. Continued live fire threat/vulnerability testing.
- (\$11.5) Continued MK41 VLS ESSM QuadPack development effort at United Defense, Lockheed Martin and government labs. Conducted land based firings and testing associated with launcher environment.
- (\$8.095) Continued integrated product team efforts and government lab/engineering efforts associated with EMD. Conducted DT-IIA/OT-IIA for ESSM.

UNCLASSIFIED

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APPROPRIATION/BUDGET ACTIVITY RDT&E BA-5	Program Element Name & No. SHIP SELF DEFENSE 0604755N	Project Name and Number. NATO SEASPARROW 20173/U0173

NATO SEASPARROW (7.095)

- (\$5.655) Completed effort on EMD contract with Raytheon to modify NSSMS MK91 with SSDS Architecture. Completed formal software qualification testing in Mar 98. Commenced Self-Defense Test Ship (SDTS) installation of hardware in Jan -May 1998.
(\$1.440) Modified computer programs to address deficiencies identified in installation of MK 91 Rearchitecture hardware on the SDTS. Continued efforts associated with support of SSDS configuration.

FY 1999 PLAN

ESSM (\$29.920):

- (\$17.259) Incremental funding to continue EMD efforts at Raytheon, including the S-Band capability for AEGIS/ESSM uplinks. Continue DT-IIA/OT-IIA at WSMR.
- (\$6.460) Continue MK41 ESSM Quad Pack development effort at United Defense, Lockheed Martin and government labs. Conduct system integration testing and land base missile firings.
- (\$6.201) Continue ESSM integrated product team participation and government lab engineering efforts associated with EMD. Support development and operational tests.

ESSM U.S. Share of Cost Growth (\$16.672) :

- Above Threshold Reprogramming is required to fund the U.S. share of the ESSM cost growth associated with the autopilot redesign and the program schedule. Source of funding is WP,N BA-2 Other Missiles, Evolved Seasparrow Missile, #230700.

NATO SEASPARROW (\$1.750)

- Complete MK91 software installation in Self Defense Test Ship in December 1998. Support testing of the MK91 Rearchitecture with RIM 7P baseline and RIM-7P++ firing (Jan-May99).

SBIR (\$.689) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

FY 2000 PLAN:

ESSM (\$8.772)

- (\$6.190) Continue EMD efforts at Raytheon, including the S Band capability for AEGIS/ESSM uplink. Conduct DT-IIC/OT-IIC on the Self Defense Test Ship (SDTS) (Oct 99-Mar 00). Conduct ESSM Aegis DT-IIB/OT-IIB at WSMR.
- (\$2.582) MK41 QuadPack. Conduct formal testing including: Weapons control system/VLS integration with AEGIS at White Sands Missile Range; and conduct LCS Regression Test and Barge Shock Test.

NATO SEASPARROW (\$2.240):

- (\$2.240) Complete computer programs/integration of the MK91 rearchitecture on CVN/LHD Class ships. Support DT-IIC/OT-IIC on SDTS with ESSM. Address any deficiencies identified as a result of testing of the MK91 Rearchitecture with RIM 7P baseline and ESSM.

UNCLASSIFIED

UNCLASSIFIED

Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E BA-5	Program Element Name & No. SHIP SELF DEFENSE 0604755N	Project Name and Number. NATO SEASPARROW 20173/U0173

B. Other Program Funding Summary

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>TO Complete</u>	<u>TOTAL Cost</u>
1. WPN BA-2 Other Missiles, Sparrow Mods (230400/Evolved SeaSparrow Missile (ESSM) (230700)	10.255	12.882*	11.668	34.452	60.613	95.993	84.453	89.938	Con't	Con't
2. OPN BA-4 NATO SEASPARROW (523700, 523705)	12.385	7.304	.492	17.726	49.794	44.728	60.346	29.387	Con't	Con't
3. Related RDT&E:										
PE 0603609N (Conventional Munitions)										
PE 0604307N (AEGIS Combat System Engineering)										
PE 0604755N (U2178 Quick Reaction Combat Capability (QRCC))										
* Reflects planned ATR to RDT&E \$16.672M.										

C. Acquisition Strategy: ESSM is a directed sole source contract to Raytheon Missile Systems Company for LRIP, and upon successful completion of TECHEVAL/OPEVAL in FY02, entering into Full Rate Production. Multi-year full rate production contracting is the preferred approach for the NATO SeaSparrow Consortium.

UNCLASSIFIED

Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E BA-5	Program Element Name & No. SHIP SELF DEFENSE 0604755N	Project Name and Number. NATO SEASPARROW 20173/U0173

D. Schedule Profile: As a result of the performance problem identified for the autopilot, the software requires a rewrite with a potential for hardware changes. Additionally, the autopilot effort requires a schedule extension which is reflected below;

	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
<u>ESSM Milestones:</u>				
Program:				2Q LRIP PMR
Engineering:	4Q CDR			
T&E:	3Q DT/OT-IIA			2Q DT/OT-IIB 2Q DT/OT-IIC
Contract				2Q LRIP CA
Contracts:	2Q DEV CA			

UNCLASSIFIED

Exhibit R-3 Cost Analysis (Page 2)		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E BA-5	Program Element Name & No. SHIP SELF DEFENSE 0604755N	Project Name and Number. NATO SEASPARROW U0173

Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
ESSM PRIMARY HARDWARE DEV	LC/CPAF LC/CPAF LC/CPAF	HUGHES RAYTHEON TDW	87.379 3.737 3.746	34.634* - -	OCT-98	4.897	OCT-99			3.862 - -	130.772* 3.737 3.746	130.083* 3.737 3.746
ANCILLARY HDWE DEV	CPAF	LOCKHEED/UDLP	37.258	6.354	NOV-98	1.422	NOV-99			.378 -	45.412	Multi-customer contract
SYSTEM ENGR		VARIOUS	17.419	1.730	OCT-98	.600	OCT-99			-	19.749	
NATO (MK 91/SDSMS) PRIMARY HARDWARE DEV	CPAF	RAYTHEON	24.227	1.750	NOV-98	1.850	NOV-99			CONT	CONT	
SOFTWARE DEV	CPFF	HUGHES TRACOR	3.638 2.346	-						CONT	CONT	
SYSTEM ENGR	WR	VARIOUS	3.857			.390	NOV-99			CONT	CONT	
SUBTOTAL PRODUCT DEV			183.607	44.468		9.159				CONT	CONT	
Remarks: * Includes planned 1415 reprogramming intended to realign \$16.672M from ESSM WPN (LI 230700N) to correct deficiencies recently identified in testing.												
ESSM ILS ENGR SPT	WR WR	NSWC PHD VARIOUS	2.618 2.297	.478 1.038	OCT-98 OCT-98	.304 .111	OCT-99 OCT-99				3.400 3.446	
NATO ENGR SPT		VARIOUS	4.824								4.824	
SUBTOTAL SUPPORT			9.739	1.516		.415					11.670	-
Remarks:												

UNCLASSIFIED

Exhibit R-3 Cost Analysis (Page 2)		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E BA-5	Program Element Name & No. SHIP SELF DEFENSE 0604755N	Project Name and Number. NATO SEASPARROW U0173

Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
ESSM												
DT&E	WR	NAWC CL	2.421	.566	OCT-98	.200	OCT-99			1.000	4.187	
	WR	NAWC WS	2.781	.566	OCT-98	-				.500	3.847	
	WR	VARIOUS		.741	OCT-98	.307	OCT-99			.577	1.625	
SUBTOTAL T&E			5.202	1.873		.507				2.077	9.659	
Remarks:												
ESSM												
ENGR SPT		VARIOUS	3.568	.322	OCT-98	.084					3.974	
PM SPT	VARIOUS	VARIOUS	.471	.028	OCT-98	.030	OCT-99			-	.529	
PM PERSONNEL	PD/WR		1.785	.600	VARIOUS	.602	VARIOUS			.700	3.687	
TRAVEL	PD/WR	VARIOUS	.590	.224	VARIOUS	.215	VARIOUS			.209	1.238	
MISC	VARIOUS	VARIOUS	1.450							.200	1.650	
NATO												
TRAVEL			.199							Cont.	Cont.	
MISC			1.084	-								
SUBTOTAL MANAGEMENT			9.147	1.174		.931				CONT.	CONT	-
Remarks:												
U0173 TOTAL			207.695	49.031*		11.012				CONT	CONT	-

* Includes reprogramming of \$16.672 and SBIR reserve of \$.689.

UNCLASSIFIED

Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E / 5	Program Element Name & No. Ship Self Defense / 0604755N	Project Name and Number. Quick Reaction Combat Capability /K2178/U2178/U2440/U2437/U2439

Cost (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost	43.904	24.768	20.412	15.180	16.746	12.777	13.044	13.310	Continuing	Continuing
RDT&E Articles Qty										

A. Mission Description and Budget Item Justification:
 The QRCC project implements an evolutionary acquisition of improved ship self defense capabilities against Anti-Ship Cruise Missiles for selected ships by integrating existing and programmed Anti-Air Warfare stand-alone systems. It provides an automated quick reaction and multi-target engagement capability emphasizing performance in the littoral environment. Integration focuses on coordinating existing sensor information, providing threat identification and evaluation, assessing defensive readiness, and recommending an optimized defensive tactical response to counter single and multiple Anti-Ship Cruise Missile attacks. Subsequent modifications and upgrades will optimize the Ship Self Defense and provide enhanced self defense capabilities while allowing for insertion of advanced technologies during Engineering and Manufacturing Development and Production and Deployment Phases. System design emphasizes use of nondevelopmental items, commercial standards, Next Generation Computer Resources, computer program reuse, and open architecture. QRCC replaces manual control of several different ship self defense systems with a single integrated capability under the computer aided control of ship operators. Improvements to current system performance for short range anti-ship self defense will implement the Ship Self Defense System (SSDS), incorporate multi-sensor integration of existing sensors, improve ship defense local command and control functions by automation of the detect through engagement sequence under the control of flexible embedded doctrine, integrate and coordinate weapon systems, and provide hardkill/softkill integration. The current focus of this project is the development of the SSDS which leverages critical experiments, the Rapid Anti-Ship Missile Integrated Defense Systems (RAIDS) program efforts, and the SSDS demonstration on USS WHIDBEY ISLAND (LSD 41) in June 1993. System Architecture centers on a distributed processing concept which uses a fiber optic local area network (LAN, LAN access units, Advanced Display System workstation, and software to integrate existing sensors and weapons. The initial effort will focus on the LSD 41 class of ships to integrate existing LSD 41 class sensors, the Rolling Airframe Missile (RAM), Phalanx Close-in Weapon Systems (CIWS), and Electronic Countermeasures Systems (AN/SLQ-32). Other ship systems such as ship support, navigation, and Identification Friend or Foe will also be integrated into the system via the LAN. The distributed architecture allows the incremental evolution and implementation of follow-on modification to the SSDS which will integrate other ship self defense elements, such as the NATO Seasparrow missile system (NSSM), AN/SPQ-9 radar, and other sensors, as well as the RAM, CIWS, and AN/SLQ-32 installations on other ship classes. Ships with the Advanced Combat Direction System (ACDS) will also have those systems integrated with SSDS to optimize the use of offboard track data in ship self defense and to transmit SSDS track data to other ships.

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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E / 5	Program Element Name & No. Ship Self Defense / 0604755N	Project Name and Number. Quick Reaction Combat Capability /K2178/U2178/U2440/U2437/U2439

FY 1998 Accomplishments

- (\$14.331) Prepared critical item development specifications and interface control drawings, conducted logistics support analysis, and commenced software coding of SSDS MK 1 for follow-on class ships. (CV(N), LPD-17, LHD, and LHA)
- (\$1.325) Prepared updated documentation for SSDS integration with RAM BLK 1.
- (\$9.387) Conducted FOT&E on Self Defense Test Ship (SDTS) in conjunction with RAM BLK 1 testing.
- (\$3.772) Established Wallops Island Systems Engineering Test Facility for SSDS MK 1.
- (\$9.431) Integrated QRCC with NSSM (NATO Sea Sparrow Missile)
- (\$5.658) Integrated QRCC with Ship Self Defense Test Ship.

2. FY 1999 Plan:

- (\$13.740) Continue software coding for LPD-17 and CV(N) ship classes and prepare for software unit testing.
- (\$ 5.205) Integrate hardware and software for LPD-17 and CV(N) ship classes and completion specifications and interface control drawings.
- (\$ 5.179) Continue to conduct further FOT&E on Self Defense Test Ship (SDTS) in conjunction with RAM BLK1 testing.
- (\$.644) Portion of extramural program is reserved for Small Business Innovation Research Assessment in accordance with 15 USC 638.

3. FY 2000 Plan:

- (\$ 7.286) Conduct Integration Test at Wallops on SSDS MK2.
- (\$11.351) Correct software and hardware deficiencies found during Wallops testing.
- (\$.650) Support National test Network (NTN) testing for LPD's.
- (\$ 1.125) Integrate logistic support (ILS) planning and documentation updates for SSDS MK2 delivery.

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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E / 5	Program Element Name & No. Ship Self Defense / 0604755N	Project Name and Number. Quick Reaction Combat Capability /K2178/U2178/U2440/U2437/U2439

B. Other Program Funding Summary

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To Complete</u>	<u>Total Cost</u>
OPN (MK1) 523900, 523905,523906	18.540	38.783	38.790	15.028	26.933	69.143	58.000	42.302	Continuing	Continuing
O&MN 14D90 WPN Maint. QRCC	5.278	7.526	11.967	10.169	10.303	10.285	10.612	10.815	Continuing	Continuing
SCN CV(N) ship class SSDS MK 1	0	42.000	0	0	0	0	0	0	0	42.000
SCN LPD-17 ship classes SSDS MK 1	0	20.200	42.000	43.600	44.800	46.600	0	0	0	245.700
Related RDT&E: PE 0603755N (Ship Self Defense) PE 0604518N (Advanced Combat Direction System Block 1) PE 0604755N (Cooperative Engagement Capability)										

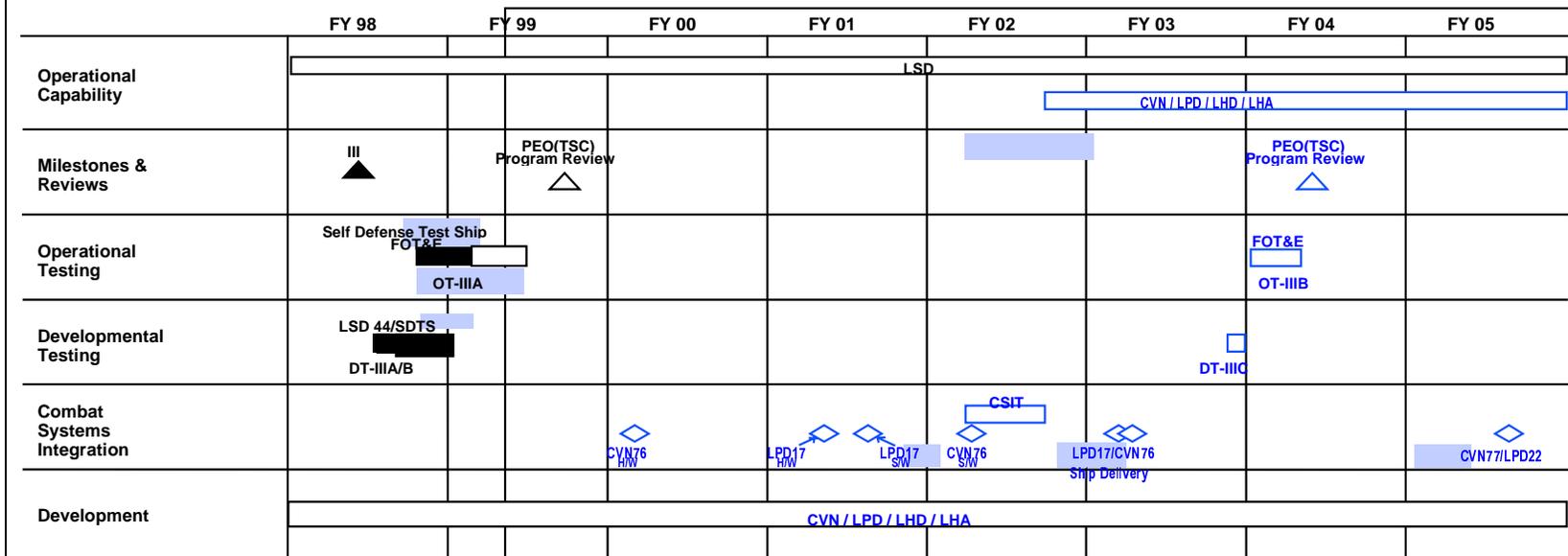
C. Acquisition Strategy: Two SSDS systems will be procured with OP,N for LSD class ships in FY 99. LSD class procurement will be completed in FY 00 with the procurement of three systems. All systems will be procured under Firm Fixed Price contract. Two of the FY00 procurements will be installed in FY01 and the final unit will be installed in FY02. The FY02 unit will be procured in FY00 to achieve an improved unit price for all three systems through a larger quantity procurement. The SSDS system will continue to undergo development and will be integrated with Advanced Combat Direction System (ACDS) and Cooperative Engagement Capability (CEC). The first integrated SSDS system procurements will take place under a Cost Fixed Fee contract in FY99 and FY00 for the CVN 76, LPD 17 and CVN 68. Follow-on procurements for additional ships of the CV(N), LPD, LHD, and LHA classes will be made using FFP contracts.

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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E / 5	Program Element Name & No. Ship Self Defense / 0604755N	Project Name and Number. Quick Reaction Combat Capability /K2178/U2178/U2440/U2437/U2439

D. Schedule Profile:

SSDS PROGRAM STRUCTURE



R-1 Line Item No 125 - 18 of 125 - 33

Exhibit R-2a RDT&E Project Justification
(Exhibit R-2a, Page 18 of 33)

UNCLASSIFIED

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Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E / 5	PROGRAM ELEMENT NAME AND NUMBER Ship Self Defense / 0604755N	PROJECT NAME AND NUMBER Quick Reaction Combat Capability / K2178/U2178

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NSWC-DD Dahlgren, VA	13.597	.554	N/A	.750	N/A			Continuing	Cont.	N/A
Systems Engineering	SS/FP	JHU/APL Laurel, MD	21.291	1.300	N/A	2.500	N/A			Continuing	Cont.	N/A
Systems Engineering	WR	NSWC-PHD Port Hueneme, CA	4.696		N/A		N/A			Continuing	Cont.	N/A
Product Development	SS/CPAF	Raytheon (TBD) San Diego, CA	0	0	0	11.536	TBD			TBD	TBD	TBD
Systems Engineering	SS/CPAF	Raytheon (5466) San Diego, CA	0	4.416	10/98	0	N/A			Continuing	Cont.	44.325
Product Development	SS/CPAF	Raytheon (5466) San Diego, CA	9.800	10.358	10/98	0	N/A			Continuing	Cont.	44.325
Systems Engineering	SS/CPAF	Raytheon (5400) San Diego, CA	7.000	0	N/A	0	N/A			0	7.000	7.000
Software Development	SS/CPAF	Raytheon (5407) San Diego, CA	39.664	0	N/A	0	N/A			0	39.664	39.664
Award Fees	SS/CPAF	Raytheon (5466) San Diego, CA	1.249	2.562	10/98	1.971	10/99			Continuing	Cont.	7.489
Miscellaneous	Various		29.702	.868	N/A	.500	N/A			Continuing	Cont.	
Subtotal Product Development	Various	Miscellaneous	126.999	20.058	N/A	17.257	N/A			Continuing	Cont.	

Remarks:

FY98 / 99: Raytheon contract (5466) was awarded as a CPAF/CPFF contract. Cost variance is due to various appropriated funds that are accepted on this contract.
 FY00 / 01: New contract award for Raytheon is TBD for FY00 / 01.

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Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E / 5	PROGRAM ELEMENT NAME AND NUMBER Ship Self Defense / 0604755N	PROJECT NAME AND NUMBER Quick Reaction Combat Capability / K2178/U2178

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Miscellaneous	Various		7.845	.340	N/A	.250	N/A			Continuing	Cont.	N/A
Subtotal Support			7.845	.340	N/A	.250	N/A			Continuing	Cont.	N/A
Remarks:												
Developmental Test & Evaluation	WR	NSWC-PHD Port Hueneme, CA	8.876		N/A		N/A			Continuing	Cont.	N/A
Developmental Test & Evaluation	Various	Wallops Island Dahlgren, VA		2.000	N/A	2.000	N/A			Continuing	Cont.	N/A
Miscellaneous	Various		16.909	1.515	N/A	.050	N/A			Continuing	Cont.	N/A
Subtotal T&E			25.785	3.515	N/A	2.050	N/A			Continuing	Cont.	N/A
Remarks:												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support												
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous	Various		3.927	.855	N/A	.855	N/A			Continuing	Cont.	N/A
Subtotal Management			3.927	.855	N/A	.855	N/A			Continuing	Cont.	N/A
Remarks:												
Total Cost			164.556	24.768	N/A	20.412	N/A			Continuing	Cont.	N/A
Remarks:												

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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY	Program Element Name & No.	Project Name and Number.
RDT&E/BA-5	Ship Self Defense/0604755N	NULKA Decoy/K2190/U2190/K2441

Cost (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
NULKA Decoy	9.573	4.250	1.435	1.094	.561	1.089	1.116	1.142	CONT.	CONT.
RDT&E Articles Qty										

A. Mission Description and Budget Item Justification

The Offboard Active Decoy (NULKA) is a joint cooperative program between the United States and Australia to develop an active offboard decoy which utilizes a broadband radio frequency repeater mounted atop a hovering rocket. The Decoy is designed to counter a wide variety of present and future radar guided Anti-Ship Missile (ASM) threats by radiating a large radar cross section signal while flying a ship-like trajectory. The United States developed the Electronic Payload and Fire Control System. Currently the United States is completing efforts to integrate with SSDS, continuing with efforts to maintain Electromagnetic Compatibility (ECM) with shipboard emitters, and continuing AIEWS integration efforts. The Fire Control System components are being consolidated and modified. The MK 36 Decoy Launching System (DLS) is being modified to support NULKA Launches. Australia developed the hovering rocket, launcher, and launcher interface unit.

Program Accomplishments and Plans:

1. FY 1998 Accomplishments:

- (\$9.573) Completed SSDS integration. Conducted DT/OT testing required to achieve a Milestone III decision for the NULKA System. Continued development of payload improvements and EMC upgrade

2. FY 1999 Plan:

- (\$2.237) Start AIEWS integration efforts.
- (\$1.995) Complete EMC upgrade and conduct testing of EMC improvements.
- (\$.018) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 Plan:

- (\$1.435) Continue AIEWS integration.

A. Other Program Funding Summary

OPN Line 553000

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To Complete</u>	<u>Total Cost</u>
Anti-Ship Missile Decoy System	16.370	22.043	20.446	19.617	17.968	17.714	18.122	19.154	CONT.	CONT.

Acquisition Strategy: Not Applicable

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Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA-5	PROGRAM ELEMENT NAME AND NUMBER Ship Self Defense/0604755N	PROJECT NAME AND NUMBER NULKA Decoy/K2190/U2190/K2441

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Product Development	WR	NSWC Crane, IN	1.784	.376	10/98	.510	10/99			CONT.	CONT.	N/A
	WR	NSWC Indian Head, MD	1.897	.150	10/98					0	2.047	N/A
	WR	NSWC Dahlgren, VA	4.091	.632	10/98	.526	10/99			CONT.	CONT.	N/A
	WR	NSWC Port Hueneme, CA	.617	.291	10/98					0	.908	N/A
	WR	NRL Washington, DC	1.780	.320	10/98					0	2.100	N/A
	SS/CPFF	Sippican Boston, MA	3.492	.100						0	3.592	3.592
	SS/CPFF	BAeA, Australia	3.740	1.700						0	5.440	5.440
	PD	NAVSUP Washington, DC	2.400	0						0	2.400	N/A
Subtotal Product Development			19.801	3.569		1.036				CONT.	CONT.	
Remarks:												
Support and Management	CC/CPFF	Techmatics Arlington, VA	.806	.195	11/98	.195	11/99			CONT.	CONT.	CONT.
Travel/Miscellaneous	Various	Various	1.860	.464	10/98	.204	10/98			CONT.	CONT.	CONT.
Subtotal			2.666	.659		.399				CONT.	CONT.	CONT.
Remarks:												
Test & Evaluation	WR	OPTEVFOR	.150	0						0	.150	N/A
	WR	NSWC Pt Mugu, CA	.545	.022						0	.567	N/A
Subtotal T&E			.695	.022						0	.717	N/A
Remarks:												
Total Cost			23.162	4.250		1.435				CONT.	CONT.	CONT.
Remarks:												

R-1 Item No 125- 23 of 125- 33

Exhibit R-3 Project Cost Analysis
(Exhibit R-3, Page 23 of 33)

UNCLASSIFIED

UNCLASSIFIED

Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/5	Program Element Name & No. Ship Self Defense / 0604755N	Project Name and Number. Advanced Integrated Electronic Warfare System (AIEWS)/U2309

Cost (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost	24.678	40.715	43.744	18.184	31.341	40.513	41.389	42.285	Continuing	Continuing
RDT&E Articles Qty	4									

A. Mission Description and Budget Item Justification: Advanced Integrated Electronic Warfare System (AIEWS) is the next generation EW system which will be an integral part of the ship combat system (AEGIS and Ship Self Defense System (SSDS)). AIEWS will be developed using a two increment approach. Increment 1 will introduce advanced Electronic Support (ES) consisting of precision Electronic Support Measures (ESM), Specific Emitter Identification (SEI) and special receiver, increased processing throughput, open architecture, a standard combat system workstation with new Human Machine Interface (HMI), decoy integration, and EMI improvements. Increment 2 will introduce both RF and IR advanced Electronic Attack (EA) capabilities. This development will support both backfit and forward fit. The EMD prime contract includes 4 EDMs to be used for multiple purposes: factory qualification tests, Landbased testing and at-sea Operational Assessment (OA), Wallops Island B/L 7 & 6 & SSDS development testing, Combat System Engineering Development System (CSEDS) testing and DT/OT.

Program Accomplishments and Plans:

FY1998 ACCOMPLISHMENTS:

- (15.270) Awarded AIEWS Increment 1 EMD prime contract to include receiver, SEI, precision ESM, logistics, and integration effort for both AEGIS and ISDS Combat Systems; implementation of risk reduction efforts and advanced technology demonstrations; Lab/Field Activity support included.
- (7.500) Awarded Control and Processing (CAP) software development contract.
- (1.140) Funded share of AEGIS forward fit integration development for AIEWS.
- (.768) Initiated development of Increment 1 logistics efforts to include electronic technical documentation, embedded training foundation, and performed manpower personnel and training analysis.

FY1999 PLAN:

- (30.273) Continue AIEWS Increment 1 EMD prime contract; conduct PDR and most of incremental CDR; Lab/Field Activity support included.
- (8.332) Continue CAP software development.
- (.625) Continue development of Increment 1 logistics efforts.
- (.550) Initiate electronic attack trade study to optimize and ensure compatibility of onboard (RF/IR) countermeasures with offboard (RF/IR) countermeasures for Increment 2.
- (.935) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/5	Program Element Name & No. Ship Self Defense / 0604755N	Project Name and Number. Advanced Integrated Electronic Warfare System (AIEWS)/U2309

FY2000 PLAN:

- (33.471) Continue AIEWS Increment 1 EMD prime contract; Complete CDR; Lab/Field Activity support included
- (8.118) Continue CAP software development.
- (.455) Continue development of Increment 1 logistics efforts.
- (.600) Begin establishment of resources and initiate efforts for accomplishing T&E.
- (1.100) Continue/complete Increment 2 electronic attack trade study.

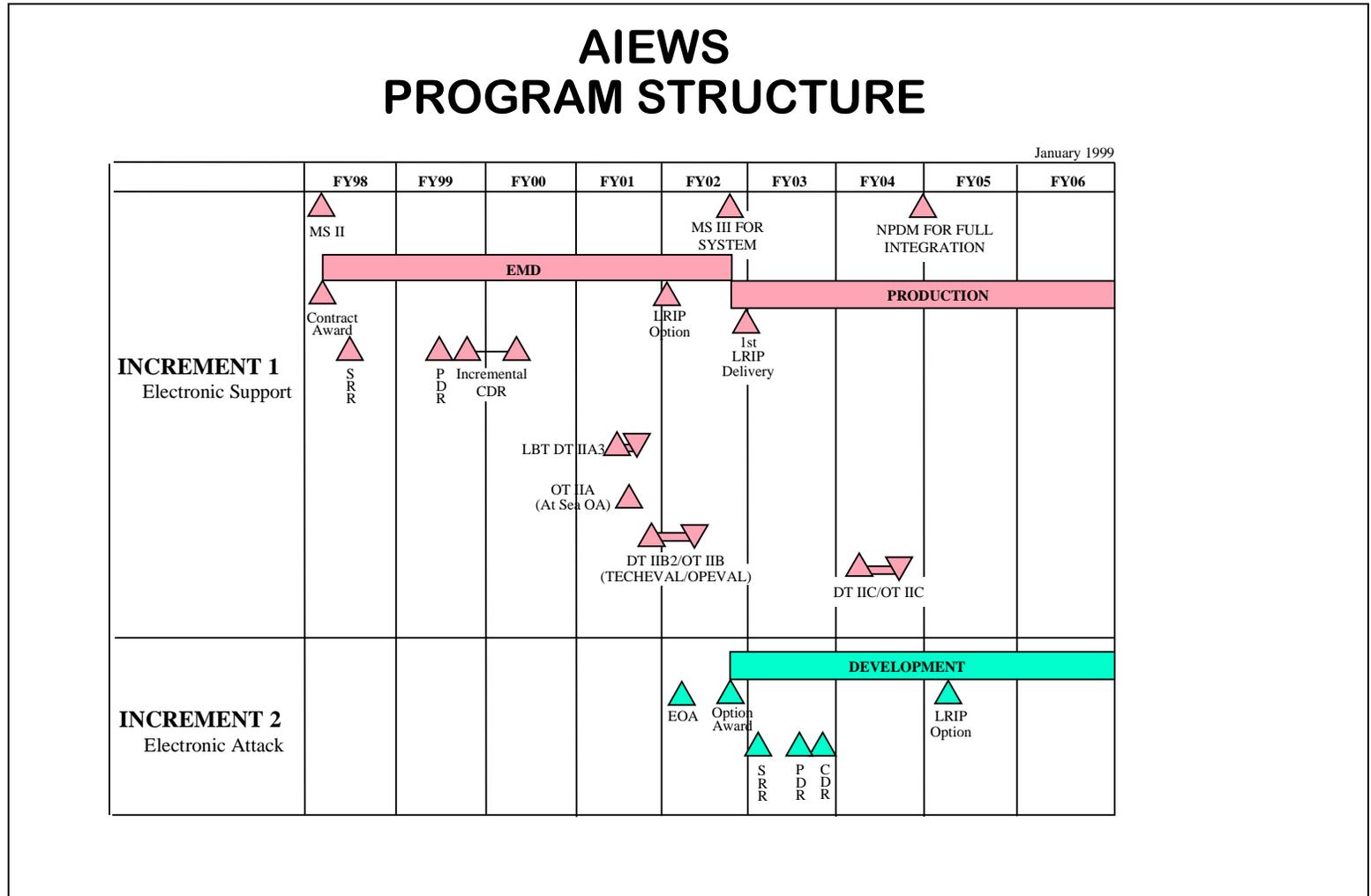
B. Other Program Funding Summary

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>To</u> <u>FY 2005</u>	<u>Total</u> <u>Complete</u>	<u>Cost</u> <u>CONT</u>
OPN 231300	0	0	0	0	32.879	35.015	53.789	77.976	CONT	CONT
AIEWS										

- C. Acquisition Strategy: The AIEWS program awarded its Increment 1 EMD Cost Plus Award Fee (CPAF) contract based on best value as a result of a full and open competition. Included in the contract were phased price options for Increment 1 LRIP and production. Other options include Increment 2 EMD and LRIP for RF and IR countermeasures. Options for full contractor support including Direct Vendor Delivery (DVD), Software Support Activity (SSA) and engineering services are also part of the contract.
- D. Schedule Profile: See attached schedule.

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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/5	Program Element Name & No. Ship Self Defense / 0604755N	Project Name and Number. Advanced Integrated Electronic Warfare System (AIEWS)/U2309



R-1 Item No 125 - 26 of 125 - 27

Exhibit R-2a RDT&E Project Justification
(Exhibit R-2a, Page 26 of 33)

UNCLASSIFIED

UNCLASSIFIED

Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/5	PROGRAM ELEMENT NAME AND NUMBER Ship Self Defense 0604755N	PROJECT NAME AND NUMBER Advanced Integrated Electronic Warfare System (AIEWS) U2309

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Hardware Development	C/CPAF	LMIS Syracuse NY	10.636	24.522	12/98	26.383	11/99			15.959	77.500	73.249
Software Development	C/CPAF	DSR Fairfax VA	7.022	7.619	12/98	6.925	11/99			3.987	25.553	20.678
Systems Engineering	WR/RCP	NSWCDD	1.508	1.395	11/98	2.703	10/99			CONT	CONT	-
Miscellaneous	Various	Various	1.197	2.247	11/98	1.657	10/99			CONT	CONT	-
Q-70 Procurement	FFP	LM/Eagan	-	.900	03/99	-						
Award Fees	C/CPAF	LMIS	.665	* .665	06/99	1.330	03/00			.665		
	C/CPAF	DSR	.478	.713	04/99	.600	03/00					
		DSR				.593	11/00					
Subtotal Product Development			21.506	38.061		40.191				CONT	CONT	

Remarks: * Award Fee scheduled for obligation 06/99 (LMIS).
For LMIS, Total Cost is government estimate from the Program Manager's Life Cycle Cost Estimate (PLCCE) developed by SEA 017.

Specialty Engineering												
System/Subsystem Integration	PD	AEGIS/SSDS Integr	1.140	-	N/A	-	N/A			CONT	CONT	-
Integrated Logistics Support												
Training												
Technical Engineering Services	WR/RCP	NRL	.904	.961	11/98	1.416	10/99			CONT	CONT	-
Miscellaneous	Various	Various	.768	1.108	11/98	1.193	10/99			CONT	CONT	-
Subtotal Support			2.812	2.069		2.609				CONT	CONT	

Remarks:

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Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/5	PROGRAM ELEMENT NAME AND NUMBER Ship Self Defense 0604755N	PROJECT NAME AND NUMBER Advanced Integrated Electronic Warfare System (AIEWS) U2309

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Test Planning/ Pre-TECHEVAL Events	WR/RCP	NSWCDD	-	.200	1/99	.500	10/99			CONT	CONT	-
Miscellaneous	Various	Various	.070	.070	-	.100	10/99			CONT	CONT	-
Subtotal T&E			.070	.270		.600				CONT	CONT	
Remarks:												
Program Management Support	Various	Various	.290	.315	10/98	.344	10/99			CONT	CONT	-
Travel												
Subtotal Management			.290	.315		.344				CONT	CONT	
Remarks:												
Total Cost			24.678	40.715		43.744				CONT	CONT	
Remarks:												

UNCLASSIFIED

Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA5	Program Element Name & No. SHIP SELF DEFENSE/0604755N	Project Name and Number. Infrared Search and Track (IRST) U2442/22649

Cost (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost	3.772	7.463	13.110	8.661	2.755	4.916	2.456	0.0	Continuing	Continuing
RDT&E Articles Qty										

A. (U) This project provides funding for the Infrared Search & Track (IRST) System. The threat from Sea Skimming Anti-Ship Cruise Missiles (ASCMs) is increasing at a substantial rate and is impacting the Navy's force protection and battle space dominance capability. The IRST program bolsters ships force protection capabilities by providing fully integrated passive detection/declaration of Sea Skimming ASCM threats. Because IRST operates in the infrared portion of the electromagnetic spectrum it is immune to radar countermeasures and is not affected by atmospheric anomalies such as surface based ducting. In addition, IRST provides extremely accurate and precise elevation data at the horizon that allows immediate determination of hostile intent. IRST can also free up search radar resources by providing horizon search coverage where radar performance is marginal. The IRST provides passive augmentation to complement radar, electronic support measures (ESM) and visual surveillance systems for air targets. IRST will declare those air targets to the ships' combat system.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) **FY 1998 ACCOMPLISHMENTS:**

- (U) (\$.050) Conducted acceptance testing of Stabilized Infrared Scanner, shipped unit to Lockheed Martin.
- (U) (\$1.100) Completed software development, began software test.
- (U) (\$1.500) Conducted data collection test at Wallops Island, VA.
- (U) (\$.772) Completed Signal Processing Control Unit (SPCU) assembly and checkout.
- (U) (\$.350) Began System Integration via CEC.

2. (U) **FY 1999 PLAN:**

- (U) **Complete IRST Phase 1.**
- (U) (\$.800) Conduct at-sea data collection as part of USN/FGN joint fleet exercise.
- (U) (\$1.000) Conduct integrated Land Based Systems Test at Aegis Combat Systems Center (ACSC), Wallops Island, VA.
- (U) (\$.300) Continue Combat Systems Integration via CEC.
- (U) (\$.164) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
- (U) **Begin IRST Phase 2.**
- (U) (\$2.300) Begin detector design and fabrication.
- (U) (\$.400) Complete scanner design and begin fabrication.
- (U) (\$1.419) Begin SPCU Phase 2 modifications.
- (U) (\$.600) Begin software development.
- (U) (\$.480) Begin algorithm and simulation development.

3. (U) FY 2000 PLAN:

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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA5	Program Element Name & No. SHIP SELF DEFENSE/0604755N	Project Name and Number. Infrared Search and Track (IRST) U2442/22649

- (U) (\$2.300) Complete detector design and fabrication. Begin acceptance test.
- (U) (\$1.200) Continue scanner fabrication.
- (U) (\$1.800) Continue SPCU Phase 2 modifications.
- (U) (\$3.500) Continue software development.
- (U) (\$1.510) Continue algorithm and simulation development.
- (U) (\$2.800) Begin systems integration.

B. Other Program Funding Summary: Not Applicable

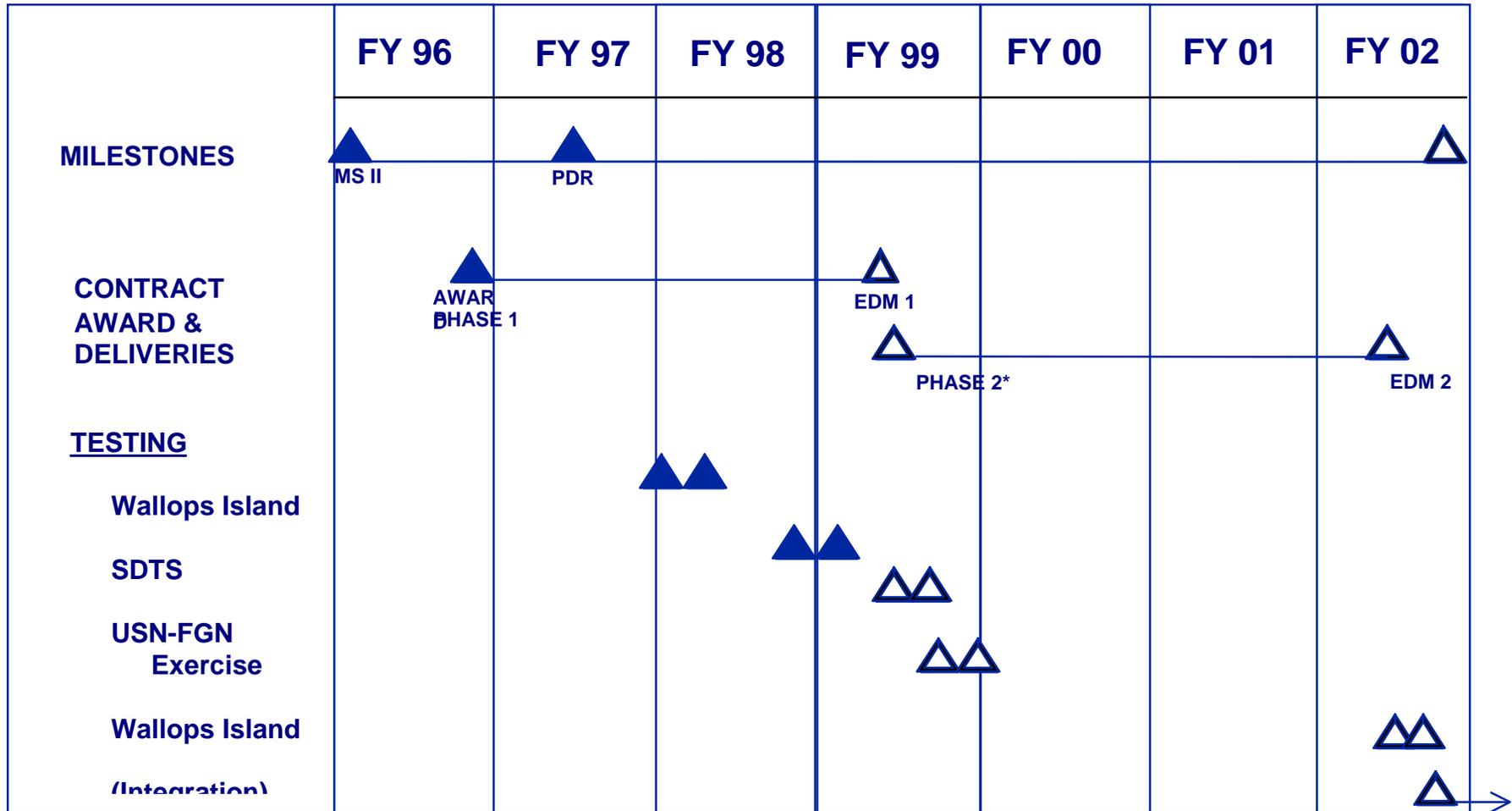
C. Acquisition Strategy: Proceed to production for USN new construction ships.

D. Schedule Profile: See attached.

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Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDTE&BA5	Program Element Name & No. SHIP SELF DEFENSE/0604755N	Project Name and Number. Infrared Search and Track (IRST) U2442/22649



* PHASE 2 - OPTION IN CURRENT E&MD CONTRACT

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Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/5	PROGRAM ELEMENT NAME AND NUMBER Ship Self Defense 0604755N	PROJECT NAME AND NUMBER Infrared Search and Track (IRST) U2442/22649

Cost Categories PRODUCT DEVELOPMENT	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	C/CPAF	Lockheed Martin, Orlando, FL	19.593	3.900	3/99	9.610	11/99			Continuing	CONT.	CONT.
Ancillary Hardware Development	N/A	N/A	N/A	N/A	N/A	N/A	N/A			Continuing	CONT.	CONT.
Miscellaneous	Various	Various	10.386	1.500	various	3.300	various			Continuing	CONT.	CONT.
Subtotal Product Development			29.979	5.400		12.910						
Remarks:												
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
Subtotal Support												
Remarks: N/A												

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Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/5	PROGRAM ELEMENT NAME AND NUMBER Ship Self Defense 0604755N	PROJECT NAME AND NUMBER Infrared Search and Track (IRST) U2442/22649

Cost Categories TEST AND EVALUATION	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Land Based Test and Evaluation	N/A	NSWC/Lockheed Martin, Wallops Island, VA	1.500	1.000	3/99					Continuing	CONT.	CONT.
At-Sea Test & Evaluation		NSWC/Lockheed Martin, USN/FGN "May fly" Exercise		.800	3/99					Continuing	CONT.	CONT.
											CONT.	CONT.
											CONT.	CONT.
Subtotal T&E			1.500	1.800							CONT.	CONT.
Remarks:												
Cost Categories MANAGEMENT												
Miscellaneous	Various	Various	2.062	.263	11/98	.200	11/99			Continuing	CONT.	CONT.
Subtotal Management			2.062	.263		.200				Continuing	CONT.	CONT.
Remarks:												
Total Cost			33.541	7.463		13.110				Continuing	CONT.	CONT.
Remarks:												

R-1 Item No 125 - 33 of 125 - 33

Exhibit R-3 Project Cost Analysis
(Exhibit R-3, Page 33 of 33)

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