CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification						DATE: **February 2006**	
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-5**				R-1 ITEM NOMENCLATURE 0604307N/AEGIS COMBAT SYSTEM ENGINEERING			
COST (in Millions)	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Total PE Cost	**148.939**	**228.932**	**190.059**	**209.311**	**218.081**	**242.782**	**268.415**
1447/Surface Combatant Combat System Improvements	136.011	200.743	151.594	95.169	72.118	88.068	87.825
3044/Solid State Spy Radar/AN/SPY-1 Radar System Readiness Improvement	3.174	12.289	38.465	114.142	145.963	154.714	180.590
9223/Silicon Carbide MMIC Production	2.907	0.000	0.000	0.000	0.000	0.000	0.000
9383/Smart Integration Data Env. (SIDE)	0.962	0.000	0.000	0.000	0.000	0.000	0.000
9555/AEGISTraveling Wave Tube Circuit	1.737	0.000	0.000	0.000	0.000	0.000	0.000
9556/Integrated Display & Enhanced Architecture (IDEA)	4.148	0.000	0.000	0.000	0.000	0.000	0.000
9999/Congressional Adds	0.000	15.900	0.000	0.000	0.000	0.000	0.000

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The AEGIS Combat System (ACS) provides immediate and effective capability to counter the current and expected air, surface, and sub-surface threats. Changes in the threat capability and advances in technology such as fiber optics, local area networks, and high performance computing require corresponding AEGIS Weapon System (AWS) and ACS changes. This program provides the ACS engineering and weapon system developments necessary for a continued increase in the capability of AEGIS Cruisers and Destroyers. In addition to developing and integrating improvements to the AWS, this program integrates combat capabilities developed in other Navy R&D programs into the ACS. Modifications of AWS computer programs must be made to integrate these capabilities into the ACS so that battle effectiveness and ACS performance will be retained against the evolving threat. Selected AWS and ACS upgrades will be backfitted into CG 47 Class and DDG 51 Class ships already in the Fleet, providing new key warfighting capability while reducing life cycle maintenance costs. In addition, the extensive use of Commercial Off-the-Shelf (COTS) equipment throughout the combat system requires necessary COTS refresh development efforts to pace the core Baseline development work. AEGIS Combat System engineering includes the CG/DDG Open Architecture (OA) effort, including rearchitected computer programs, to the AEGIS fleet. CG/DDG OA positions the cruisers and destroyers for maximum warfighting improvements and life cycle support benefit and produces a system which is considerably less difficult to maintain and modernize and mitigates the cost of inevitable required and repetitive technology refresh. The DDG Modernization Program will identify and introduce OA Category-3 compliant hardware and software. As part of the Naval Integrated Fire Control Counter Air (NIFC-CA) program, SM-6 integration efforts will begin in FY06.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification							DATE: **February 2006**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 5**	PROGRAM ELEMENT NAME AND NUMBER **AEGIS COMBAT SYS ENG PE 0604307N**				R-1 ITEM NOMENCLATURE **1447 Surface Combatant Combat System Improvements**				
COST ($ in Millions)		FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	
Surface Combatant Combat Sys/1447		**136.011**	**200.743**	**151.594**	**95.169**	**72.118**	**88.068**	**87.825**	
RDT&E Articles Qty **Not Applicable**									

A. Mission Description and Budget Item Justification:

This program provides cruiser & destroyer ACS upgrades and integrates new equipment and systems to pace the threat and capture advances in technology. Examples of captured advanced technologies are fiber optics, distributed architecture, and high performance computing, all of which require corresponding AWS and ACS changes. The ACS capabilities have continually evolved. Baseline (B/L) 2 (CG 52-58) introduced the Vertical Launching System, TOMAHAWK Weapon System, and Anti-Submarine Warfare upgrades. B/L 3 (CG 59-64) introduced the AN/SPY-1B Radar, AN/UYQ-21 consoles, and UYK-43 "low boy" computers. B/L 4 (CG 65-73) introduced the production AN/UYK-43/44 computers with superset computer programs developed for the DDG 51. Baseline 5 was introduced in FY1992 DDGs and included the Joint Tactical Information Distribution System (JTIDS) [Tactical Data Information Link (TADIL)16], Command and Control Processor (C2P), Combat Direction Finding, Tactical Data Information Exchange System, AN/SLQ-32 (V)3 Active Electronic Counter Countermeasures, and Aegis Extended Range (ER) Missile. B/L 5 was developed in two steps (Phases): Phase 1 integrated Aegis ER and supported the missile Initial Operational Capability; Phase 3 integrated system upgrades including Defensive Electronic Attack, Track Load Control Algorithms, and Track Initiation Processor (integrated on 5.3, DDGs 68+); JTIDS and the OJ-663 color display Tactical Graphics capability into the ACS. B/L 5 Phase 3 is now resident on baseline 3 & 4 CGs and DDG 51-78. Baseline 6 Phase I introduced COTS, FDDI LAN, UYQ-70 consoles, CEC for CGs, and an adjunct COTS computer for ADS. It supported OPEVAL of CEC in CGs 66 and 69 and was introduced in the DDG 51 class beginning with DDG 79. B/L 6 Phase 1 is now resident on CGs 59, 65, 66, 68, 69 and 71. B/L 6 Phase 3 was introduced on DDG 85-90 and is being backfit onto DDGs 79-84. B/L 6 Phase 3 upgrades included embarked helicopters, Fiber Optics as applied to Data Multiplexing (FODMS), implementation of affordability initiatives, adjunct computers for all AWS elements, CEC for DDGs, and Battle Force Tactical Trainer (BFTT), Advanced Display System, Evolved Sea Sparrow Missile (ESSM) Identification (ID) upgrades Phase 1, Advanced TOMAHAWK Weapon System (ATWCS) Phase II, Fire Control System Upgrades, and the Joint Maritime Command Information System (JMCIS). B/L 7 Phase 1 is installed in the DDG 51 class beginning with DDG 91. Major Baseline 7 upgrades include but are not limited to introduction and integration of a new radar (AN/SPY-1D(V) upgrade), all UYK-43 and adjunct computers to be replaced with COTS-based advanced computer processing, A/N-SQQ-89(V)15, and the Remote Mine Hunting System. The Cruiser Modernization Program will upgrade cruisers to provide enhanced Air Dominance and C4I improvements, enhanced Gun Weapon system capability, improved force protection, replaces UYA-4 consoles with COTS consoles, replaces obsolete UYK-7 computers with COTS computing architecture to introduce Open Architecture. Experience with COTS equipment in baselines 6 Phase 1 through Baseline 7 has shown that COTS equipment will require a nominal four year cyclical refresh (periodic replacement) plan. This is a fact of life introduced by COTS because industry stops supporting older COTS components as it progresses to the next version. Currently, these refresh efforts are not "plug and play." They require additional developmental efforts that will necessitate replacement of new components with updated operating systems, device drivers, and interfaces. This program introduces a CG/DDG Open Architecture (OA) effort, including rearchitected computer program components, in accordance with Navy Open Architecture guidance and standards. CG/DDG OA positions the cruisers and destroyers for maximum warfighting improvements and life cycle support benefit to meet evolving threats. It produces a system which is considerably less difficult to maintain and modernize and mitigates the cost of inevitable, required, and repetitive technology refreshes. The DDG Modernization Program will identify and introduce OA Category-3 compliant hardware and software. As part of the Naval Integrated Fire Control Counter Air (NIFC-CA) program, SM-6 integration efforts will begin in FY06. Due to FY05 Congressional action, the B/L 7 Phase 1C effort originally targeted for fielding in FY06 has been replanned as Cruiser Modernization CR2 (CGM CR2) for fielding in FY08 on B/L 2 CGs and FY11 on B/L 3/4 CGs and highly leverages AOA efforts and funding.

R-1 SHOPPING LIST - Item No. 102

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2006**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-5	0604307N/AEGIS COMBAT SYSTEM ENGINEERING	1447 Surface Combatant Combat System Improvements

B. Accomplishments/Planned Program

	FY 05	FY 06	FY 07
Accomplishments/Efforts/Subtotal Cost	27.196	0.000	0.000
RDT&E Articles Quantity			

Accomplishments: Continued maturation of Baseline 7 Phase I in support of SPY-1D(V) DT/OT and DDG 91-102 ship building milestones. Conducted demonstration of Baseline 7 Phase I capabilities. Included support of AWS Baseline Replan initiatives: capture of high priority CPCR fixes into Baseline 7 Phase I variants (7IC, 7IR); reducing number of deficiency workarounds; NSWC-DD Forward Engineering Test Team and SPY-1D (V) TECHEVAL.

	FY 05	FY 06	FY 07
Accomplishments/Efforts/Subtotal Cost	27.751	16.197	0.000
RDT&E Articles Quantity			

Accomplishments: Continued coding, debugging and testing of Baseline 7 Phase I COTS Refresh necessary for fielding DDGs 103-112.
Planned: Continue to code, debug and conduct element test and multi-element integration tests, including CEC 2.1, culminating in a Navy Integrated test Event starting in 2Q FY06.

	FY 05	FY 06	FY 07
Accomplishments/Efforts/Subtotal Cost	41.595	97.200	74.000
RDT&E Articles Quantity			

Accomplishments: Baseline 7 Phase II evolved into a three Spiral development effort to implement CG/DDG Open Architecture (OA) by providing open architected elements into B/L 7.1R and both cruiser and destroyer modernization. This effort re-architects Aegis computer program for the following elements: SPY (Radar), AEGIS Display System (ADS), and Weapon Control System (WCS) in accordance with and compliant with Navy Open Architecture specifications and standards. Incrementally introducing the re-architected products in a spiral fashion in 7 Phase 1 Refresh (DDG103+) and Cruiser Modernization COTS Refresh 2 (CGM CR2) (Baseline 2 Cruisers). Successfully demonstrated design and code portability of the preliminary SPY OA and WCOA elements.
Planned: Conduct Lifecycle Objective Review (LOR) and Lifecycle Architecture Review (LAR) for Spiral Three.

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EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2006**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-5	0604307N/AEGIS COMBAT SYSTEM ENGINEERING	1447 Surface Combatant Combat System Improvements

B. Accomplishments/Planned Program (Cont.)

	FY 05	FY 06	FY 07
Accomplishments/Efforts/Subtotal Cost	9.971	22.820	18.518
RDT&E Articles Quantity			

Accomplishments: Switched work from Baseline 7 Phase 1C development efforts originally targeted for a FY06 Cruiser in accordance with FY05 Congressional action to design of Cruiser Modernization CGM CR2 effort now targeted for Baseline 2 Cruisers in FY08 and applicable to Baseline 3/4 Cruisers in FY11. Completed product definition of COTS Refresh 2 computing environment that will integrate both legacy and Open Architecture (OA) computer programs for CGM CR2 . Effort highly leveraged to AOA.

Planned: Design, code, debug and test Cruiser unique modifications associated with interfacing to AOA products and computer program.

	FY 05	FY 06	FY 07
Accomplishments/Efforts/Subtotal Cost	13.488	17.869	19.891
RDT&E Articles Quantity			

Accomplishments/Planned: Continued to provide the RDT&E share of operations and maintenance of the Combat System Engineering Development Site(CSEDS), Program Generation Center, Computer Program Test Site, and Land Based Test Site.

	FY 05	FY 06	FY 07
Accomplishments/Efforts/Subtotal Cost	16.010	7.621	12.400
RDT&E Articles Quantity			

Accomplishments/Planned: Provided funds for labs and field activities to support forward fit and backfit baseline upgrades in order to conduct engineering and scientific studies and analysis to minimize the risk in the introduction of increased warfighting capability. Studies produced by the Applied Physics Lab and the NSWC-DD ensure effective management of COTS. NSWC-DD personnel also provide on site technical support at contractor facilities during development, testing, and evaluation of upgrades to the ACS.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2006**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-5	0604307N/AEGIS COMBAT SYSTEM ENGINEERING	1447 Surface Combatant Combat System Improvements

B. Accomplishments/Planned Program (Cont.)

	FY 05	FY 06	FY 07
Accomplishments/Efforts/Subtotal Cost	0.000	15.700	14.100
RDT&E Articles Quantity			

Accomplishments/Planned: Begin development efforts to identify and introduce Open Architecture Category-3 compliant hardware and Crusier Modernization COTS Refresh 2 computer programs in support of the DDG Modernization program. Create a common set of specifications and drawings.

	FY 05	FY 06	FY 07
Accomplishments/Efforts/Subtotal Cost	0.000	23.336	12.685
RDT&E Articles Quantity			

Planned: Begin development efforts for Naval Integrated Fire Control Counter Air (NIFC-CA), SM-6/AEGIS integration. Conduct Performance Analyses and Trade studies, Modeling and Simulation studies and SM-6 algorithmic studies culminating in a development leading to a Family of Systems design.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2006**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-5	0604307N/AEGIS COMBAT SYSTEM ENGINEERING	1447 Surface Combatant Combat System Improvements

C. PROGRAM CHANGE SUMMARY:

Funding:	FY 2005	FY 2006	FY 2007
Previous President's Budget: (FY06/07 Pres Controls)	143.889	203.837	182.518
Current President's Budget: (FY07 PB Controls)	136.011	200.743	151.594
Total Adjustments	-7.878	-3.094	-30.924
Execution Year Adjustments			
Other General Provisions	-3.130	-3.094	
Programmatic changes			-30.815
BTR	-4.748		
Other misc. changes			-0.109
PB07 Fuel Price Adjustments			
Subtotal	-7.878	-3.094	-30.924

Schedule:

1) Baseline 7P1R Initial Cert moved to 4Q FY06
2) Schedule Program Assessment Review (PAR) for 3Q FY07
3) CG/DDG OA Spiral 2 EA 2 moved to 3Q FY06
4) DDG Modernization Initial Cert moved to 2Q FY10

Technical:

N/A

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CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2006**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-5	0604307N/AEGIS COMBAT SYSTEM ENGINEERING	1447 Surface Combatant Combat System Improvements

D. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	To Complete	Total Cost
SCN 2122 - DDG 51	3,428.3	146.9	355.8	86.0				Cont.	Cont.
OPN 5246 - AEGIS Supt. Eqp	61.5	101.6	75.3	114.7	138.5	172.6	161.6	Cont.	Cont.
OPN 0900 - DDG Mod		3.0	2.2	55.7	200.8	177.9	180.3	Cont.	Cont.

E. ACQUISITION STRATEGY:

Combat System Improvements are implemented in Baselines as described in the project mission statement. In FY 1998, Lockheed Martin was awarded an omnibus contract (sole source) to develop and integrate combat system improvements, which will fund all remaining Aegis Baseline Upgrade Development efforts. After the baseline has been completed and tested, the computer program and associated equipment are delivered to the new construction shipbuilders where the program and equipment are installed and tested along with all other elements of the shipboard combat system and associated combat support systems. The computer program is a GFE deliverable to the Production Test Center for equipment test and check out.

F. MAJOR PERFORMERS:

Lockheed Martin, Moorestown, NJ (Combat System Design Agent/Prime Contractor)
NSWC/DD, Dahlgren, VA (Lifetime Support Engineering Agent)

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)								DATE: **February 2006**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-5**			PROGRAM ELEMENT 0604307N/AEGIS COMBAT SYSTEM ENGINEERING			PROJECT NUMBER AND NAME 1447 Surface Combatant Combat System Improvements						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 05 Cost	FY 05 Award Date	FY 06 Cost	FY 06 Award Date	FY 07 Cost	FY 07 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Systems Engineering	SS/CPAF	Lockheed, Moorestown, NJ	887.166	89.478	01/05	145.104	01/06	105.593	01/07	Cont.	Cont.	
Systems Engineering	SS/CPFF	APL, Baltimore MD	27.643	0.100	10/04	0.617	10/05	0.817		Cont.	Cont.	
Systems Engineering	WR/RCP	NSWC, Dahlgren VA	157.819	6.682	11/04	12.748	11/05	9.915		Cont.	Cont.	
Systems Engineering	SS/CPAF	BAE Systems, Rockville, MD	0.000	6.089	10/04	6.855		6.089				
Systems Engineering	WR	NSWC, PHD CA	21.867	2.948	11/04	7.177	11/05	1.848		Cont.	Cont.	
Systems Engineering	WR/RCP	NWAS, Corona CA	16.559	2.570	11/04	1.650	11/05	1.325		Cont.	Cont.	
Systems Engineering	WR	SPAWAR	4.764	0.752	11/04	0.591	11/05	0.840		Cont.	Cont.	
Systems Engineering	WR/RCP	Dam Neck	7.015	0.038		0.100		0.000		Cont.	Cont.	
Systems Engineering	WR/RCP	Miscellaneous	35.126	4.088	Various	2.494		0.670		Cont.	Cont.	
Award Fees	SS/CPAF	Lockheed, Moorestown, NJ	117.880	10.737	07/05	11.536	07/06	14.561		Cont.	Cont.	
Award Fees	SS/CPAF	BAE Systems, Rockville, MD	0.580	0.250	10/04	0.250		0.250		Cont.	Cont.	
Award Fees	SS/CPAF	Anteon, Washington, DC	0.000	0.250	10/04	0.250		0.250		Cont.	Cont.	
Award Fees	WR/RCP	Miscellaneous	2.790	0.000		0.000		0.000		Cont.	Cont.	
Subtotal Product Development			1279.209	123.982		189.372		142.158		Cont.	Cont.	

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CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)

DATE: **February 2006**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N / BA-5**

PROGRAM ELEMENT: 0604307N/AEGIS COMBAT SYSTEM ENGINEERING

PROJECT NUMBER AND NAME: 1447/9066 Surface Combatant Combat System

Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 05 Cost	FY 05 Award Date	FY 06 Cost	FY 06 Award Date	FY 07 Cost	FY 07 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Test and Evaluation	SS/CPAF	Lockheed, Moorestown, NJ	19.622	3.390	07/05	4.218	07/06	2.838	07/07	Cont.	Cont.	
Test and Evaluation	WR	NSWC, Pt. Hueneme, CA	6.840	1.547	11/04	0.760	11/05	0.724		Cont.	Cont.	
Test and Evaluation	CPFF	APL, Baltimore MD	3.500	0.000		0.000		0.000		Cont.	Cont.	
Test and Evaluation	WR/RCP	Miscellaneous	11.527	1.829	Various	1.984	Various	1.523		Cont.	Cont.	
										Cont.	Cont.	
										Cont.	Cont.	
										Cont.	Cont.	
Subtotal T&E			41.489	6.766		6.962		5.085		Cont.	Cont.	
Remarks:												
Program Management Support	SS/CPAF	Anteon, Washington, DC	0.000	4.300	10/04	4.000		4.000				
	WR/RCP	Miscellaneous	7.246	0.963	Various	0.409	Various	0.351	Various	Cont.	Cont.	
										Cont.	Cont.	
										Cont.	Cont.	
										Cont.	Cont.	
SBIR Assessment										Cont.	Cont.	
Subtotal Management			7.246	5.263		4.409		4.351		Cont.	Cont.	
Remarks:												
Total Cost			1,327.944	136.011		200.743		151.594		Cont.	Cont.	

Remarks:

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CLASSIFICATION:

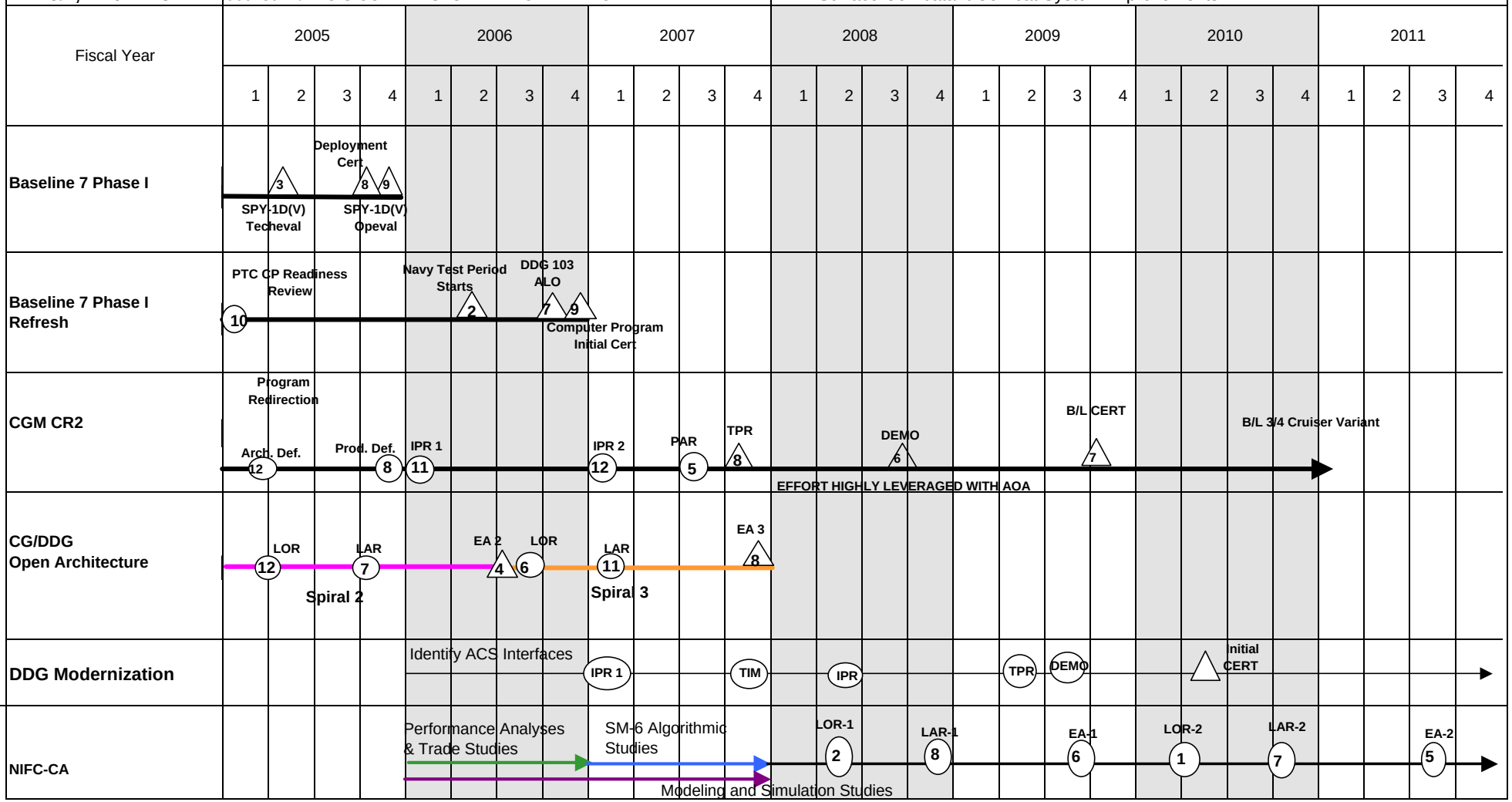
EXHIBIT R-4, RDT&E Schedule Profile

DATE: **February 2006**

APPROPRIATION/BUDGET A: **RDT&E, N / BA-5**

PROGRAM ELEMENT NUMBER AND NAME: 0604307N/AEGIS COMBAT SYSTEM ENGINEERING

PROJECT NUMBER AND NAME: 1447 Surface Combatant Combat System Improvements



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CLASSIFICATION:

Exhibit R-4a, Schedule Detail					DATE: **February 2006**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E BA-5**	PROGRAM ELEMENT 0604307N/AEGIS COMBAT SYSTEM ENGINEERING				PROJECT NUMBER AND NAME 1447 Surface Combatant Combat System Imp.			
Schedule Profile	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	
7 Phase I								
SPY-1D(V) Opeval	4Q							
Deployment Cert	4Q							
7 Phase I Refresh								
PTC CP Readiness Review	1Q							
Navy Integrated Test Period		2Q-4Q						
DDG 103 Aegis Light Off (ALO)		4Q						
Computer Program Initial Cert		4Q						
CGM CR2								
Architecture Definition	1Q							
Product Definition	4Q							
Initial Process Review (IPR) 1		1Q						
Initial Process Review (IPR) 2			1Q					
Program Assessment Review (PAR)			3Q					
Test Program Review (TPR)			4Q					
Demo				3Q				
B/L Cert					4Q			
CG/DDG Open Architecture								
Spiral 2 Lifecycle Objective Review (LOR)	1Q							
Spiral 2 Lifecycle Architecture Review (LAR)	4Q							
Spiral 2 Engineering Assessment (EA) 2		3Q						
Spiral 3 LOR		3Q						
Spiral 3 Lifecycle Architecture Review (LAR)			1Q					
Spiral 3 Engineering Assesment (EA) 3			4Q					
DDG Modernization								
Initial Process Review (IPR) 1			1Q					
Technical Interchange Meeting (TIM)			4Q					
Initial Process Review (IPR) 2				2Q				
Test Program Review (TPR)					2Q			
Demo					3Q			
Initial Cert						2Q		
NIFC-CA								
Performance Analyses and Trade Studies		1Q-4Q						
SM-6 Algorithmic Studies			1Q-4Q					
Modeling and Simulation Studies		1Q-4Q	1Q-4Q					
Lifecycle Objective Review (LOR) 1				2Q				
Lifecycle Architecture Review (LAR) 1				4Q				
Engineering Assesment (EA) 1					3Q			
Lifecycle Objective Review (LOR) 2						2Q		
Lifecycle Architecture Review (LAR) 2						4Q		
Engineering Assesment (EA) 2							3Q	

EXHIBIT R-2a, RDT&E Project Justification						DATE: February 2006	
APPROPRIATION/BUDGET ACTIVITY **RDT&E,N / BA-5**	PROGRAM ELEMENT NUMBER AND NAME **0604307N/AEGIS COMBAT SYSTEM ENG**			PROJECT NUMBER AND NAME **3044/9223/9555 - Solid State SPY Radar**			
COST ($ in Millions)	FY 2005*	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project Cost	**7.818**	**12.289**	**38.465**	**114.142**	**145.963**	**154.714**	**180.590**
RDT&E Articles Qty	**0**	**0**	**0**	**0**	**0**	**0**	**0**

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

SOLID STATE SPY RADAR / SILICON CARBIDE MMIC PRODUCIBILITY PROGRAM:
The Solid State SPY Radar is being developed to support Theater Air and Missile Defense requirements as part of a next generation cruiser, CG(X), radar suite. The S-Band Solid State SPY Radar will provide multi-mission capabilities, supporting both long range, exoatmospheric detection, tracking and discrimination of ballistic missiles, as well as robust Ballistic Missile Defense and Self Defense against air and surface threats. For the BMD capability, increased radar sensitivity and bandwidth over the current SPY-1 system is needed to detect, track and support engagements of advanced ballistic missile threats at the required ranges. For the Ballistic Missile Defense and Self Defense capability, increased sensitivity and clutter rejection capability is needed to detect, react to, and engage stressing Very Low Observable /Very Low Flyer (VLO/VLF) threats in the presence of heavy land, sea, and rain clutter. This effort provides for the development of an S-Band solid state replacement for the SPY-1 Radar with the required capabilities to pace the evolving threat.

AN/SPY-1 RADAR SYSTEM READINESS IMPROVEMENT PROGRAM:
The AN/SPY-1 radar system is the Navy's primary radar for air defense and ballistic missile defense and will be so for the next 20+ years. Readiness improvements will be analyzed and systems engineering performed to improve the readiness of the AN/SPY-1 Radar. This program will improve AN/SPY-1 operational availability, reliability and reduce cost of operation. The AN/SPY-1 Readiness Improvement program also includes the production of intelligent automated maintenance tools, which will improve operational & combat effectiveness while improving system availability of the AN/SPY-1. The funding will go towards the non-recurring engineering costs for development of the AN/SPY-1 readiness improvements and related tools; as well as provide money for production drawings, interface/maintenance documents, and logistical planning. Additional readiness improvements will address transmitter, signal processor and microwave tube shortcomings.

AEGIS TRAVELING WAVE TUBE CIRCUIT:
This program defines the efforts necessary to identify and solve DMS issues with the 10KW traveling wave tube (TWT). In particular, changes to the slow wave structure will be identified that will provide an additional source for the slow wave structure used in the 10KW TWT.

CG(X) PROGRAM:
CG(X) transferred into P.E. 0604307N (3044) from P.E. 0604300N (3104)
The CG(X) is a multi-mission ship required to perform self-defense, area air defense, and ballistic missile defense. The CG(X) must have a radar capable of operating in different environmental and mission regimes against a wide variety of potential targets and profiles. A scalable radar design with major improvements in power, sensitivity, resistance to natural and man-made environments over current radar systems is needed for multi-mission TAMD (BMD and Area AAW). Modularity of hardware and software, a designed in growth path for technology insertion, and Open Architecture (OA) Compliance are required for performance and technology enhancements throughout service life.

* FY 2005 includes: Silicon Carbide MMIC Producibility Program congressional add, Improved Readiness for AN/SPY-1 Radar congressional add, and the AEGIS Traveling Wave Tube Circuit congressional add.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2006**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-5	**0604307N/AEGIS COMBAT SYSTEM ENG**	**3044/9223/9555 - Solid State SPY Radar**

B. Accomplishments/Planned Program

	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost	0.000	4.480	17.309
RDT&E Articles Quantity	0	0	0

R&D / RISK REDUCTION
Planned:
- Digital Array Radar (DAR) build, integration, and component test
- Prototype build, integration, and initial test
- Conduct Navy Program Decision Milestone to finalize technology and radar baseline

	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost	2.500	0.000	0.000
RDT&E Articles Quantity	0	0	0

ADVANCED TECHNOLOGY MMIC DEVELOPMENT
Accomplishments:
- Improve the producibility (i.e. yield and cost) of high power Silicon Carbide (SiC) MMIC power amplifiers.
- Non recurring engineering design of high power SiC MMICs. Recurring fabrication to support future capability radar demonstrations

R-1 SHOPPING LIST - Item No. 102

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2006
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-5	**0604307N/AEGIS COMBAT SYSTEM ENG**	**3044/9223/9555 - Solid State SPY Radar**

B. Accomplishments/Planned Program (Cont.)

	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost	5.268	7.289	20.386
RDT&E Articles Quantity	0	0	0

SYSTEMS ENGINEERING

Accomplishments:

- Produced an operational, proof-of-concept, software demonstration/simulation model of Adaptive Diagnostic Electronic Portable Testset (ADEPT) and a stand-alone prototype system capable of performing alignment and maintenance procedures on the AN/SPY-1A radar in Phase I and Phase II of the ADEPT SBIR, respectively.
- Defined efforts necessary to identify and solve DMS issues with the 10KW traveling wave tube (TWT).

Planned:

- Participate in the development of threat definitions, performance requirements and radar specifications; perform radar systems performance analysis.
- Participate in Integrated Product Teams (IPTs) and Working Groups (WGs) to resolve critical issues.
- Perform supporting studies and analyses.
- Finalize Acquisition Strategy (AS), Acquisition Plan (AP), and Technical Data Package (TDP) for competition
- Conduct CG(X) Radar competiton

	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost	0.050	0.520	0.770
RDT&E Articles Quantity			

PROGRAM MANAGEMENT SUPPORT

Planned:

- Program planning, assessment of technical alternatives, risk identification and mitigation.
- Cost and schedule development and execution.

Total Cost:	7.818	12.289	38.465

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2006**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E,N / BA-5	**0604307N/AEGIS COMBAT SYSTEM ENG**	**3044/9223/9555 - Solid State SPY Radar**

C. (U) PROGRAM CHANGE SUMMARY:

Funding:	FY 2005	FY 2006	FY 2007
Previous President's Budget: (FY06 PB Controls)	8.021	12.476	45.433
Current President's Budget: (FY07 PB Controls)	7.818	12.289	38.465
Total Adjustments	-0.203	-0.187	-6.968
Summary of Adjustments			
Programmatic Changes	0.000	0.000	-6.723
Other General Provisions	-0.203	-0.187	
Other misc. changes			-0.245
Subtotal	-0.203	-0.187	-6.968

Schedule:

Not Applicable.

Technical:

Not Applicable.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2006**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E,N / BA-5	**0604307N/AEGIS COMBAT SYSTEM ENG**	**3044/9223/9555 - Solid State SPY Radar**

D. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	To Complete	Total Cost
RDTEN 0604300N - 3107 CG (X) Development	0.000	29.658	9.282	102.577	187.069	254.605	239.731	Cont.	Cont.

E. ACQUISITION STRATEGY:

SOLID STATE SPY RADAR / SILICON CARBIDE MMIC PRODUCIBILITY PROGRAM: The Solid State SPY Radar Program was awarded to Lockheed Martin in June 1999 based upon a competitive selection resulting from a Broad Agency Announcement (BAA). This program is for the competition of a prototype radar system. A milestone decision for EDM will be based upon successful completion of this prototype phase.

AN/SPY-1 RADAR SYSTEM READINESS IMPROVEMENT PROGRAM: This is a Phase II SBIR managed by Mikros Systems Corporation.

AEGIS TRAVELING WAVE TUBE CIRCUIT PROGRAM: This program is managed by NSWC Crane.

CG(X): (U) Plans are to leverage research and development investments, integrate significantly matured fundamental advanced technologies from technology risk reduction efforts and allies, and incorporate Open Architecture approaches to develop a scalable radar design with major improvements in power, sensitivity, resistance to natural and man-made environments over current radar systems for multi-mission TAMD (BMD and Area AAW). System design will be accomplished using proven advanced technologies and commercial standards to lower schedule risk and

F. MAJOR PERFORMERS:

SS SPY: Lockheed Martin - Moorestown, NJ
Improved Readiness for AN/SPY-1 Radar: Mikros Systems Corporation, Princeton, NJ
Silicon Carbide Producibility MMIC Program: CREE, Inc. Durham, NC
CG(X): TBD

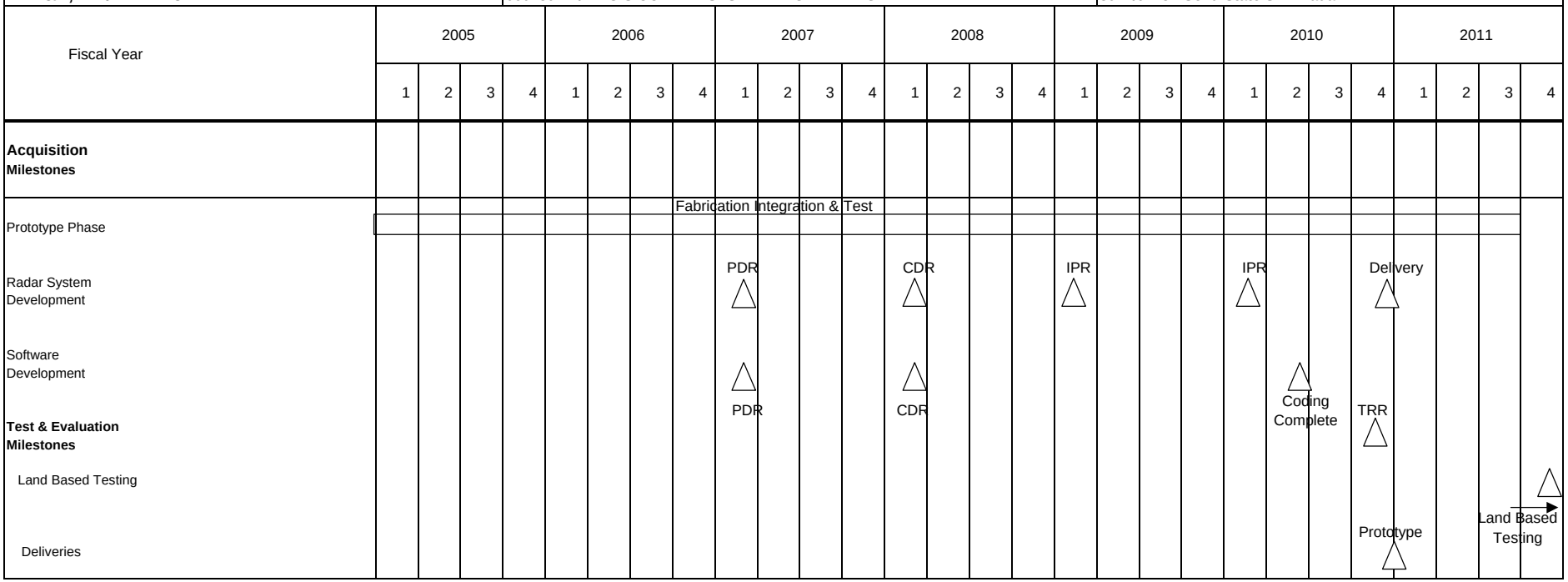
CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)											DATE: **February 2006**	
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA - 5**			PROGRAM ELEMENT NAME AND NUMBER **0604307N/AEGIS COMBAT SYSTEM ENG**			PROJECT NUMBER AND NAME **3044/9223/9555 - Solid State SPY Radar**						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 05 Cost	FY 05 Award Date	FY 06 Cost	FY 06 Award Date	FY 07 Cost	FY 07 Award Date	Cost to Complete	Total Cost	Target Value of Contract
R&D / Risk Reduction	Various	Various	0.000	0.000	N/A	0.530	02/06	17.309	TBD	Continuing	Continuing	TBD
	CPFF	JHU/APL	0.000	0.000	N/A	0.550	02/06			Continuing	Continuing	TBD
	Cost Share	CREE	0.000	0.000	N/A	0.050	05/06			Continuing	Continuing	TBD
	SS/CPAF	Lockheed Martin (NJ)	22.204	0.000	N/A	0.000	N/A					
	MIPR	DCMA	8.000	0.000	N/A	0.000	N/A					
	MIPR	DMEA	0.000	0.000	N/A	2.500	05/06			Continuing	Continuing	TBD
	MIPR	MIT	0.000	0.000	N/A	0.350	02/06			Continuing	Continuing	TBD
	WX	NSWC DD	0.000	0.000	N/A	0.500	02/06			Continuing	Continuing	TBD
Advanced Technology MMIC Dev	Cost Share	CREE	2.759	0.000	N/A	0.000	N/A			Continuing	Continuing	TBD
	CPFF	AFRL	0.000	2.500	06/05	0.000	N/A					
System Engineering	Various	Various	1.565	0.000	N/A	0.854	02/06	17.881	TBD	Continuing	Continuing	TBD
	WX	Various	0.000	0.027	02/06	0.000	N/A			Continuing	Continuing	TBD
	CPAF	BAE Systems	0.000	0.283	11/05	0.605	02/06			Continuing	Continuing	TBD
	C NF	GTRI	0.000	0.000	N/A	0.200	03/06			Continuing	Continuing	TBD
	CPFF	JHU/APL	1.614	0.000	N/A	0.550	03/06			Continuing	Continuing	TBD
	CPFF	MIKROS	2.503	2.949	09/05	0.000	N/A			Continuing	Continuing	TBD
	MIPR	MIT	0.000	0.093	06/05	0.350	02/06			Continuing	Continuing	TBD
	WX	NAVFAC PAC	0.000	0.000	N/A	0.230	02/06			Continuing	Continuing	TBD
	WX	NRL	0.250	0.000	N/A	0.480	02/06			Continuing	Continuing	TBD
	WX	NSWC Crane	0.000	1.737	06/05	0.000	N/A			Continuing	Continuing	TBD
	WX	NSWC DD	2.050	0.055	06/05	0.500	02/06			Continuing	Continuing	TBD
	WX	PHD	0.050	0.120	06/05	0.000	N/A			Continuing	Continuing	TBD
	WX	PMRF	0.000	0.005	N/A	0.158	02/06			Continuing	Continuing	TBD
	WX	SPAWAR	0.000	0.000	N/A	0.087	02/06			Continuing	Continuing	TBD
Subtotal Product Development			40.995	7.768		8.494		35.190		Continuing	Continuing	TBD
Remarks:												
Contractor Engineering	Various	Various	0.155	0.000	N/A	0.000	N/A	2.430	TBD	Continuing	Continuing	TBD
	CPAF	BAE Systems	0.000	0.000	N/A	3.200	02/06		TBD	Continuing	Continuing	TBD
Support / Management Services	Various	Various	0.155	0.000	N/A	0.000	N/A	0.770	TBD	Continuing	Continuing	TBD
	CPAF	BAE Systems	0.000	0.050	11/05	0.520	02/06			Continuing	Continuing	TBD
Travel			0.000	0.000	N/A	0.075	02/06	0.075	TBD	Continuing	Continuing	TBD
Subtotal T&E:			0.310	0.050		3.795		3.275		Continuing	Continuing	TBD
Remarks:												
Total Cost			41.305	7.818		12.289		38.465		Continuing	Continuing	TBD

R-1 SHOPPING LIST - Item No. 102

CLASSIFICATION:

EXHIBIT R4, Schedule Profile		DATE: **February 2006**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-5**	PROGRAM ELEMENT NUMBER AND NAME **0604307N / AEGIS COMBAT SYSTEM ENGINEERING**	PROJECT NUMBER AND NAME **3044/9223 - Solid State SPY Radar**



R-1 SHOPPING LIST - Item No. 102

CDR	Critical Design Review
IPR	In-Progress Review
PDR	Preliminary Design Review
TRR	Test Readiness Review

CLASSIFICATION:

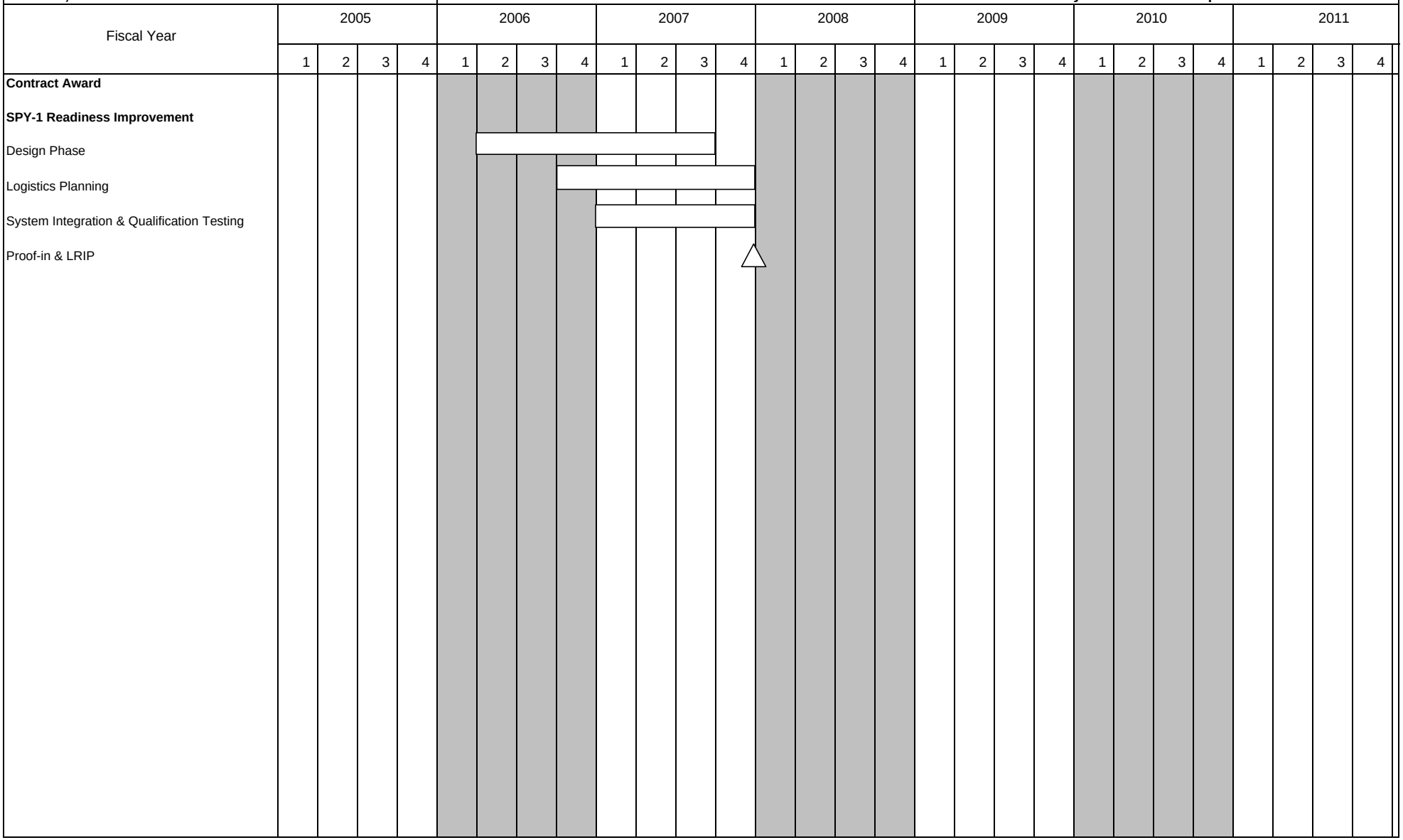
Exhibit R-4a, Schedule Detail					DATE: **February 2006**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E,N / BA-5**	PROGRAM ELEMENT **0604307N/AEGIS COMBAT SYSTEM ENG**				PROJECT NUMBER AND NAME **3044/9223 - Solid State SPY Radar**		
Schedule Profile	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Prototype Phase							
Radar System Development							
Preliminary Design Review (PDR)			1Q				
Critical Design Review (CDR)				1Q			
In-Process Review (IPR)					1Q	1Q	
Delivery						4Q	
Software Delivery							
Preliminary Design Review (PDR)			1Q				
Critical Design Review (CDR)				1Q			
Coding Complete						2Q	
Test & Evaluation							
Test Readiness Review (TRR)						4Q	
Land Based Test							4Q
Deliverables							
Prototype							
						4Q	

R-1 SHOPPING LIST - Item No. 102

EXHIBIT R4, Schedule Profile

DATE: **February 2006**

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA - 5	**0604307N/AEGIS COMBAT SYSTEM ENG**	**3044/AN/SPY-1 Radar System Readiness Improvement**



- Not required for Budget Activities 1, 2, 3, and 6

CLASSIFICATION:

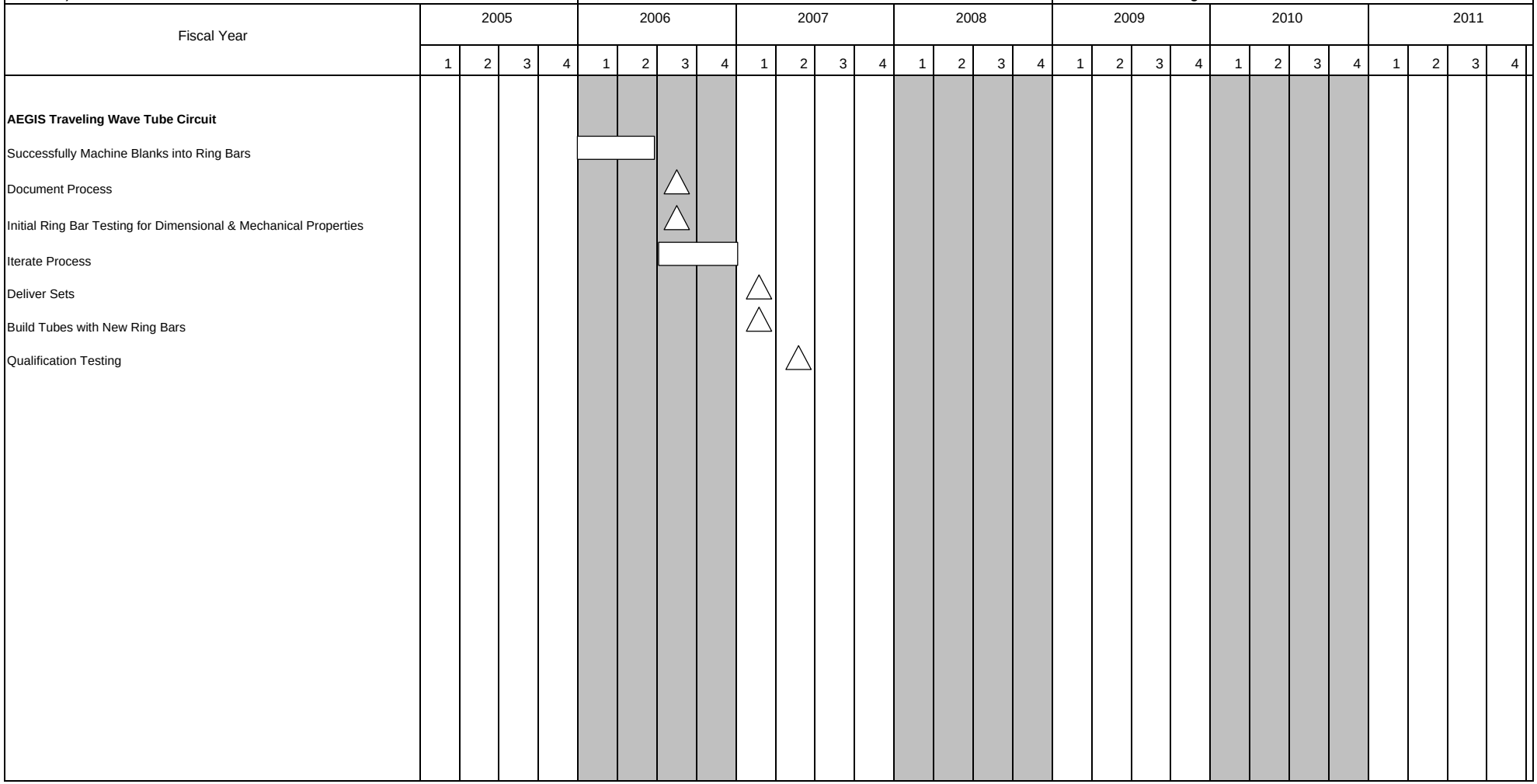
Exhibit R-4a, Schedule Detail						DATE: **February 2006**	
APPROPRIATION/BUDGET ACTIVITY **RDT&E,N / BA-5**	PROGRAM ELEMENT **0604307N/AEGIS COMBAT SYSTEM ENG**			PROJECT NUMBER AND NAME **3044/AN/SPY-1 Radar System Readiness Improvement**			
Schedule Profile	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
SPY-1 Readiness Improvement							
Design Phase		2Q-4Q	1Q-3Q				
Logistics Planning		4Q	1Q-4Q				
System Integration & Qualification Testing			1Q-4Q				
Proof-in & LRIP			4Q				

R-1 SHOPPING LIST - Item No. 102

CLASSIFICATION:

EXHIBIT R-4, Schedule Profile | DATE: **February 2006**

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA - 5	**0604307N/AEGIS COMBAT SYSTEM ENG**	**9555/AEGIS Traveling Wave Tube Circuit**



R-1 SHOPPING LIST - Item No. 102

- Not required for Budget Activities 1, 2, 3, and 6

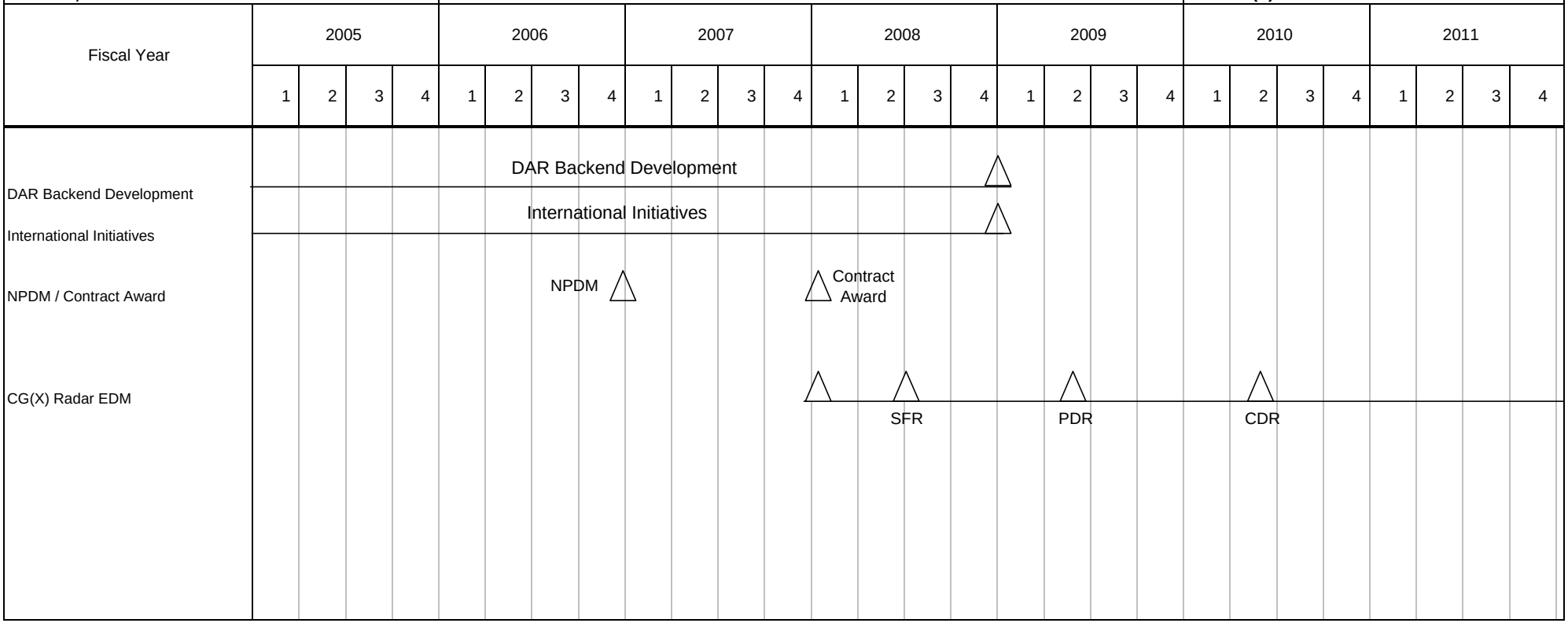
CLASSIFICATION:

Exhibit R-4a, Schedule Detail						DATE: **February 2006**	
APPROPRIATION/BUDGET ACTIVITY **RDT&E,N / BA-5**	PROGRAM ELEMENT **0604307N/AEGIS COMBAT SYSTEM ENG**				PROJECT NUMBER AND NAME **9555/AEGIS Traveling Wave Tube Circuit**		
Schedule Profile	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
AEGIS Traveling Wave Tube Circuit							
Successfully Machine Blanks into Ring Bars		1Q-2Q					
Document Process		3Q					
Initial Ring Bar Testing for Dimensional & Mechanical Properties		3Q					
Iterate Process		3Q-4Q					
Deliver Sets			1Q				
Build Tubes with New Ring Bars			1Q				
Qualification Testing			2Q				

R-1 SHOPPING LIST - Item No. 102

CLASSIFICATION:

EXHIBIT R-4, Schedule Profile			DATE: **February 2006**
APPROPRIATION/BUDGET ACTIVITY **RDT&E,N/BA-5**	PROGRAM ELEMENT NUMBER AND NAME **0604307N / AEGIS COMBAT SYSTEM ENGINEERING**		PROJECT NUMBER AND NAME **3044/CG(X)**



* Not required for Budget Activities 1, 2, 3, and 6

LEGEND

CDR	Critical Design Review
EDM	Engineering Development Model
LBT	Land Based Testing
NPDM	Navy Program Decision Milestone
PDR	Preliminary Design Review
SFR	System Functional Review

R-1 SHOPPING LIST - Item No. 102

CLASSIFICATION:

Exhibit R-4a, Schedule Detail						DATE: **February 2006**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-5**	PROGRAM ELEMENT **0604307N / AEGIS COMBAT SYSTEM ENGINEERING**					PROJECT NUMBER AND NAME **3044/CG(X)**		
Schedule Profile		FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
CG(X) EDM								
Navy Program Decision Milestone (NPDM)			4Q					
Contract Award(s)					1Q			
System Functional Review (SFR)					2Q			
Preliminary Design Review (PDR)						2Q		
Critical Design Review (CDR)							2Q	

R-1 SHOPPING LIST - Item No. 102

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2006**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-5	**0604307N/AEGIS COMBAT SYSTEM ENG**	**9999 / Congressional Adds: Various**

CONGRESSIONAL ADDS:

	FY 06			
3044C				
AN/SPY-1 Radar System Readiness Improvement	3.400			

The AN/SPY-1 radar system is the Navy's primary radar for air defense and ballistic missile defense and will be so for the next 20+ years. Readiness improvements will be analyzed and systems engineering performed to improve the readiness of the AN/SPY-1 Radar. This program will improve AN/SPY-1 operational availability, reliability and reduce cost of operation. The AN/SPY-1 Readiness Improvement program also includes the production of intelligent automated maintenance tools, which will improve operational & combat effectiveness while improving system availability of the AN/SPY-1. The funding will go towards the non-recurring engineering costs for development of the AN/SPY-1 readiness improvements and related tools; as well as provide money for production drawings, interface/maintenance documents, and logistical planning. Additional readiness improvements will address transmitter, signal processor and microwave tube shortcomings.

	FY 06			
9223C				
Silicon Carbide MMIC Producibility	2.000			

This program continues development of producible SiC high power MMICs for incorporation into Navy S-band advanced radar systems. This funding will be used to improve SiC MMIC manufacturing processes, significantly reducing MMIC component and radar system production costs.

	FY 06			
9566C				
Integrated Display & Enhanced Architecture CV-T	3.400			

IDEA permits an operator to immediately reconfigure his/her workstation and assume the responsibilities of any other operator, thereby facilitating real Navy manning reductions while still meeting operational requirements. In addition to reconfigurable display surfaces, IDEA enables HSI improvements for improved decision-making and increased productivity. Allows display components to be developed once and reused to realize cost savings across Navy programs.

R-1 SHOPPING LIST - Item No. 102

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2006**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-5	**AEGIS COMBAT SYS ENG PE 0604307N**	**9999 / Congressional Adds : Various**

CONGRESSIONAL ADDS:

	FY 06			
9383C				
Smart Integrated Data Environment	1.000			

Provide a brief description of the Congressional Plus-Up.
The Smart Integrated Data Environment (SIDE) is a concept for a fully interactive, ship-wide integration of physical plant and supporting operations, maintenance, logistics, training, and other data. Decision-aids and automated processes are further integrated to make the data both dynamic and useful at every echelon of the organization. SIDE has potential to increase productivity and, hence, decrease Sailor workload. The funding will be used for the development of a limited capability, shore-based prototype that will prove the concept and provide an automated Engineering Operating Sequencing System (EOSS)/Combat Systems Operating Sequencing Systems (CSOSS) equipment tag-out capability for shore based validation teams. This initial capability will be expanded to incorporate an engineering casualty control exercise component and subsequently will be transitioned to shipboard use and further developed to incorporate the full range of potential capability.

	FY 06			
9837N				
Smart Link Planar Scanner Antenna Modernization	1.000			

Provide a brief description of the Congressional Plus-Up.
This project began as a light-weight, portable shipboard antenna utilizing C-Band mainly for enhancement of crew quality of life. Also under the original effort an additional, interchangeable antenna and feed at the Super High Frequency (SHF) was being designed. The Navy focus has changed to a requirement for designs that are stealthy with low radar cross section for new ships. To meet that requirement, Malibu Research has been retasked under the original effort to investigate an alternate optimum frequency and form factor configurations for an antenna to meet quality of life applications. This task is using a compact planar scanner using a lens scanning antenna technique and will be flush mounted/embedded into the ship structure. The task is therefore to design, fabricate and demonstrate a Super High Frequency (SHF) and a Global Broadcast System (GBS) antenna that will fit into the DOD's present and future information dominance architecture.

	FY 06			
9556C				
Integrated Display & Enhanced Architecture Aegis	5.100			

IDEA permits an operator to immediately reconfigure his/her workstation and assume the responsibilities of any other operator, thereby facilitating real Navy manning reductions while still meeting operational requirements. In addition to reconfigurable display surfaces, IDEA enables HSI improvements for improved decision-making and increased productivity. Allows display components to be developed once and reused to realize cost savings across Navy programs.