CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification | DATE: **February 2005**

APPROPRIATION/BUDGET ACTIVITY
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA 5

R-1 ITEM NOMENCLATURE
0604777N NAVIGATION/ID SYSTEMS

COST ($ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Total PE Cost	**42.806**	**27.785**	**52.717**	**51.072**	**54.158**	**55.377**	**56.803**	**55.513**
0253 Navigation and Electro-Optical Support	**10.618**	**6.054**	**11.947**	**8.423**	**8.007**	**8.202**	**8.404**	**8.606**
0676 Improved ID Development	**1.479**	**1.789**	**2.797**	**3.839**	**4.000**	**4.117**	**4.235**	**4.354**
1253 Combat ID System	**10.229**	**5.631**	**14.485**	**13.614**	**14.135**	**14.507**	**17.003**	**17.410**
0921 NAVSTAR GPS Equipment	**20.480**	**14.311**	**23.488**	**25.196**	**28.016**	**28.551**	**27.161**	**25.143**
Quantity of RDT&E Articles	**28**	**1**	**37**			**8**		

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

Reliable and secure Navigation and positive identification (ID) systems are essential elements of battle management in the naval environment. The Photonics Imaging System (0253) is a non-hull penetrating replacement for existing optical periscopes. The Photonics Imaging System exploits a wide portion of the electro-magnetic spectrum utilizing advanced Electro-Optic/thermal imaging; and communications intercept/Electronic Warfare Support (ES). The Combat Identification System (CIS) project (1253) for Mark XIIA, and Improved Identification Development (0676) for AN/UPX-29, covers the Navy lead of a MK XIIA Mode 5 upgrade to the existing Mark XII family of systems that is Joint and NATO interoperable. NATO participation is encouraged and performance data is exchanged to ensure the opportunity for interoperability with allied identification systems is maximized. In addition to distinguishing friend from foe for weapons employment, the Navy requires secure, jam resistant Identification Friend or Foe (IFF) systems for battle group air defense management and air traffic control. Identification is multifaceted and includes information received from several sensors (both cooperative and non-cooperative systems).

NAVSTAR Global Positioning System (GPS), project (0921) is a space-based positioning, navigation and timing (PNT) system that provides authorized users with secure, worldwide, all weather, three dimensional position, velocity and precise time data. Navigation Sensor System Interface (NAVSSI) is a system that provides an integrated navigation message structure for network distribution to support combat, command and control, information and other mission critical capabilities. Navy Navigation Warfare (NAVWAR) is a major element of the GPS program. NAVWAR's mission is to provide continued access to GPS information in a denied environment. NAVWAR accomplishes this through the use of enhanced user equipment (UE). Enhanced UE consists of GPS antijam antennas and modernized receivers.

R-1 SHOPPING LIST - Item No. 131

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification							DATE: **February 2005**	
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-5**	PROGRAM ELEMENT NUMBER AND NAME 0604777N NAVIGATION / ID SYSTEMS				PROJECT NUMBER AND NAME 0253 Navigation and Electro-Optical Support			
COST ($ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project Cost	**10.618**	**6.054**	**11.947**	**8.423**	**8.007**	**8.202**	**8.404**	**8.606**
RDT&E Articles Qty								

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Navigation and Electro-Optical Support program develops Submarine Electro-Optical and imagery systems and equipment that will improve submarine imaging capability in the areas of: ship safety, Intelligence, Surveillance and Reconnaissance (ISR), and tactical control (contact management in the littorals). The Photonics Imaging System, mounted on the Universal Modular Mast will provide imaging capability for the VIRGINIA class submarine. The Photonics Imaging System design exploits a wide portion of the electro-magnetic spectrum through advanced E-O and thermal imaging and Electronic Warfare Support (ES)/Communications intercept. It will provide significant improvements in submarine stealth and infrared imaging capability. The non-hull penetrating design provides freedom in ship design and space savings for VIRGINIA CLASS and future submarines designs. The system was designed to satisfy Operational Requirement #365-87-94. Specific efforts include: (1) Photonics Imaging System On-Board Team Trainer Development (2) Photonics Imaging System At Sea Test And Evaluation (3) Photonics Imaging System Sensors and image processing improvements.

The Department of the Navy established the Integrated Submarine Imaging System (ISIS) to rapidly field the Type 18 Periscope Patriot Rangefinder, Type 8IR Periscope systems, and integrate existing periscope imagery systems into a single system for installation on board submarines. The ISIS baseline includes the Type 18 Periscope Patriot Rangefinder, Type 8IR Periscope, and the Submarine Common Imaging System (SCIS) and supports high intensity operations in the littoral and provides the submarine force with the tactical imaging systems necessary to safely and effectively employ its surveillance and weapons capabilities. Specific efforts undertaken to meet the ISIS requirements are: (1) Type 18 Periscope Automated Range Finder development. (2) Submarine Common Imagery System Development. Development of capabilities common to ISIS and Photonics, include: Image stitching, high resolution imaging, automatic visual detection, tracking and classification capabilities.

This program funds the development of Patriot Radar Range Finding for Photonics for SSGN and VIRGINIA Class Submarines. Patriot for Photoncis will provide SSGN and VIRGINIA Class submarines with enhanced situations awareness and collision avoidance. Currently Patriot has only been developed for SSN 688 and SSN 21 Class submarines. This effort will provide Patriot Radar Range Finding to SSGN and VIRGINIA Class submarines on the Photonics Mast.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2005**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N /BA-5	0604777N NAVIGATION / ID SYSTEMS	0253 Navigation and Electro-Optical Support

(U) B. Accomplishments/Planned Program

	FY 04	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost	0.391	0.130	0.900	0.365
RDT&E Articles Quantity				

Upgrade/Resolve Obsolesence Photonics On-Board Team Trainer development.

	FY 04	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost	5.326	3.873	4.708	4.647
RDT&E Articles Quantity				

Commence development of capabilities common to ISIS and Photonics, including: Image stitching, high resolution imaging, automatic visual detection, tracking and classification capabilities.

	FY 04	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost	3.453	2.051	3.539	2.211
RDT&E Articles Quantity				

Develop Low Light Level TV, improved image processing, and Photonics Imaging System all digital signal path.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2005**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N /BA-5	0604777N NAVIGATION / ID SYSTEMS	0253 Navigation and Electro-Optical Support

(U) B. Accomplishments/Planned Program

	FY 04	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost	1.448			
RDT&E Articles Quantity				

Complete Photonics Imaging System EDM Shock Test and convert to the configuration control model.

	FY 04	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost			2.800	1.200
RDT&E Articles Quantity				

Develop Patriot Radar Range Finding for Photonics for SSGN and VIRGINIA Class Submarines.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2005
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-5	0604777N NAVIGATION / ID SYSTEMS	0253 Navigation and Electro-Optical Support

(U) C. PROGRAM CHANGE SUMMARY:

(U) Funding:	FY 2004	FY 2005	FY 2006	FY 2007
FY2005 President's Budget	11.347	6.120	9.142	7.162
FY2006 President's Budget	10.618	6.054	11.947	8.423
Total Adjustments	-0.729	-0.066	2.805	1.261
Summary of Adjustments				
Congressional Adjustments				
Congressional Recissions		-0.053		
Reprogrammings	-0.552			
Programmatic Adjustments		-0.013	2.739	1.150
Economic Assumptions			0.070	0.063
Pricing Adjustments			-0.004	0.048
SBIR/STTR Transfers	-0.177			
Subtotal	-0.729	-0.066	2.805	1.261

(U) Schedule:

(U) Technical:

R-1 SHOPPING LIST - Item No. 131

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: February 2005
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-5**	PROGRAM ELEMENT NUMBER AND NAME 0604777N NAVIGATION / ID SYSTEMS	PROJECT NUMBER AND NAME 0253 Navigation and Electro-Optical Support	

D. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	To Complete	Total Cost
(U) SCN Line 201300 (Photonics Mast only)	18.865	19.208	19.558	19.665	20.039	49.144	50.149	51.157	Continuing	Continuing
OPN Line 083100 (PL018, PL021 & PL022)	16.596	50.700	61.361	47.394	44.327	45.104	46.006	16.882	Continuing	Continuing
OPN Line 083105	0.000	0.652	3.151	7.947	4.925	5.415	2.896	4.225	Continuing	Continuing
(U) Related RDT&E										
(U) PE 0604558N (The VIRGINIA Class Design Development)	1.159	1.171	1.183	.188	.196	.202	.202	.202	Continuing	Continuing

E. ACQUISITION STRATEGY:

The Acquisition Strategy for AN/BVS-1 Photonics Mast Program (PMP) is dtd 24 Sept 2001. The PMP provides for the development and acquisition of a non-hull penetrating submarine electronic imaging system. The Acquisition Strategy for Integrated Submarine Imaging System (ISIS) is dtd 07 Jul 2003. The ISIS will provide mission critical, all weather, visual, and electronic search, digital image management, indication, warning, and platform architecture interface capabilities for SSN 688, SSN 21, and SSGN class submarines.

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)								DATE:						
								February 2005						
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NUMBER AND NAME								
RDT&E, N / BA-5			0604777N NAVIGATION / ID SYSTEMS			0253 Navigation and Electro-Optical Support								
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 04 Cost	FY 04 Award Date	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
Primary Hardware Development	Various	Various	43.451	5.397	10/03	1.565	10/04	2.487	10/05	2.167	10/06	Continuing	Continuing	
Software Development	Various	Various	1.477	1.922	10/03	0.879	10/04	2.343	10/05	1.907	10/06	Continuing	Continuing	
Aircraft Integration													0.000	
Ship Integration													0.000	
Ship Suitability													0.000	
Systems Engineering	Various	Various	8.489	1.678	10/03	1.791	10/04	2.830	10/05	1.609	10/06	Continuing	Continuing	
Training Development													0.000	
Licenses													0.000	
Miscellaneous	Various	Various	1.251	0.010	10/03	0.367	10/04	1.190	10/05	0.833	10/06	Continuing	Continuing	
GFE													0.000	
Award Fees													0.000	
Subtotal Product Development			54.668	9.007		4.602		8.850		6.516		Continuing	Continuing	
Remarks:														
Development Support													0.000	
Software Development													0.000	
Integrated Logistics Support													0.000	
Configuration Management													0.000	
Technical Data													0.000	
Studies & Analyses													0.000	
GFE													0.000	
Award Fees													0.000	
Subtotal Support			0.000	0.000		0.000		0.000		0.000		0.000	0.000	
Remarks:														

R-1 SHOPPING LIST - Item No. 131

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2) | DATE: **February 2005**

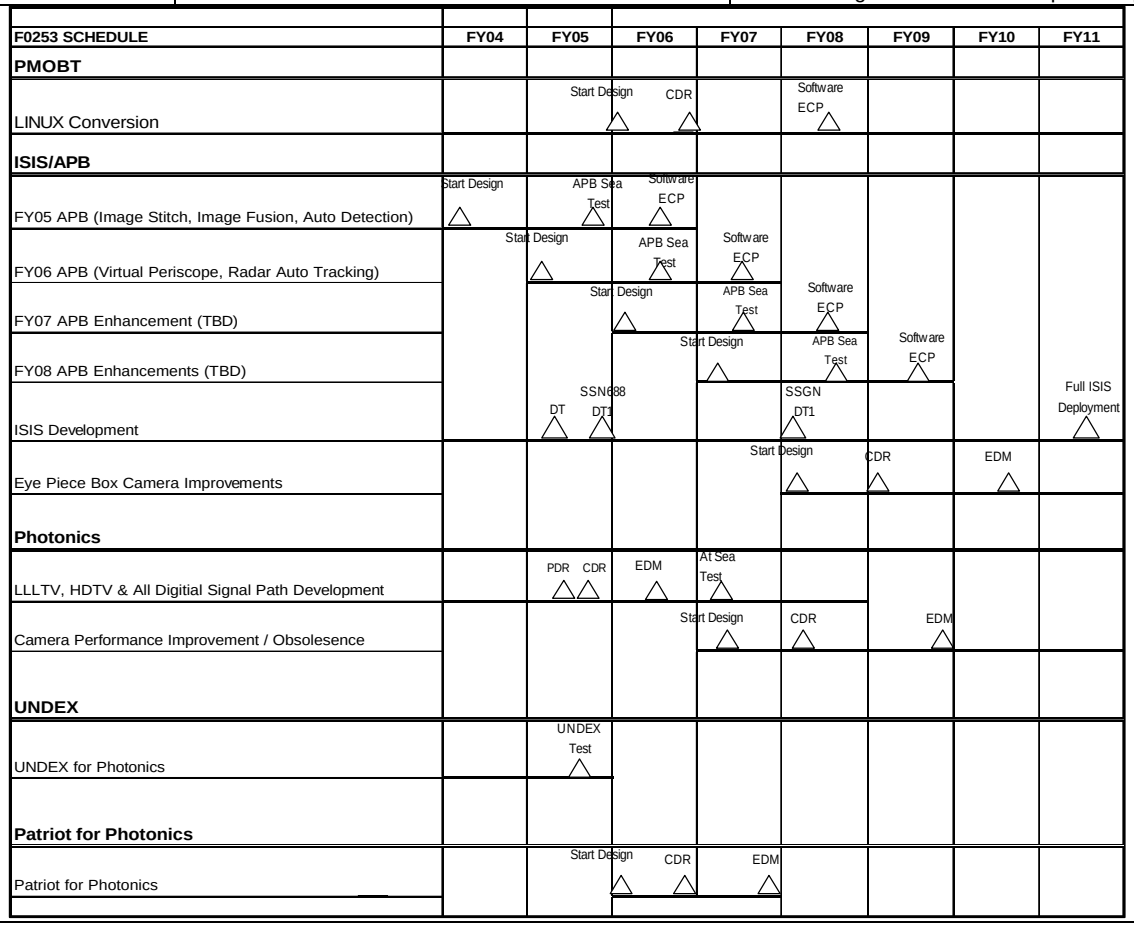
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N / BA-5** | PROGRAM ELEMENT: 0604777N NAVIGATION / ID SYSTEMS | PROJECT NUMBER AND NAME: 0253 Navigation and Electro-Optical Support

Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 04 Cost	FY 04 Award Date	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
Developmental Test & Evaluation	Various	Various		0.681	10/03	0.608	10/04	1.580	10/05	0.731	10/06		3.600	
Operational Test & Evaluation													0.000	
Live Fire Test & Evaluation													0.000	
Test Assets													0.000	
Tooling													0.000	
GFE													0.000	
Award Fees													0.000	
Subtotal T&E			0.000	0.681		0.608		1.580		0.731		0.000	3.600	
Remarks:														
Contractor Engineering Support													0.000	
Program Management Support												Continuing	Continuing	
Management Support Services/ETS	Various	Various		0.767	10/03	0.483	10/04	0.511	10/05	0.457	10/06	Continuing	Continuing	
Travel				0.051		0.109		0.050		0.045			0.255	
Transportation													0.000	
SBIR Assessment				0.112		0.252		0.956		0.674			1.994	
Subtotal Management			0.000	0.930		0.844		1.517		1.176		Continuing	Continuing	
Remarks:														
Total Cost			54.668	10.618		6.054		11.947		8.423		Continuing	Continuing	
Remarks:														

R-1 SHOPPING LIST - Item No. 131

CLASSIFICATION:

EXHIBIT R-4, RDT&E Schedule Profile		DATE: **February 2005**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-5**	PROGRAM ELEMENT NAME AND NUMBER 0604777N NAVIGATION / ID SYSTEMS	PROJECT NAME AND NUMBER 0253 Navigation and Electro-Optical Support



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CLASSIFICATION:

Exhibit R-4a, Schedule Detail						DATE: **February 2005**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E BA-5**	PROGRAM ELEMENT 0604777N NAVIGATION / ID SYSTEMS				PROJECT NUMBER AND NAME 0253 Navigation and Electro-Optical Support			
Schedule Profile	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
PMOBT								
Initiate PMOBT Linux Conversion			1Q					
PMOBT Linux Conversion CDR			4Q					
PMOBT Linux Software ECP					3Q			
ISIS/APB								
Initiate FY05 APB	1Q							
Initiate FY06 APB		1Q						
ISIS DT Assist		2Q						
ISIS SSN688 DT		4Q						
FY05 APB Sea Test		4Q						
Initiate FY07 APB			1Q					
FY06 APB Sea Test			3Q					
FY05 APB Software ECP			3Q					
Initiate FY08 APB				1Q				
FY07 APB Sea Test				3Q				
FY06 APB Software ECP				3Q				
ISIS SSGN DT					1Q			
Initiate ISIS Eye Piece Box Upgrades					1Q			
FY08 APB Sea Test					3Q			
FY07 APB Software ECP					3Q			
ISIS Eye Piece Box Upgrades CDR						1Q		
FY08 APB Software ECP						2Q		
ISIS Eye Piece Box Upgrades EDM							3Q	
Full ISIS Deployment								3Q
Photonics								
Photonics LLLTV, HDTV, All Digital Signal Path PDR		2Q						
Photonics LLLTV, HDTV, All Digital Signal Path CDR		4Q						
Photonics LLLTV, HDTV, All Digital Signal Path EDM			3Q					
Photonics LLLTV, HDTV, All Digitial Signal Path Sea Test				2Q				
Initiate Photonics Camera Development				2Q				
Photonics Camera Development Improvement CDR					2Q			
UNDEX for Photonics								
UNDEX Test for Photonics		3Q						
Patriot for Photonics								
Initiate Patriot for Photonics			1Q					
Patriot for Photonics CDR			4Q					
Patriot for Photonics EDM				4Q				

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CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification							DATE: **February 2005**	
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-5**	PROGRAM ELEMENT NUMBER AND NAME 0604777N NAVIGATION/ID SYSTEMS				PROJECT NUMBER AND NAME 0676 IMPROVED ID DEVELOPMENT			
COST ($ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project Cost	**1.479**	**1.789**	**2.797**	**3.839**	**4.000**	**4.117**	**4.235**	**4.354**
RDT&E Articles Qty		**1**						

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

Reliable and secure navigation and positive identification (ID) systems are essential elements of battle management in the naval environment. In addition to distinguishing friend from foe for weapons employment, the Navy requires secure, jam resistant Identification Friend or Foe (IFF) systems for battle group air defense management and air traffic control. Identification is multifaceted and includes information received from several sensors (both cooperative and non-cooperative systems). The Improved MK XII (0676) addresses the Navy lead of a MK XIIA Mode 5 Upgrade to the existing Mark XII family of systems that is Joint and NATO interoperable. These funds provide for Mode 5 integration into the AN/UPX-29(V) IFF system which interfaces with the AEGIS baseline weapon system and for other AN/UPX-29(V) improvements. FY05 RDT&E article is a Mode 5 capable AN/UPX-24(V) (AN/UPX-29 Processor) for use in Combat System Certification for Mode 5 in AEGIS.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2005**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA -5	0604777N NAVIGATION/ID SYSTEMS	0676 IMPROVED ID DEVELOPMENT

B. Accomplishments/Planned Program

	FY 04	FY 05	FY 06	FY 07
Mark XIIA Mode 5 Improvement for AN/UPX-29	0.573	1.363	1.207	1.486
RDT&E Articles Quantity				

Engineering and integration development of MARK XIIA Improvements to the AN/UPX-29(V). Correct deficiencies from Developmental Test B1 and Operational Test B1. (DTB1-OTB1). Develop AN/UPX-29 interface capability.

	FY 04	FY 05	FY 06	FY 07
AN/UPX-29(V) Software Development	0.606		1.135	1.436
RDT&E Articles Quantity				

Development of MARK XIIA Improvement to the AN/UPX-29(V) system software for interface with AEGIS weapon system and core Integrated Logistics Support (ILS) documents; formalize hardware/software configuration; update technical data as required. Develop ILS documentation in support of DT-C1/OT-C1 and software for AN/UPX-29(V) interface. Correct DT-C1/OT-C1 software deficiencies and baseline software and documentation.

	FY 04	FY 05	FY 06	FY 07
Mark XIIA Mode 5 Development and Operational Test	0.300	0.426	0.455	0.917
RDT&E Articles Quantity		1		

Provide support for MARK XIIA Mode 5 DT/OA and provide test asset for MARK XIIA Mode 5 DT/OT B1 and AEGIS Combat system development site. Provide support for MARK XIIA Improvements to the AN/UPX-29(V) DT-B1/OT-B1 . Provide support for AEGIS Combat System operational demonstration. Provide support for AEGIS Combat System certification.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2005**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-5	0604777N NAVIGATION/ID SYSTEMS	0676 IMPROVED ID DEVELOPMENT

C. PROGRAM CHANGE SUMMARY:

(U) Funding:	FY 04	FY 05	FY 06	FY 07
FY2005 President's Budget	1.536	1.811	2.778	3.753
FY2006 President's Budget	1.479	1.789	2.797	3.839
Total Adjustments	-0.057	-0.022	0.019	0.086

Summary of Adjustments

Congressional Adjustments				
Congressional Recissions		-0.019		
Reprogrammings	-0.057	-0.003		
Programmatic Adjustments			-0.003	
Economic Assumptions				
Pricing Adjustments			0.022	0.086
SBIR/STTR Transfers				
Subtotal	-0.057	-0.022	0.019	0.086

Schedule:

Developmental Tests (DT-B1) duration was increased from 3 months to 6 months to allow for additional risk reduction of production representative modules. Operational Tests (OT-B1) baseline dates have increased by three months. These minor Test & Evaluation milestone changes do not impact Milestone C. Integrated Combat Systems Test Facility (ICSTF) event was moved to FY 2007 to properly support production line efforts that will begin in FY 2008.

Technical: Not applicable.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: **February 2005**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME	
RDT&E, N / BA-5	0604777N NAVIGATION/ID SYSTEMS	0676 IMPROVED ID DEVELOPMENT	

D. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	To Complete	Total Cost
Identification Systems - 42MT	21.687	18.183	24.915	30.592	31.406	32.288	35.991	36.866	Continuing	Continuing

E. ACQUISITION STRATEGY:

The acquisition strategy is to develop Mode 5 ECPs (Engineering Change Proposals) for modern Mark XII IFF (Identification Friend or Foe) equipment and integrate into all Navy Combat Weapons systems platforms and transition the Navy's Cooperative Identification Capability to Mode 5.

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CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)								DATE: **February 2005**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-5**		PROGRAM ELEMENT 0604777N NAVIGATION/ID SYSTEMS			PROJECT NUMBER AND NAME 0676 IMPROVED ID DEVELOPMENT							
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
Primary Hardware Development	WR	NAWCAD, MD	0.883			0.600	11/05	0.300	11/06	Continuing	Continuing	
Ancillary Hardware Development												
Aircraft Integration												
Ship Integration	WR	NAWCAD, MD	0.460	0.300	11/04	0.050	11/05	0.250	11/06	Continuing	Continuing	
Ship Suitability												
Systems Engineering	WR	NAWCAD, MD	1.145	0.637	11/04	0.750	11/05	0.686	11/06	Continuing	Continuing	
Training Development	WR	NAWCAD, MD				0.100	11/05	0.100	11/06	Continuing	Continuing	
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			2.488	0.937		1.500		1.336		Continuing	Continuing	
Remarks:												
Development Support												
Software Development	WR	NAWCAD, MD	1.580			0.400	11/05	0.400	11/06	Continuing	Continuing	
Integrated Logistics Support	WR	NAWCAD, MD	0.371	0.386	11/04	0.728	11/05	0.500	11/06	Continuing	Continuing	
Configuration Management	WR	NAWCAD, MD	0.050	0.050	11/04	0.069	11/05	0.300	11/06	Continuing	Continuing	
Technical Data	WR	NAWCAD, MD	0.188	0.100	11/04	0.100	11/05	0.500	11/06	Continuing	Continuing	
Studies & Analyses												
Reprogramming			0.001									
Award Fees												
Subtotal Support			2.190	0.536		1.297		1.700		Continuing	Continuing	
Remarks:												

R-1 SHOPPING LIST - Item No. 131

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)								DATE: **February 2005**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-5**			PROGRAM ELEMENT 0604777N NAVIGATION/ID SYSTEMS			PROJECT NUMBER AND NAME 0676 IMPROVED ID DEVELOPMENT						
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
Developmental Test & Evaluation	WR	NAWCAD, MD	0.050	0.100	11/04			0.200	11/06	Continuing	Continuing	
Operational Test & Evaluation	WR	NAWCAD, MD		0.216	11/04			0.300	11/06	Continuing	Continuing	
Live Fire Test & Evaluation												
Test Assets	WR	NAWCAD, MD	0.250					0.303	11/06	Continuing	Continuing	
Tooling												
GFE												
Award Fees												
Subtotal T&E			0.300	0.316				0.803		Continuing	Continuing	
Remarks:												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support											0.000	
Travel											0.000	
Transportation											0.000	
SBIR Assessment											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Total Cost			4.978	1.789		2.797		3.839		Continuing	Continuing	
Remarks:												

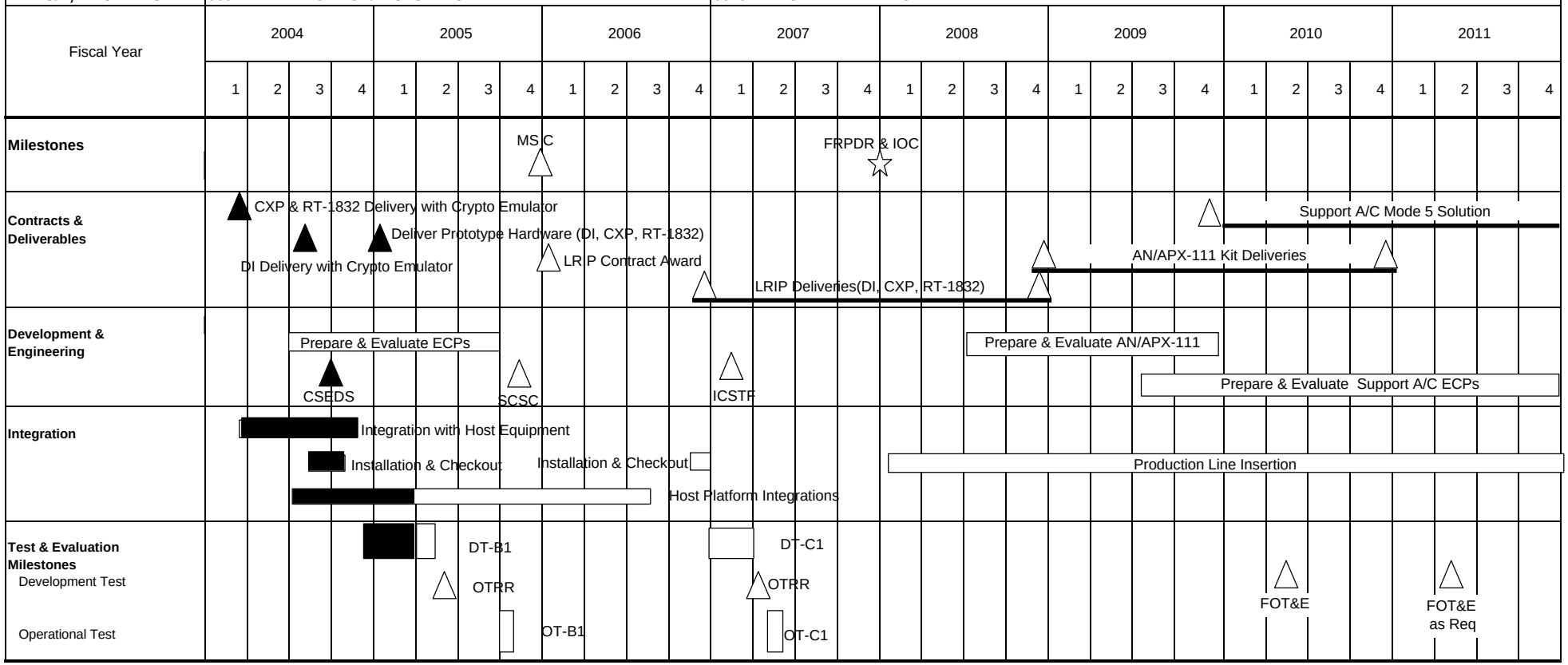
R-1 SHOPPING LIST - Item No. 131

CLASSIFICATION:

EXHIBIT R4, Schedule Profile

DATE: **February 2005**

APPROPRIATION/BUDGET /	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-5	0604777N NAVIGATION/ID SYSTEMS	0676 IMPROVED ID DEVELOPMENT



R-1 SHOPPING LIST - Item No. 131

CLASSIFICATION:

Exhibit R-4a, Schedule Detail					DATE: **February 2005**			
APPROPRIATION/BUDGET ACTIVITY **RDT& BA-5**	PROGRAM ELEMENT 0604777N NAVIGATION/ID SYSTEMS			PROJECT NUMBER AND NAME 0676 IMPROVED ID DEVELOPMENT				
Schedule Profile	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
CXP & RT-1832 Deliveries with Crypto Emulator	1Q							
DI Delivery with Crypto Emulator	3Q							
Integration with Host Equipment	1Q-4Q							
Prepare & Evaluate ECPs	3Q-4Q	1Q-3Q						
Combat Systems Engineering Development Site (CSEDS)	3Q							
Installation & Checkout	3Q-4Q		4Q					
Host Platform Integrations	3Q-4Q	1Q-4Q	1Q-3Q					
Developmental Testing (DT-B1)	4Q	1Q-2Q						
Deliver Prototype Hardware (DI, CXP, RT-1832)		1Q						
Operational Test Readiness Review (OTRR)		2Q						
Operational Testing (OT-B1)		4Q						
Surface Combat Systems Center (SCSC)		4Q						
Milestone C (MS C)		4Q						
Integrated Combat Systems Test Facility (ICSTF)				1Q				
Low-Rate Initial Production Contract Award			1Q					
Low-Rate Initial Production Deliveries (CXP, DI, RT-1832)			4Q	1Q-4Q	1Q-4Q			
Technical Evaluation (DT-C1)				1Q				
Operational Test Readiness Review (OTRR)				2Q				
Operational Evaluation (OT-C1)				2Q				
IOC				4Q				
Full Rate Production Decision Review (FRPDR)				4Q				
AN/APX-111 Deliveries						1Q-4Q	1Q-4Q	
Follow-on Test and Evaluation							2Q	2Q
Support A/C Mode 5 H/W solution deliveries							1Q-4Q	1Q-4Q

R-1 SHOPPING LIST - Item No. 131

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification							DATE: **February 2005**	
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-5**	PROGRAM ELEMENT NUMBER AND NAME 0604777N NAVIGATION/ID SYSTEMS				PROJECT NUMBER AND NAME 1253 COMBAT ID SYSTEMS			
COST ($ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project Cost	**10.229**	**5.631**	**14.485**	**13.614**	**14.135**	**14.507**	**17.003**	**17.410**
RDT&E Articles Qty	**28**		**37**			**8**		

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

In 1995, the Under Secretary of Defense (Acquisition and Technology)/Vice Chairman, Joint Chiefs of Staff {USD(A7T)/VCJCS} tasked the Services to develop a high-level plan and long-range strategy for migrating to new Mark XII equipment. The services were also tasked to work with participating NATO Allies to develop a new MK XII waveform and document it in NATO Standard Agreement (STANAG). The Navy took the lead in a waveform development effort conducted in coordination with a five nation Technical Working Group (TWG), supported by Joint Services and Industry. The Navy, in conjunction with the TWG, designed, developed, modeled, and tested a new waveform - MK XIIA Mode 5. A separate five nation Communications Security (COMSEC) group, led by the National Security Administration (NSA), developed a new cryptographic algorithm and associated cryptographic equipment interoperability requirements specification. STANAG 4193, Part V has been ratified and promulgated to all NATO nations, and Part VI was approved for promulgation in January 2002. The 28 RDT&E articles in FY04 included Mode 5 emulators, cryptographic modules, install kits, and associated hardware and software changes to host AN/UPX-37, AN/APX-118, and RT-1832s. The FY06 RDT&E articles are production representative Low Rate Initial Procurement units comprised of Mode 5 cryptographic modules and install kits for AN/APX-118, R/T-1832 and AN/UPX-24 with associated hardware and software changes to host boxes. The FY09 RDT&E articles are cryptographic modules, install kits and associated hardware and software changes in the AN/APX-111.

In August 2003 the Navy MK XIIA Mode 5 program was approved for entry in Systems Development and Demonstration (SDD) phase with approval to develop prototypes. Operational Assessment (OA) is scheduled for 3Q FY05 with Operational Evaluation (OE) in 2Q FY07.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2005**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA -5	0604777N NAVIGATION/ID SYSTEMS	1253 COMBAT ID SYSTEMS

B. Accomplishments/Planned Program

	FY 04	FY 05	FY 06	FY 07
Mode 5 prototype hardware & cryptographic module	6.040	2.281	10.479	6.275
RDT&E Articles Quantity	28		37	

Perform development of kits for installation into existing fleet assets (includes but not limited to AN/UPX-37 Interrogator, AN/APX-118 Common Digital Transponder, AN/APX-111 Interrogator/Transponder, and RT-1832/APX Transponder). Repair and correct deficiencies identified during testing in support of Milestone C decision and procure 37 Low Rate Initial Procurement (LRIP) units in FY06 to support OPEVAL. LRIP units include Mode 5 cryptographic modules install kits for AN/APX-118, R/T-1832 and AN/UPX-24 with associated hardware and software changes to the host boxes.

	FY 04	FY 05	FY 06	FY 07
Mode 5 systems engineering	1.492	1.510	2.120	1.894

Perform systems engineering and analysis in support of Mode 5 hardware/software development and platform integration efforts on the AN/UPX-37 Interrogator, AN/APX-118 Common Digital Transponder, AN/APX-111 Interrogator/Transponder, RT-1832/APX Transponders, Cryptographic Module, Mode 5 Engineering Test Equipment, and Mode 5 support equipment.

	FY 04	FY 05	FY 06	FY 07
Conduct DT & OT of the Mode 5 upgrade	2.697	1.840	1.886	5.445

Perform Mode 5 developmental and operational test phases for AN/UPX-37 Interrogator, AN/APX-118 Common Transponder, and RT-1832/APX Transponder.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2005**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-5	0604777N NAVIGATION/ID SYSTEMS	1253 COMBAT ID SYSTEMS

C. PROGRAM CHANGE SUMMARY:

(U) Funding:	FY 04	FY 05	FY 06	FY 07
FY2005 President's Budget	10.454	5.706	14.399	13.401
FY2006 President's Budget	10.229	5.631	14.485	13.614
Total Adjustments	-0.225	-0.075	0.086	0.213
Summary of Adjustments				
Congressional Adjustments				
Congressional Recissions		-0.059		
Reprogrammings	-0.225	-0.016		
Programmatic Adjustments			-0.02	-0.071
Economic Assumptions			0.034	
Pricing Adjustments			0.072	
SBIR/STTR Transfers				
Subtotal	-0.225	-0.075	0.086	-0.071

(U) Schedule:

Developmental Tests (DT-B1) duration was increased from 3 months to 6 months to allow for additional risk reduction of production representative modules. Operational Tests (OT-B1) baseline dates have increased by three months. These minor Test & Evaluation milestone changes do not impact Milestone C. Integrated Combat Systems Test Facility (ICSTF) event was moved to FY 2007 to properly support production line efforts that will begin in FY 2008.

(U) Technical: Not applicable.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: **February 2005**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME	
RDT&E, N / BA-5	0604777N NAVIGATION/ID SYSTEMS	1253 COMBAT ID SYSTEMS	

D. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	To Complete	Total Cost
Identification Systems - 42MT	21.687	18.183	24.915	30.592	31.406	32.288	35.991	36.866	Continuing	Continuing
ID Systems - 45CS		1.569	7.741	11.197	11.351	6.745	24.194	30.945	Continuing	Continuing

E. ACQUISITION STRATEGY:

The acquisition strategy is to develop Mode 5 ECPs (Engineering Change Proposals) for modern Mark XII IFF (Identification Friend or Foe) equipment and integrate into all Navy Combat Weapons systems platforms and transition the Navy's Cooperative Identification Capability to Mode 5.

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)								DATE: **February 2005**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-5**		PROGRAM ELEMENT 0604777N NAVIGATION/ID SYSTEMS			PROJECT NUMBER AND NAME 1253 COMBAT ID SYSTEMS							
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
Primary Hardware Development	VAR	VAR	15.840	2.281	12/04	1.035	12/05	0.992	12/06	Continuing	Continuing	
Ancillary Hardware Development												
Aircraft Integration	WR	NAWCAD, MD				4.445	11/05	1.835	11/06	Continuing	Continuing	
Ship Integration	WR	NAWCAD, MD				1.349	11/05	1.504	11/06	Continuing	Continuing	
Ship Suitability												
Systems Engineering	WR	NAWCAD, MD	3.628	0.288	11/04	2.120	11/05	1.894	11/06	Continuing	Continuing	
Training Development												
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			19.468	2.569		8.949		6.225		Continuing	Continuing	
Remarks:												
Development Support												
Software Development	VAR	VAR	2.708			2.500	12/05	0.780	12/06	Continuing	Continuing	
Integrated Logistics Support	WR	NAWCAD, MD	0.317			0.193	11/05	0.201	11/06	Continuing	Continuing	
Configuration Management	WR	NAWCAD, MD				0.042	11/05	0.043	11/06	Continuing	Continuing	
Technical Data	WR	NAWCAD, MD	0.053			0.042	11/05	0.043	11/06	Continuing	Continuing	
Studies & Analyses												
Reprogramming												
Award Fees												
Subtotal Support			3.078			2.777		1.067		Continuing	Continuing	
Remarks:												

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)								DATE: **February 2005**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-5**		PROGRAM ELEMENT 0604777N NAVIGATION/ID SYSTEMS				PROJECT NUMBER AND NAME 1253 COMBAT ID SYSTEMS						
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
Developmental Test & Evaluation	WR	NAWCAD, MD	4.564	0.882	11/04	1.886	11/05	1.906	11/06	Continuing	Continuing	
Operational Test & Evaluation	WR	NAWCAD, MD		0.958	11/04			3.539	11/06	Continuing	Continuing	
Live Fire Test & Evaluation												
Test Assets												
Tooling												
GFE												
Award Fees												
Subtotal T&E			4.564	1.840		1.886		5.445		Continuing	Continuing	
Remarks:												
Contractor Engineering Support	VAR	NAWCAD, MD	0.450			0.495	11/05	0.487	11/06	Continuing	Continuing	
Government Engineering Support	WR	NAWCAD, MD	1.811	0.558	11/04	0.169	11/05	0.175	11/06	Continuing	Continuing	
Program Management Support	WR	NAVAIR, MD	1.961	0.624	11/04	0.169	11/05	0.175	11/06	Continuing	Continuing	
Travel	WR	NAWCAD, MD	0.165	0.040	11/04	0.040	11/05	0.040	11/06	Continuing	Continuing	
Transportation												
SBIR Assessment												
Subtotal Management			4.387	1.222		0.873		0.877		Continuing	Continuing	
Remarks:												
Total Cost			31.497	5.631		14.485		13.614		Continuing	Continuing	
Remarks:												

R-1 SHOPPING LIST - Item No. 131

CLASSIFICATION:

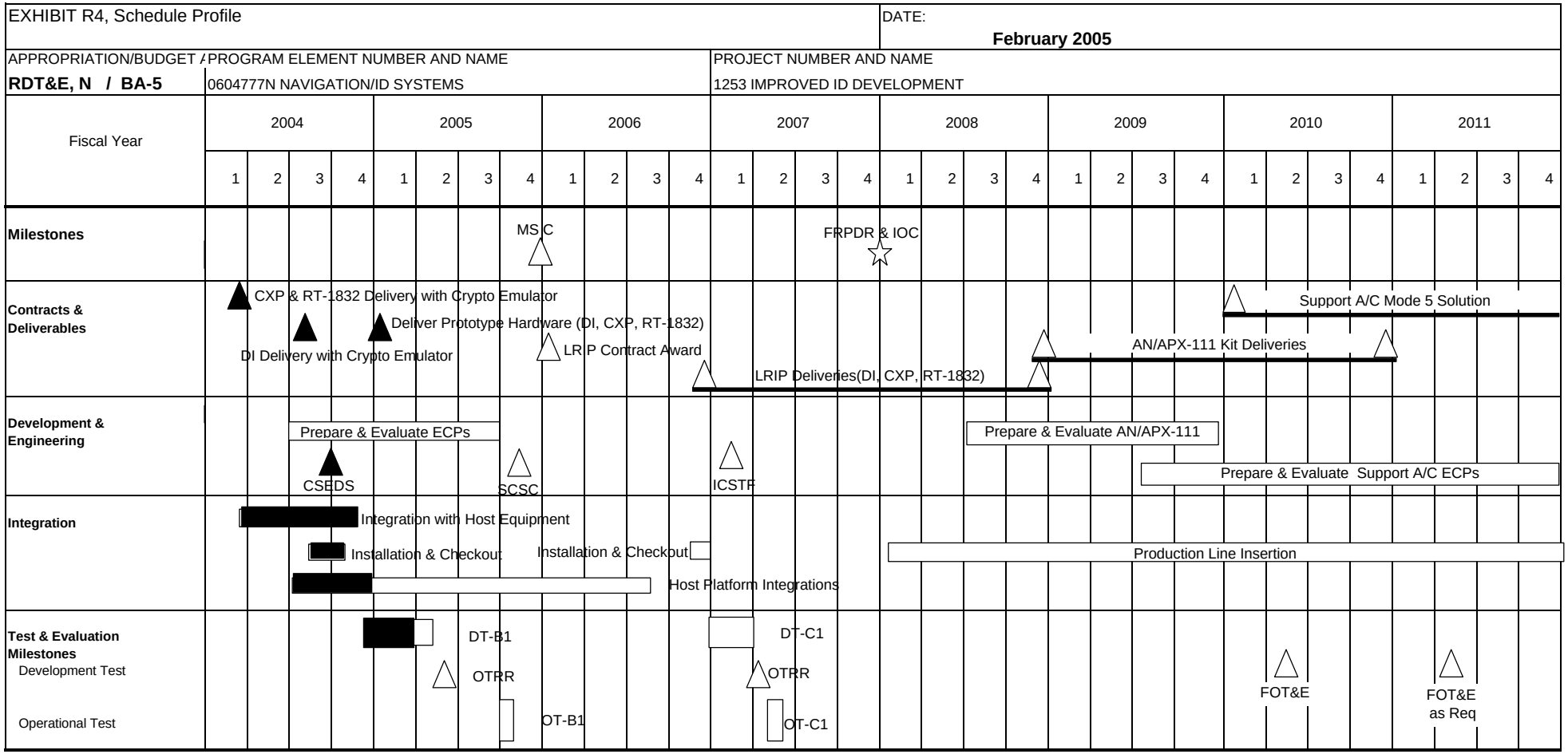
EXHIBIT R4, Schedule Profile

DATE: **February 2005**

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

PROGRAM ELEMENT NUMBER AND NAME: 0604777N NAVIGATION/ID SYSTEMS

PROJECT NUMBER AND NAME: 1253 IMPROVED ID DEVELOPMENT



R-1 SHOPPING LIST - Item No. 131

CLASSIFICATION:

Exhibit R-4a, Schedule Detail					DATE: **February 2005**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E BA-5**	PROGRAM ELEMENT 0604777N NAVIGATION/ID SYSTEMS			PROJECT NUMBER AND NAME 1253 COMBAT ID SYSTEMS				
Schedule Profile	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
CXP & RT-1832 Deliveries with Crypto Emulator	1Q							
DI Delivery with Crypto Emulator	3Q							
Integration with Host Equipment	1Q-4Q							
Prepare & Evaluate ECPs	3Q-4Q	1Q-3Q						
Combat Systems Engineering Development Site (CSEDS)	3Q							
Installation & Checkout	3Q-4Q		4Q					
Host Platform Integrations	3Q-4Q	1Q-4Q	1Q-3Q					
Developmental Testing (DT-B1)	4Q	1Q-2Q						
Deliver Prototype Hardware (DI, CXP, RT-1832)		1Q						
Operational Test Readiness Review (OTRR)		2Q						
Operational Testing (OT-B1)		4Q						
Surface Combat Systems Center (SCSC)		4Q						
Milestone C (MS C)		4Q						
Integrated Combat Systems Test Facility (ICSTF)				1Q				
Low-Rate Initial Production Contract Award			1Q					
Low-Rate Initial Production Deliveries (CXP, DI, RT-1832)			4Q	1Q-4Q	1Q-4Q			
Technical Evaluation (DT-C1)				1Q				
Operational Test Readiness Review (OTRR)				2Q				
Operational Evaluation (OT-C1)				2Q				
IOC				4Q				
Full Rate Production Decision Review (FRPDR)				4Q				
AN/APX-111 Deliveries						1Q-4Q	1Q-4Q	
Follow-on Test and Evaluation							2Q	2Q
Support A/C Mode 5 H/W solution deliveries							1Q-4Q	1Q-4Q

R-1 SHOPPING LIST - Item No. 131

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification							DATE: **February 2005**	
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-5**	PROGRAM ELEMENT NUMBER AND NAME 0604777N NAVIGATION/ID SYSTEMS				PROJECT NUMBER AND NAME 0921 NAVSTAR GPS EQUIPMENT			
COST ($ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project Cost	**20.480**	**14.311**	**23.488**	**25.196**	**28.016**	**28.551**	**27.161**	**25.143**
RDT&E Articles Qty								

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

The mission is to provide supported, affordable, integrated, and interoperable navigation solutions to the war fighters. RDT&E funds are used to perform all the non-recurring Global Positioning System (GPS) Surface Ship, Submarine and Aircraft Integration efforts. The Aircraft integration efforts are required for 102 different configurations of Navy, Marine Corps and Coast Guard aircraft. The GIG directs GPS design functional characteristics for the aircraft and Public Law 103-160 directs the schedule for completion of all "basic GPS" installations by 30 September 2005. The Navigation Warfare (NAVWAR) mission was initiated in FY 99 in response to emerging GPS jamming threats and the requirement to protect the Navy's growing investment in GPS.

The GPS is a space-based positioning, navigation and timing (PNT) system that provides authorized users with secure, worldwide, all-weather, three-dimensional position, velocity and precise time data. PMW/PMA-156 is the central office responsible for funding all GPS aircraft integration RDT&E efforts performed by over 20 NAVAIR program offices, dozens of DoD/Navy field activities and laboratories, and dozens of contractors. The primary tasks to be accomplished for each of the 102 aircraft configurations include: GPS integration design studies; acquisition of aircraft and lab RDT&E assets; timing and frequency, development of test aircraft hardware and/or software designs; development of Integrated Logistics Support (ILS) elements to support test (operator and maintenance training, technical manuals); and Formal Navy Test and Evaluation (Development and Operational Test). Other tasks include the development of: new hardware and software systems for over 3300 Naval Aircraft to meet GIG, GPS Flight In Controlled Airspace (FICA), Common Navigation System/Air Traffic Management (CNS/ATM) and JPALS requirements when existing systems are unsuitable; the Digital Data Set (DDS); the Control Display Navigation Unit (CDNU) and associated software for many different aircraft and modifications to the GPS Mission Planning Module for the Naval Mission Planning System (NAVMPS)/Joint Mission Planning System (JMPS).

The Surface Ship and Submarine integration efforts include two vitally important navigation integration initiatives: NAVSSI and the AN/WRN-6 replacement. The first program is the Navigation Sensor System Interface (NAVSSI) development. The NAVSSI is the surface ship system with a requirement of integrating with over 54 systems/interfaces on 131 surface ship platforms. This operational requirement for the NAVSSI is the integration and distribution of real time navigation and time sources, primarily GPS, to combat systems, combat support systems, air alignment systems and support systems. NAVSSI is an evolutionary acquisition development. The program will begin developing a replacement for both the AN/WRN-6 shipboard GPS receiver on non-NAVSSI ships and the GVRC shipboard GPS receiver on NAVSSI ships beginning in FY06. Both the WRN-6 and the GVRC are no longer in production and require replacement.

For submarine systems, the program is supporting ongoing NAVSEA initiatives for the replacement of the AN/WRN-6 systems with the GVRC card technology. The National Defense Authorization Act for Fiscal Year 1999 included GPS language directing DoD to start "The development of an enhanced Global Positioning System [as] an urgent national security priority."

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification	DATE: **February 2005**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-5**	PROJECT NUMBER AND NAME 0921 NAVSTAR GPS EQUIPMENT

The Naval Research Advisory Committee (NRAC) GPS Vulnerability Study Panel tasked by OPNAV N6 and ASN(RD&A), assessed the Navy's GPS Vulnerabilities and recommended specific actions to resolve serious issues to ensure the continued availability of GPS information in a high risk hostile jamming environment. As a result, OPNAV N633 (now N611) and N880 (now N78) drafted the Navy Enhanced GPS User Equipment ORD to address operational requirements. These were validated and the ORD was approved on June 7, 2000. With this beginning, OSD directed the first phase of the Navy's overall GPS upgrade program with RDT&E leading to initial procurements of GPS anti-jam (AJ) antennas beginning in 2001 for aircraft and 2002 for ships. RDT&E continues to support platform integration requirements, DT/OT, as well as the GPS JPO's development of an Advanced Digital Antenna Production (ADAP) program, the Navy's development of a smaller AJ antenna and a conformal low-observable AJ antenna for aircraft with those requirements, and a new a technology AJ solution for submarines and the integration of AJ protection into handheld receivers. Two similar but separate ACAT III programs (Air and Sea NAVWAR) have been established and have become the basis for the Navy's NAVWAR program.

The second phase (referred to as Air and Sea GPS Modernization) of the Navy's overall GPS User Equipment upgrade, will require RDT&E to support the replacement of existing legacy GPS receivers with enhanced capability receivers and antennas. These new receivers and antennas will incorporate GPS Joint Program Office (JPO) and Navy directed and developed technology enhancements to support new signals in space, enhanced receiver security, and aircraft operations within controlled airspace and Joint Precision Approach and Landing System (JPALS) requirements. All of these efforts will be directed, tasked, and funded through PMW/PMA-156, including development of solutions for GPS Handheld receivers and Combat Survivor Evader and Locator (CSEL) user equipment.

The primary Global Positioning System (GPS) shipboard receivers fielded on the majority of U.S Navy ships today include the AN/WRN-6 and the GPS VME Receiver Card (GVRC). These military GPS receivers provide precise Position, Velocity, and Time (PVT) data required for many combat weapons and navigation systems, as well as providing the time synchronization critical to the network environments. The failure of the GPS receiver ultimately means the loss of GPS for the ship and those systems that depend upon it. However, as GPS devices have proliferated throughout the commercial community, it has become more readily available not only to civilians, but to adversaries as well. As a result, even the military GPS Precise Positioning System (PPS) is more vulnerable today to unintentional and intentional jamming. The new security architecture, known as Selective Availability Anti-Spoof Module (SAASM), addresses this vulnerability, and has been mandated for all military combat GPS users beginning in FY07. Additionally, the GPS satellite constellation is being modernized to incorporate new GPS signals from space for both military and civilian users (e.g., M-code and L5). While SAASM-capable GPS receivers are available commercially today, they require modification to support the various combat system requirements and interfaces required by the Navy shipboard systems, and will require modification in the future to implement the new GPS modernized signals (expected to become available in FY11). The WRN-X system, a new development , will be engineered for immediate implementation of SAASM, and will be an open architecture allowing for modification to implement modernized GPS signals when they become available; thus making it backwards and forwards compatible with all GPS systems (e.g., Y code, M code, (C/A) code (YMCA)). This will allow other programs to integrate the same GPS engine utilized in WRN-X into their system sooner than when a WRN-X system would become available, but at the same time allow for the goal of reducing the different GPS engines fielded in the Naval Fleet today.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2005**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA 5	0604777N NAVIGATION/ID SYSTEMS	0921 NAVSTAR GPS EQUIPMENT

(U) B. Accomplishments/Planned Program

	FY 04	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost	14.051	9.341	14.112	14.611
RDT&E Articles Quantity	0	0	0	0

(U) FY04 ACCOMPLISHMENTS: ($14.051) Air NAVWAR: Completed DT on the HH-60H and will translate that performance data to the other H-60 series platforms. Continued DT testing on the AV-8B. Began investigation of integrations on H-53 platforms. Began integration studies on the AH/UH-1. Continued F/A-18E/F/G integration analysis's and monitored continued conformal/low observable array technologies. Continued testing on the GAS-1N and GAS-1N polarimetric antennas. Participated in the GPS JPO's Advanced Digital Antenna Program (ADAP) source selection & hardware testing for potential application to Naval platforms. Began integration efforts on additional aircraft T/M/S. Participated in joint NAVWAR MOU initiatives with Canada, United Kingdom and Australia.
(U) FY05 PLANS: ($9.341) Air NAVWAR: Continue DT/OT testing on AV-8B and H-60 series platforms. Begin integration and testing on the H-53 and H-1 series platforms. Begin technology analysis and down select for the F/A-18 E/F/G. Continue monitoring/testing on conformal/Low Observable (LO) arrays. Initiate contract for conformal-LO array. Continue development and integration testing on the ADAP. Begin/continue integration efforts and DT on additional aircraft T/M/S. Continue participation in joint NAVWAR MOU initiatives with Canada, United Kingdom and Australia.
(U) FY06 PLANS: ($14.112) Air NAVWAR: Complete A/V-8B testing. Continue integration and DT/OT testing on H-1 and H-53 platforms. Continue technology down select on the F/A-18 E/F/G. Continue monitoring/testing on conformal/LO arrays. Continue development/integration testing on the ADAP. Begin integration analysis on E-2C. Begin/continue integration efforts and DT on additional aircraft T/M/S. Continue participation in joint NAVWAR MOU initiatives with Canada, United Kingdom and Australia.
(U) FY07 PLANS: ($14.611) Air NAVWAR: Begin integration and testing on the F/A-18 E/F/G . Complete DT/OT on the H-1 platforms. Complete DT on E-2C. Begin/continue integration efforts and DT on additional aircraft T/M/S. Continue participation in joint NAVWAR MOU initiatives with Canada, United Kingdom and Australia. Begin integration of ADAP on selected air platforms.

	FY 04	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost	4.929	3.470	5.876	6.085
RDT&E Articles Quantity	0	0	0	0

((U) FY04 ACCOMPLISHMENTS: ($4.929) Sea NAVWAR: Continued initial integration efforts (modeling and simulation) on selected Phase 1 platforms. Began DT efforts on selected Phase 1A (i.e. FFG) and Phase 1B (DDG) NAVSSI ship classes. Coordinated with NAVSSI program for integration of NAVWAR software capability into NAVSSI . Continued Wavelength Division Multiplexer (WDM) technology evaluation. Conducted submarine AOA preparations for MDA Milestone review and technology down select for Phase 2 efforts. Participated in the GPS JPO's Advanced Digital Antenna Program (ADAP) source selection & hardware testing for potential application to sea Naval platforms. Participated in joint NAVWAR MOU initiatives with Canada, United Kingdom and Australia.
(U) FY05 PLANS: ($3.470) Sea NAVWAR: Continue modeling/simulation, integration, DT efforts on selected Phase 1A & and DT/OT on Phase 1B sea platforms (CVN). Continue submarine AJ development and integration efforts. Support Phase 2 M/S B decision efforts. Continued WDM technology evaluation. Continue development/integration testing on the ADAP. Continue participation in joint NAVWAR MOU initiatives with Canada, United Kingdom and Australia.
(U) FY06 PLANS: ($5.876) Sea NAVWAR: Continue modeling/simulation, integration, DT efforts on selected Phase 1A and 1B sea platforms. Continue submarine AJ antenna development and integration efforts. Continue participation in Joint NAVWAR MOU initiatives with Canada, United Kingdom and Australia. Continue development/integration testing on the ADAP.
(U) FY07 PLANS: ($6.085) Sea NAVWAR: Continue modeling/simulation, integration, DT efforts on selected Phase 1A and 1B platforms. Continue submarine AJ development and integration efforts. Begin DT on submarines. Continue participation in Joint NAVWAR MOU initiatives with Canada, United Kingdom and Australia. Begin integration of ADAP on selected platforms.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2005**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA 5	0604777N NAVIGATION/ID SYSTEMS	0921 NAVSTAR GPS EQUIPMENT

(U) B. Accomplishments/Planned Program

	FY 04	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost	1.500	1.500	1.500	1.500
RDT&E Articles Quantity	0	0	0	0

U) FY04 ACCOMPLISHMENTS: ($1.500) Coordinated Navy efforts with the GPS JPO, PEO C4I , SPAWAR, NAVAIR and NAVSEA in preparation for new GPS modernization initiatives i.e. M-Code, Beam steering antennas, new 24-channel receivers, SAASM, Y-Code, M-Code C/A Code (YMCA), etc. Evaluating platform requirements and continued efforts to support the evaluations of smaller new technology AJ antennas. Participated in the development of OPNAV's GPS roadmap. Coordinated the upgrade of the Navy's Enhanced User Equipment ORD into a Capabilities Development Document (CDD).
(U) FY05 PLANS: ($1.500) Continue the above in support of the GPS JPO, PEO C4I , SPAWAR, NAVAIR and NAVSEA.
U) FY06 PLANS: ($1.500) Continue the above in support of the GPS JPO, PEO C4I , SPAWAR, NAVAIR and NAVSEA. Begin the process of capturing the Navy's Air and Sea platform requirements for the integration of new GPS signals from space
U) FY07 PLANS: ($1.500) Continue the above in support of the GPS JPO, PEO C4I , SPAWAR, NAVAIR and NAVSEA. Initial Air and Sea platform specification developments for hardware/software upgrades to support the integration of new capabilities and signals from space.

	FY 04	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost	0.000	0.000	2.000	3.000
RDT&E Articles Quantity	0	0	0	0

(U) FY06 PLANS: WRN X
(U) ($1.050) Determine the appropriate milestone decision point of entry for the new WRN-X system. Perform programmatic tasks such as development of mandatory acquisition documentation (e.g., Acquisition Strategy Plan), as required for that milestone entry point. Conduct GPS market investigations and research to scope the level of engineering effort that will be necessary to integrate a commercially available GPS engine into the WRN-X system. Begin preparing for that milestone decision review.
(U) ($.950) Working with the GPS Joint Program Office (JPO), and utilizing the newly available GPS initial specifications and Interface Control Documents, definitize the Navy shipboard GPS functional requirements. Work with other program offices who maintain interfaces with the WRN-6 and GVRC, to determine which legacy interfaces are no longer required, and identify any new or future interfaces that might be required for the WRN-X shipboard GPS receiver. Draft the WRN-X technical specifications or Statement of Objectives (SOO), along with a draft Request for Proposal (RFP).
(U) FY07 PLANS: WRN X
(U) ($.250) Finalize mandatory acquisition documentation. Conduct appropriate milestone decision review.
(U) ($.925) Finalize the WRN-X technical specifications or SOO. Finalize and issue the RFP. Evaluate responses through a source selection team.
(U) ($1.825) Award the WRN-X system Development and Demonstration contract. Begin design, functional allocation, and preparation for System Design Review (SDR).

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2005**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA 5	0604777N NAVIGATION/ID SYSTEMS	0921 NAVSTAR GPS EQUIPMENT

(U) C. PROGRAM CHANGE SUMMARY:

(U) Funding:	FY 2004	FY 2005	FY 2006	FY 2007
FY2005 President's Budget	21.831	14.467	21.433	21.856
FY2006 President's Budget	20.480	14.311	23.488	25.196
Total Adjustments	-1.351	-0.156	2.055	3.340
Summary of Adjustments				
Congressional Adjustments				
Congressional Recissions		-0.129		
Reprogrammings	-0.697			
Programmatic Adjustments		-0.027	1.942	2.962
Economic Assumptions	-0.074		0.071	0.097
Pricing Adjustments			0.042	0.281
SBIR/STTR Transfers	-0.580			
Subtotal	-1.351	-0.156	2.055	3.340

(U) Schedule:

WRN X development efforts begin in FY06.

(U) Technical:

Not Applicable

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2005**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-5	0604777N NAVIGATION/ID SYSTEMS	0921 NAVSTAR GPS EQUIPMENT

(U) D. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	To Complete	Total Cost
(U) OPN Line #2657	15.417	11.579	14.715	13.631	14.479	14.208	14.487	18.782	Continuing	Continuing
(U) APN - Common Avionics	2.260	0.000	17.976	22.304	22.812	23.278	24.605	26.025	Continuing	Continuing

(U) E. ACQUISITION STRATEGY:

NAVWAR/GPS Modernization: Participate in GPS Joint Program Office and Warner Robbins ALC FY 01-FY 07 procurements for the GAS-1 anti-jam antenna. Initiate Navy contracting options for smaller array anti-jam antennas and conformal/low observable arrays for selected aircraft. Initiate Navy contracting for the shipboard ground plane and submarine array. Participate with the GPS JPO in their development of a Advanced Digital Antenna Program (ADAP) Lowest Repairable Unit (LRU) and identify potential Navy candidate platforms. Participate in GPS JPO procurements wherever practicable for GPS Modernization Enhancements. Develop the Navy's specifications necessary to capture and implement future GPS enhancements. See attached Milestone chart.

WRN-X: Initiate Navy contracting options for a WRN-6 Replacement (WRN-X Modernized Shipboard GPS system). Investigate commerical modernized GPS engines certified through the GPS JPO for application in the WRN-X system. Support the development of the Navy's Modernized GPS User Equipment efforts as they apply specifically to non-NAVSSI shipboard applications. Work in concert with the WRN-6 sustainment efforts to ensure a coupled solution of obsolescence upgrades (occurring under WRN-6 Sustainment) and modernizations tasks (for WRN-X development).

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)

DATE: **February 2005**

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT	PROJECT NUMBER AND NAME
RDT&E, N / BA-5	0604777N NAVIGATION/ID SYSTEMS	0921 NAVSTAR GPS EQUIPMENT

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
Product Development	Various	Product Vendors	268.878	1.800	Various	3.433	Various	4.233	Various	Continuing	Continuing	
Product Development (SSC-SD)	WX	SSC-SD	65.938	0.371	10/04	0.750	10/05	0.850	10/06	Continuing	Continuing	
Product Dev (other in house)	WX	Various Field Activities	439.397								439.397	
Systems Engineering	Various	Various Govt/Contractor	4.310	1.500	Various	2.400	Various	2.923	Various	Continuing	Continuing	
											0.000	
											0.000	
											0.000	
Subtotal Product Development			778.523	3.671		6.583		8.006		Continuing	Continuing	

Remarks:

Development Support	Various	Various	12.710								12.710	
Software Development	Various	SSC-SD/Platfrom Primes	5.900	0.700	10/04	1.000	10/05	1.000	10/06	Continuing	Continuing	
Integrated Logistics Support	Various	SSC-SD/NAWC/SIR/DCS	1.607	0.850	10/04	0.900	10/05	0.900	10/06	Continuing	Continuing	
Training Development	WX	SSC-SD/NAWC	1.450	0.275	10/04	0.600	10/05	0.600	10/06	Continuing	Continuing	
Technical Data	Various	Platform PMO's	1.000	0.300	10/04	0.600	10/05	0.600	10/06	Continuing	Continuing	
											0.000	
											0.000	
Subtotal Support			22.667	2.125		3.100		3.100		Continuing	Continuing	

Remarks:

R-1 SHOPPING LIST - Item No. 131

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)

DATE: **February 2005**

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

PROGRAM ELEMENT: 0604777N NAVIGATION/ID SYSTEMS

PROJECT NUMBER AND NAME: 0921 NAVSTAR GPS EQUIPMENT

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 & Evaluation (NAWC PAX)	WX	NAWC PAX	13.729	1.700	10/04	2.500	10/05	2.500	10/06	Continuing	Continuing	
Test & Evaluation (DCS)	CPAF	DCS CORP PAX	2.111	0.365	10/04	0.450	10/05	0.450	10/06	Continuing	Continuing	
Test & Evaluation (SSC-SD)	WX	SSC-SD	2.545	0.586	10/04	0.900	10/05	0.900	10/06	Continuing	Continuing	
Test & Evaluation Platform Testing	Various	VARIOUS CONTRACTORS	9.196	1.869	Various	3.755	Various	4.040	Various	Continuing	Continuing	
											0.000	
											0.000	
Subtotal T&E			27.581	4.520		7.605		7.890		Continuing	Continuing	
Remarks:												
Contractor Engineering Support	Various	DCS, SAIC, ARINC	4.785	1.452	10/04	1.800	10/05	1.800	10/06	Continuing	Continuing	
Government Engineering Support	WX	SSC, NAWC, WR	4.050	0.899	10/04	2.200	10/05	2.200	10/06	Continuing	Continuing	
Program Management Support	CPAF	DCS, Price Systems	11.452	1.644	10/04	2.200	10/05	2.200	10/06	Continuing	Continuing	
											0.000	
Subtotal Management			20.287	3.995		6.200		6.200		Continuing	Continuing	
Remarks:												
Total Cost			849.058	14.311		23.488		25.196		Continuing	Continuing	0.000
Remarks:												

R-1 SHOPPING LIST - Item No. 131

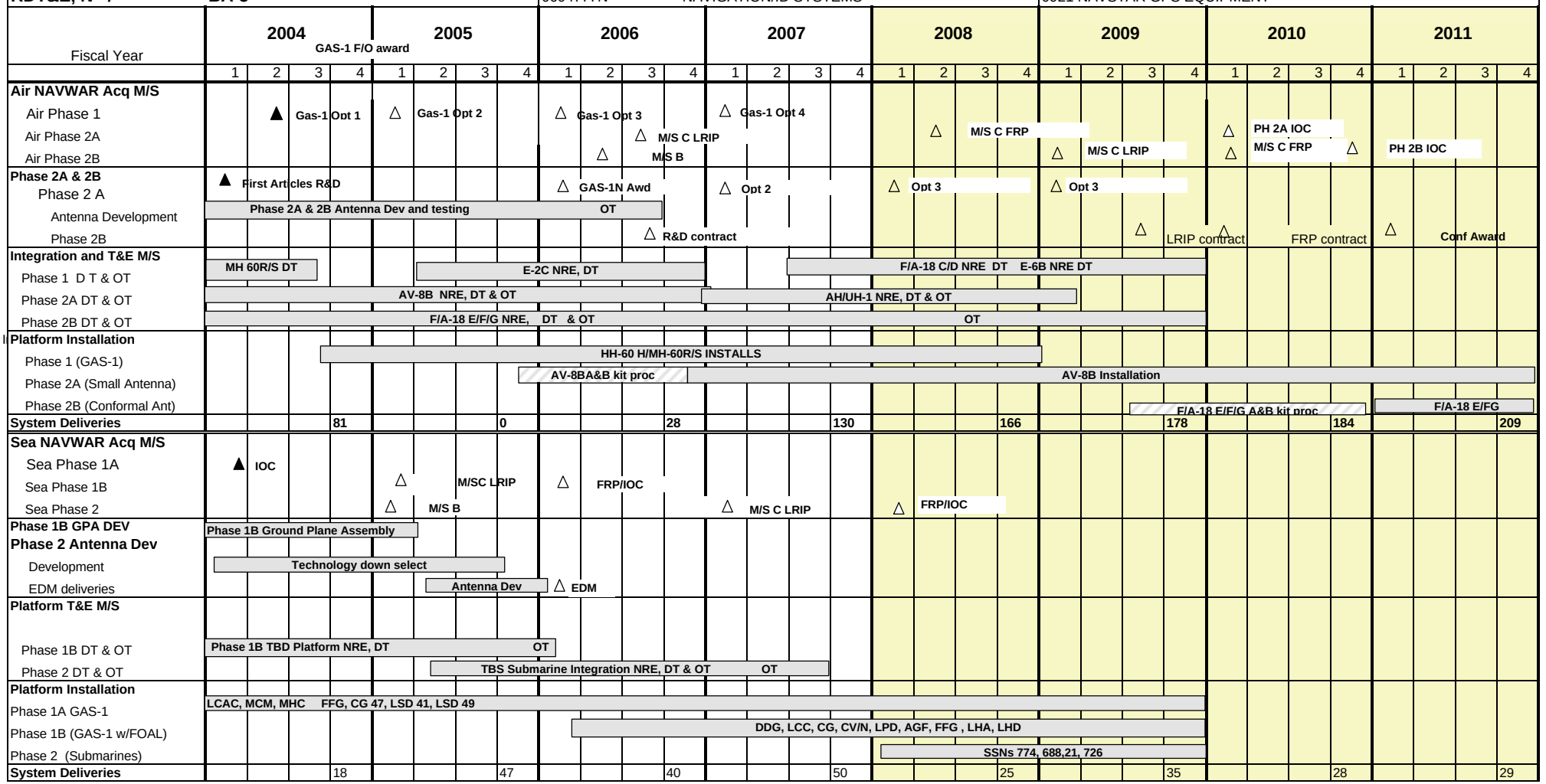
CLASSIFICATION:

EXHIBIT R4, Schedule Profile | DATE: **February 2005**

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

PROGRAM ELEMENT NUMBER AND NAME: 0604777N NAVIGATION/ID SYSTEMS

PROJECT NUMBER AND NAME: 0921 NAVSTAR GPS EQUIPMENT



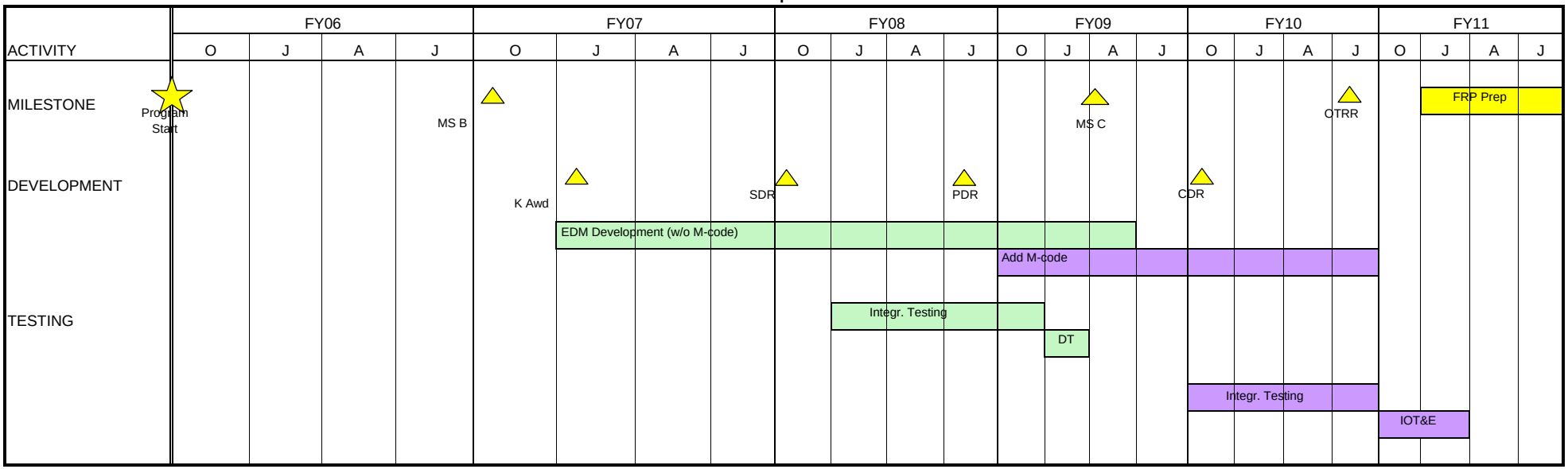
R-1 SHOPPING LIST - Item No. 131

Begin GPS Modernization design and development to support JPALS and incorporate new capabilities from space

CLASSIFICATION:

EXHIBIT R4, Schedule Profile		DATE: **February 2005**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-5	0604777N NAVIGATION/ID SYSTEMS	0921 NAVSTAR GPS EQUIPMENT

WRN-X Development Schedule



R-1 SHOPPING LIST - Item No. 131

CLASSIFICATION:

Exhibit R-4a, Schedule Detail						DATE: **February 2005**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 5**	PROGRAM ELEMENT 0604777N NAVIGATION/ID SYSTEMS				PROJECT NUMBER AND NAME 0921 NAVSTAR GPS EQUIPMENT			
NAVWAR Air Profile	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
H-60 completes DT	3Q							
Phase 1 NPDM	4Q							
GAS-1 F/O Deliveries Begin	3Q							
AV-8B DT/OT	1-4Q	1-4Q	1-4Q					
Phase 2A 1st platform production integration				1Q				
Phase 2A LRIP			3Q					
Phase 2A FRP					2Q			
Phase 2A IOC							1Q	
Phase 2B Milestone B			2Q					
F/A-18 E/F DT/OT				1-4Q	1-4Q	1-4Q		
Phase 2B Milestone C LRIP						1Q		
Phase 2B 1st platform production integration							1Q	
Phase 2B FRP							1Q	
Phase 2B IOC							3Q	
NAVWAR Sea Profile								
Phase 1A IOC	1Q							
Phase 1B LRIP		1Q						
Phase 1B Operational Test (OT)		1Q	1Q-2Q					
Phase 1B Platform 1st production installation			1Q					
Phase 1B FRP			1Q					
Phase 1B IOC			1Q					
Phase 2 M/S B		1Q						
Phase 2 LRIP				1Q				
Phase 2 Operational Test (OT)				1Q				
Phase 2 Platform 1st production installation					1Q			
Phase 2 FRP					1Q			
Phase 2 IOC					1Q			
WRN X								
Milestone B				1Q				
Milestone C						3Q		

R-1 SHOPPING LIST - Item No. 131