

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification							DATE:		
							February 2005		
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE				
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-4					0603658N Cooperative Engagement Capability				
COST (\$ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	To Complete
Total PE Cost	86.996	102.150	88.135	59.881	56.724	56.968	58.274	55.597	Cont.
2039/Cooperative Engagement Capability (CEC)	\$72.301	\$102.150	\$88.135	\$59.881	\$56.724	\$56.968	\$58.274	\$55.597	Cont.
2616/Battlegroup Interoperability Issues	\$14.695	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	
Defense Emergency Response Funds (DERF) Funds: Not Applicable.									
A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:									
<p>Cooperative Engagement Capability (CEC) significantly improves Battle Force Anti-Air Warfare (AAW) capability by coordinating all Battle Force AAW sensors into a single, real-time, composite track picture capable of fire control quality. CEC distributes sensor data from each ship and aircraft, or cooperating unit (CU), to all other CUs in the battle force through a real-time, line of sight, high data rate sensor and engagement data distribution network. CEC is highly resistant to jamming and provides accurate gridlocking between CUs. Each CU independently employs high capacity, parallel processing and advanced algorithms to combine all distributed sensor data into a fire control quality track picture which is the same for all CUs. CEC data is presented as a superset of the best AAW sensor capabilities from each CU, all of which are integrated into a single input to each CU's combat weapons system. CEC significantly improves our Battle Force defense in depth, including both local area and ship defense capabilities against current and future AAW threats. Moreover, CEC provides critical connectivity and integration of over-land air defense systems capable of countering emerging air threats, including land attack cruise missiles, in a complex littoral environment.</p> <p>CEC consists of the Data Distribution System (DDS), the Cooperative Engagement Processor (CEP), and Combat System modifications. The DDS encodes and distributes ownship sensor and engagement data and is a high capacity, jam resistant, directive system providing a precision gridlocking and high throughput of data. The CEP is a high capacity distributed processor that is able to process force levels of data in near real-time. This data is passed to the ship's combat system as high quality data for which the ship can cue its onboard sensors or use the data to engage targets without actually tracking them.</p> <p>The Navy has begun implementation of a Pre-Planned Product Improvement (P3I) approach to modify the current equipment to meet reduced size, weight, cost, power and cooling objectives. This P3I approach also supports continuity for interoperability improvements and program protection, as well as supporting open architecture initiatives, comms independence, JTRS compliancy, and Global Information Grid (GIG) horizontal fusion initiatives. P3I will provide hardware which complies with Category 3 Open Architecture Core Environment (OACE) standards with rehosted existing software, which will be fielded fleet-wide to allow affordable replacement of obsolete computing system components and eliminate dependencies on "closed" equipment, operating systems, and middleware.</p> <p>Additionally, CEC is working with the Joint SIAP System Engineering Organization (JSSEO) to engineer a sensor measurement fusion and track management algorithm set of solutions which is viable for all Services to implement toward achieving optimum interoperability across the battlespace. This effort supports re-architecting of battleforce functionality in order to support the Navy's Open Architecture functional architecture which establishes a common functional framework across Navy programs and platforms to reduce development cost by promoting software reuse. This architecture promotes interoperability by allowing functionality to be consistently engineered across the battleforce. This product, the JTM (Joint Track Manager) is derived through a Model Driven Architecture (MDA) approach through a series of PIM (Platform Independent Model) and PSM (Platform Specific Model) deliveries which will include joint track management functionality including air, surface, ground, and sub-surface tracks. CEC will conduct a competition for selection of a System Integrator/Design Agent (SI/DA) to facilitate the development and integration of the JTM functionality across the applicable Navy Programs (e.g. DD(X), AHE).</p>									

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Exhibit R-2, RDTEN Budget Item Justification  
(Exhibit R-2, page 1 of 11)

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EXHIBIT R-2, RDT&E Project Justification			DATE: <b>February 2005</b>																
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-4</b>	PROGRAM ELEMENT NUMBER AND NAME 0603658N Cooperative Engagement Capability	PROJECT NUMBER AND NAME 2039/Cooperative Engagement Capability; 2616/BG Interoperability Issues																	
<b>B. Accomplishments/Planned Program</b>																			
<table border="1" style="width: 100%; border-collapse: collapse;"><thead><tr><th style="width: 30%;"></th><th style="width: 15%;">FY 04</th><th style="width: 15%;">FY 05</th><th style="width: 15%;">FY 06</th><th style="width: 15%;">FY 07</th></tr></thead><tbody><tr><td>Accomplishments/Effort/Subtotal Cost</td><td style="text-align: center;">13.338</td><td style="text-align: center;">17.252</td><td style="text-align: center;">10.592</td><td style="text-align: center;">2.000</td></tr><tr><td>RDT&amp;E Articles Quantity</td><td></td><td></td><td></td><td></td></tr></tbody></table>						FY 04	FY 05	FY 06	FY 07	Accomplishments/Effort/Subtotal Cost	13.338	17.252	10.592	2.000	RDT&E Articles Quantity				
	FY 04	FY 05	FY 06	FY 07															
Accomplishments/Effort/Subtotal Cost	13.338	17.252	10.592	2.000															
RDT&E Articles Quantity																			
Development, integration and testing of computer program Baseline 2.1 with AEGIS CGs and DDGs, ACDS and SSDS equipped ships.																			
<table border="1" style="width: 100%; border-collapse: collapse;"><thead><tr><th style="width: 30%;"></th><th style="width: 15%;">FY 04</th><th style="width: 15%;">FY 05</th><th style="width: 15%;">FY 06</th><th style="width: 15%;">FY 07</th></tr></thead><tbody><tr><td>Accomplishments/Effort/Subtotal Cost</td><td style="text-align: center;">1.600</td><td></td><td></td><td></td></tr><tr><td>RDT&amp;E Articles Quantity</td><td></td><td></td><td></td><td></td></tr></tbody></table>						FY 04	FY 05	FY 06	FY 07	Accomplishments/Effort/Subtotal Cost	1.600				RDT&E Articles Quantity				
	FY 04	FY 05	FY 06	FY 07															
Accomplishments/Effort/Subtotal Cost	1.600																		
RDT&E Articles Quantity																			
Single Integrated Air Picture (SIAP) improvements.																			
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	FY 04	FY 05	FY 06	FY 07															
Accomplishments/Effort/Subtotal Cost	10.800	3.300	7.570	13.146															
RDT&E Articles Quantity																			
E-2C HAWKEYE 2000 aircraft and CEC AN/USG-3 system integration and FOT&E-2 testing; system integration with E-2C Radar Modernization Program (RMP), and NIFC-CA integration.																			

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	FY 04	FY 05	FY 06	FY 07														
Accomplishments/Effort/Subtotal Cost	1.162	1.200	1.300	1.500														
RDT&E Articles Quantity																		
Systems Engineering/Integration Agent (SE/IA) for development and execution of systems engineering processes by NSWG, Dahlgren.																		
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Accomplishments/Effort/Subtotal Cost	16.474	31.000	22.000	24.000														
RDT&E Articles Quantity																		
Execution of Systems Integration/Design Agent competition; Open Architecture Joint Track Manager PIM/PSM development, JTM PSM integration and test.																		
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	FY 04	FY 05	FY 06	FY 07														
Accomplishments/Effort/Subtotal Cost	20.000	36.000	29.500	3.100														
RDT&E Articles Quantity																		
P3I hardware and software efforts including DDS breakup and test, rehost of existing software on Open Architecture ACE CEP, comms independence efforts including antenna alternatives and JTRS compliancy, and mini terminal alternatives.																		

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CEC system improvements including enhanced communications, expansion of networking capability, development of system protection/multi-level secure operational-level secure operations, and Planar Array Active Antenna (PAAA).																			
<table border="1" style="width: 100%; border-collapse: collapse;"><thead><tr><th style="width: 30%;"></th><th style="width: 15%;">FY 04</th><th style="width: 15%;">FY 05</th><th style="width: 15%;">FY 06</th><th style="width: 15%;">FY 07</th></tr></thead><tbody><tr><td>Accomplishments/Effort/Subtotal Cost</td><td style="text-align: center;">2.000</td><td style="text-align: center;">2.000</td><td style="text-align: center;">4.000</td><td style="text-align: center;">2.000</td></tr><tr><td>RDT&amp;E Articles Quantity</td><td></td><td></td><td></td><td></td></tr></tbody></table>						FY 04	FY 05	FY 06	FY 07	Accomplishments/Effort/Subtotal Cost	2.000	2.000	4.000	2.000	RDT&E Articles Quantity				
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Accomplishments/Effort/Subtotal Cost	2.000	2.000	4.000	2.000															
RDT&E Articles Quantity																			
Participation in system interoperability exercises including the Joint Combat Identification Evaluation Team (JCIET) and Roving Sands, etc.																			

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	FY 04	FY 05	FY 06	FY 07													
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<p><b>C. PROGRAM CHANGE SUMMARY:</b></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 35%;"></th> <th style="text-align: right; width: 12.5%;">FY 2004</th> <th style="text-align: right; width: 12.5%;">FY 2005</th> <th style="text-align: right; width: 12.5%;">FY 2006</th> <th style="text-align: right; width: 12.5%;">FY 2007</th> </tr> </thead> <tbody> <tr> <td>Funding:</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>President's Budget: (FY05 Pres Controls)</td> <td style="text-align: right;">86.725</td> <td style="text-align: right;">103.452</td> <td style="text-align: right;">114.010</td> <td style="text-align: right;">67.280</td> </tr> <tr> <td>Current President's Budget</td> <td style="text-align: right; border-top: 1px solid black;">86.996</td> <td style="text-align: right; border-top: 1px solid black;">102.150</td> <td style="text-align: right; border-top: 1px solid black;">88.135</td> <td style="text-align: right; border-top: 1px solid black;">59.881</td> </tr> <tr> <td>Total Adjustments</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 1px solid black;">.271</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 1px solid black;">-1.302</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 1px solid black;">-25.875</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 1px solid black;">-7.399</td> </tr> <tr> <td colspan="5" style="padding-top: 10px;">Summary of Adjustments</td> </tr> <tr> <td>    SBIR/STTR Transfer</td> <td style="text-align: right;">-2.145</td> <td></td> <td></td> <td></td> </tr> <tr> <td>    Programmatic Adjustments</td> <td></td> <td></td> <td style="text-align: right;">-25.300</td> <td style="text-align: right;">-7.043</td> </tr> <tr> <td>    Execution Realignment</td> <td style="text-align: right;">2.677</td> <td></td> <td></td> <td></td> </tr> <tr> <td>    Miscellaneous Adjustments</td> <td></td> <td style="text-align: right;">-1.302</td> <td style="text-align: right;">-.575</td> <td style="text-align: right;">-.356</td> </tr> <tr> <td>    Inflation</td> <td style="text-align: right;">-.080</td> <td></td> <td></td> <td></td> </tr> <tr> <td>    Cancelled Accounts</td> <td style="text-align: right; border-top: 1px solid black;">-.181</td> <td></td> <td></td> <td></td> </tr> <tr> <td>    Subtotal</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 1px solid black;">.271</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 1px solid black;">-1.302</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 1px solid black;">-25.875</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 1px solid black;">-7.399</td> </tr> </tbody> </table> <p style="margin-top: 20px;">Schedule:</p> <p>Accelerated deployment of USS NIMITZ Battle Group required replanning of Follow-on Test and Evaluation-2 (FOT&amp;E) schedule of integrated CEC/E-2C HAWKEYE 2000 aircraft. FOT&amp;E-2 tests were conducted and completed in April 2004. The COMOPTEVFOR report of testing is planned for release in August 2004.</p> <p style="margin-top: 20px;">Technical:</p> <p>CEC will collaborate with Single Integrated Air Picture (SIAP) Systems Engineering track management solution. P3I developments will address a smaller, cheaper, less power and cooling hardware solutions, including alternative communications and a lightweight antenna.</p>						FY 2004	FY 2005	FY 2006	FY 2007	Funding:					President's Budget: (FY05 Pres Controls)	86.725	103.452	114.010	67.280	Current President's Budget	86.996	102.150	88.135	59.881	Total Adjustments	.271	-1.302	-25.875	-7.399	Summary of Adjustments					SBIR/STTR Transfer	-2.145				Programmatic Adjustments			-25.300	-7.043	Execution Realignment	2.677				Miscellaneous Adjustments		-1.302	-.575	-.356	Inflation	-.080				Cancelled Accounts	-.181				Subtotal	.271	-1.302	-25.875	-7.399
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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
RDT&E,N 0206313M	4.100	3.500	4.000	2.300	.900	.600			CONT	CONT
DD(X) 0604300N				8.500					CONT	CONT
APN 0195 (E-2C HAWKEYE 2000)					21.300				CONT	CONT
Procurement, Marine Corps 4640				1.000	6.000	6.000	12.000		CONT	CONT
OPN 2606 (CEC)	66.156	67.119	16.474	27.539	37.559	42.772	36.862	35.512	CONT	CONT
OPN 0960 (CG Modernization)			6.275	13.920	11.930	17.570	17.880	17.690	CONT	CONT
APN 0195 (E-2C Aircraft)	27.900	11.300				17.399	17.820	18.176	CONT	CONT
Various - SCN Procurement	20.705	6.592	18.510	7.167	28.922	22.340	40.388	30.767	CONT	CONT
									CONT	CONT
* Funding streams reflect only the CEC portion of each lines TOA.										
E. ACQUISITION STRATEGY:										
The realignment of track management functions with the SIAP SE approach and Navy Open Architecture, while competing System Integrator functions, and utilizing a Pre-planned Product Improvement (P3I) program in lieu of a CEC Block 2 development effort, has been approved by the Over-arching Integrated Product Team (OIPT). An acquisition strategy has been approved to reflect this approach and allow for multiple industry participants and focus on joint initiative involvement.										
F. MAJOR PERFORMERS:										
Raytheon Systems Company, St. Petersburg, FL Development of AN/USG-2 (shipboard) and AN/USG-3 (airborne) equipment and support of testing.										
Johns Hopkins University, Applied Physics Laboratory, Laurel, MD Technical Design Agent for AN/USG-2 and AN/USG-3 equipment and support of testing.										
Northrop-Grumman Corporation, Bethpage, LI, NY Integration of AN/USG-3 equipment with E-2C HAWKEYE 2000 and Advanced HAWKEYE aircraft.										
Naval Surface Weapons Center, Dahlgren, VA Software Support Activity (SSA) and Systems Engineering/Integration Agent (SE/IA).										

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Exhibit R-2, RDTEN Budget Item Justification  
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Exhibit R-3 Cost Analysis (page 1)											DATE:			
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RDT&E, N / BA-4			0603658N Cooperative Engagement Capability			2039/Cooperative Engagement Capability; 2616/BG Interoperability Issues								
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
AN/USG-2/3 Development	CPAF	Raytheon, St. Petersburg, FL	571.853	18.921	Oct-03	8.426	Oct-04	9.145	Oct-05	7.583	Oct-06	Continuing	Continuing	TBD
AN/USG-2/3 Development	CPAF	Award Fees	85.393	2.803	Oct-03	1.248	Oct-04	1.355	Oct-05	1.176	Oct-06	Continuing	Continuing	TBD
AN/USG-2/3 Development/TDA	CPFF	JHU/APL, Laurel, MD	236.866	7.742	Oct-03	8.000	Oct-04	6.000	Oct-04	4.000	Oct-06	Continuing	Continuing	TBD
Block 2 Development/Competition	CPAF	Various	11.000									Continuing	Continuing	TBD
Track Management	TBD	Various		12.000	Oct-03	20.000	Oct-04	28.000	Oct-05	24.000	Oct-06	Continuing	Continuing	TBD
P3I	TBD	Various		20.000	Oct-03	36.000	Oct-04	23.500	Oct-05	3.100	Oct-06	Continuing	Continuing	TBD
E-2C/AHE Aircraft Integration	CPAF	Northrop-Grumman, LI., NY	183.408	2.000	Oct-03	3.300		3.990		7.422	Oct-06		200.120	200.120
NIFC-CA Integration	TBD	Various						3.580		6.950	Oct-06	Continuing	Continuing	TBD
Tactical Component Network (TCN)	CPFF	Various	14.576										14.576	14.576
P-3 Aircraft Integration	CPAF	Lockheed-Martin	40.377										40.377	40.377
Baseline 2.2 Development	CPAF	Lockheed-Martin	11.881										11.881	11.881
Space Based IR Sensors (SBIRS)	CPAF	Lockheed-Martin	12.843										12.843	12.843
Modeling & Simulation	PD	PMS-456	5.261									Continuing	Continuing	TBD
In-Service Engineering Activity	WX	NSWC, Port Hueneme, CA	18.432	2.527	Oct-03	2.285	Oct-04	3.000	Oct-05	2.000	Oct-06	Continuing	Continuing	TBD
Land Based Test Network	PD	SPAWAR (PMW-159)	1.302										1.302	1.302
Land Based Test Network	PD	NATC, Patuxent River, MD	.957										.957	0.957
Software Support Activity	WX	NSWC, Dahlgren, VA	57.472	4.000	Oct-03	3.500	Oct-04	1.300	Oct-05	.800	Oct-06	Continuing	Continuing	TBD
Antenna Redesign	RC	NSWC, Crane, IN	6.483										6.483	6.483
Production Engineering Activity	WX	NSWC, Crane, IN	41.243	1.000	Oct-03	1.000	Oct-04	2.000	Oct-05	.500	Oct-06	Continuing	Continuing	TBD
AEGIS Integration	CPAF	Lockheed-Martin	124.933										124.933	124.933
SSDS/ACDS Integration	CPAF	Raytheon, San Diego, CA	39.871	4.474		11.000							55.345	39.871
Area Air Def. Commander (AADC)	CPAF	General Dynamics	10.096										10.096	10.096
SIAP Improvements	CPFF	JHU/APL, Laurel, MD		1.600	Oct-03								1.600	1.600
Various	Various	Miscellaneous	85.700		Oct-03	.826	Various	1.003				Continuing	Continuing	TBD
Subtotal Product Development			1,559.947	77.067		95.585		82.873		57.531		Continuing	Continuing	TBD
Remarks:														

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Exhibit R-2, RD TEN Budget Item Justification  
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**CLASSIFICATION:**

Exhibit R-3 Cost Analysis (page 2)											DATE: <b>February 2005</b>			
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-4</b>			PROGRAM ELEMENT 0603658N Cooperative Engagement Capability			PROJECT NUMBER AND NAME 2039/Cooperative Engagement Capability; 2616/BG Interoperability Issues								
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
Test Support	CPAF	Raytheon, St. Peters., FL	8.116	1.219	Oct-03	1.742	Oct-04	1.132	Oct-05	.435	Oct-06		12.644	12.644
Test Support	CPAF	Award Fees	1.202	.181	Oct-03	.258	Oct-04	.168	Oct-05	.065	Oct-06		1.874	1.874
Test Support	CPFF	JHU/APL, Laurel, MD	10.007	1.100	Oct-03	.800	Oct-04	.600	Oct-05	.300	Oct-06		12.807	12.807
Test Support	WX	NRL, Washington, DC	6.352	1.230									7.582	7.582
Test Support	WX	NSWC, Port Hueneme, CA	31.601	1.458	Oct-03	1.000	Oct-04	1.000	Oct-05	.400	Oct-06		35.459	35.459
Air Operations Test Support	WX	NAVAIR (PMA-207)	6.009	1.450									7.459	7.459
Test Data Reduction	WX	NWAS, Corona, CA	16.624	1.440	Oct-03	.800	Oct-04	.800	Oct-05	.800	Oct-06		20.464	20.464
Various	Various	Various	92.024	1.283	Various	1.400	Various	1.012	Various		Various		95.719	95.719
Subtotal Test & Evaluation			171.935	9.361		6.000		4.712		2.000		Continuing	Continuing	TBD
Remarks:														
Program Management Support	FFP	Various	60.364	.568	Oct-03	.565	Oct-04	.550	Oct-05	.350	Oct-06	Continuing	Continuing	TBD
Subtotal Management			60.364	.568		.565		.550		.350		Continuing	Continuing	TBD
Remarks:														
Total Cost			1,792.246	86.996		102.150		88.135		59.881		Continuing	Continuing	Continuing
Remarks:														

R-1 SHOPPING LIST - Item No. 60

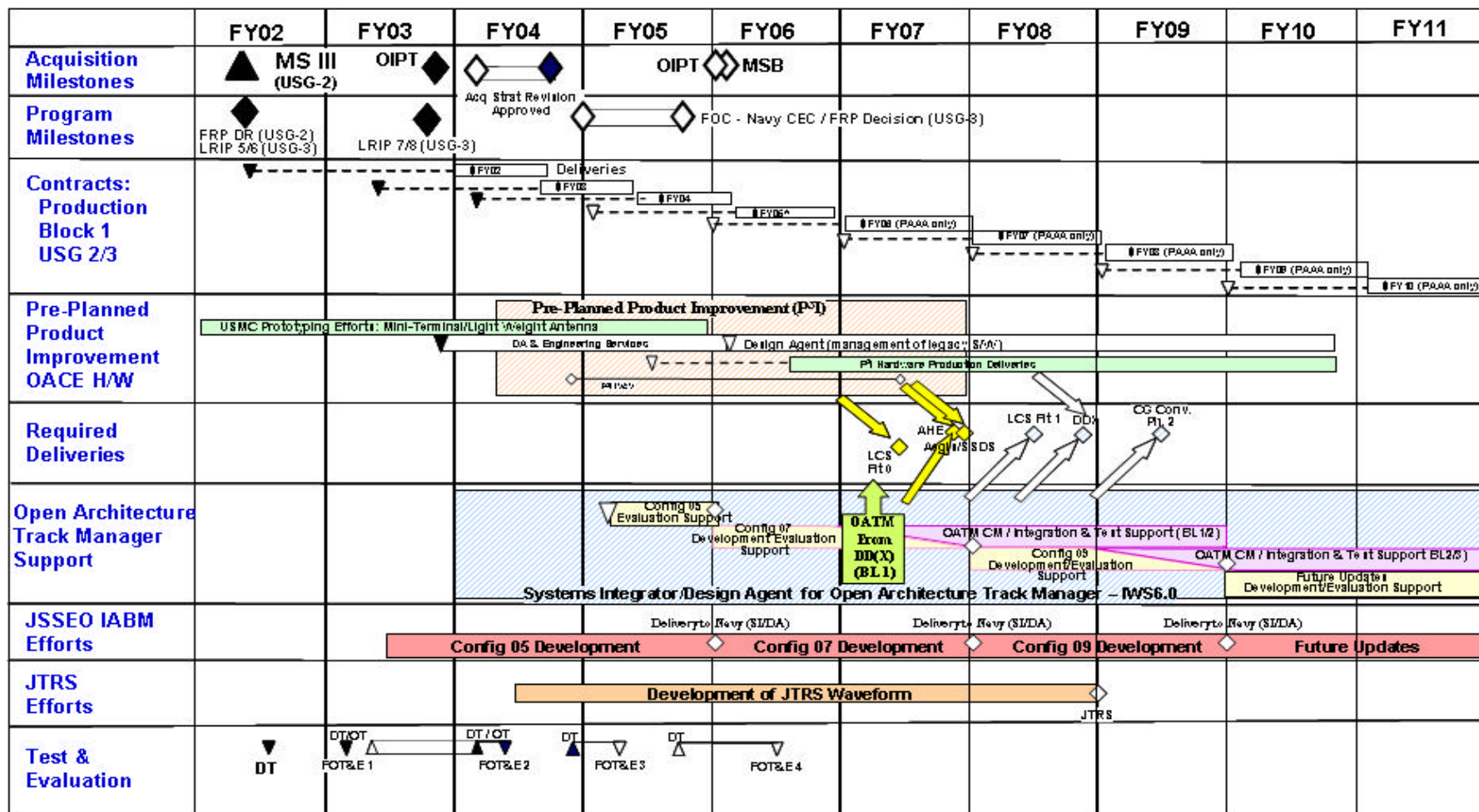
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**Exhibit R-2, RD TEN Budget Item Justification**  
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# UNCLASSIFIED

CLASSIFICATION:

EXHIBIT R4, Schedule Profile						DATE: <b>February 2005</b>				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT NUMBER AND NAME			PROJECT NUMBER AND NAME				
RDT&E, N / BA-4			0603658N Cooperative Engagement Capability			2039/Cooperative Engagement Capability; 2616/BG Interoperability Issues				



\* NOTE: If P3 H/W is available for production, it will be cut into the FY05 production contract

\*\* NOTE: Initial drop for integration into DDX software baseline

R-1 SHOPPING LIST - Item No. 60

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Exhibit R-2, RDTE Budget Item Justification  
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**CLASSIFICATION:**

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R-1 SHOPPING LIST - Item No. 60

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**Exhibit R-2, RD TEN Budget Item Justification**  
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