Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Navy										DATE: February 2010	
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*				R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*							
COST ($ in Millions)	**FY 2009 Actual**	**FY 2010 Estimate**	**FY 2011 Base Estimate**	**FY 2011 OCO Estimate**	**FY 2011 Total Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	4.044	32.694	60.498	0.000	60.498	71.512	25.285	38.805	47.002	Continuing	Continuing
2279: *4BW/4BN Upgrade*	4.044	32.694	60.498	0.000	60.498	71.512	25.285	38.805	47.002	Continuing	Continuing

A. Mission Description and Budget Item Justification

The mission of the AH-1W attack helicopter is to provide rotary wing close air support, anti-armor, armed escort, armed/visual reconnaissance, survivability enhancements, and fire support coordination capabilities under day/night and adverse weather conditions. The mission of the UH-1N utility helicopter is to provide command and control and combat assault support under day/night and adverse weather conditions and special operations support; supporting arms coordination and aeromedical evacuation. Major modifications for both aircraft include 168 AH-1W's converted to AH-1Z's, build 58 new AH-1Z's, remanufacture ten (10) H-1N helicopters and build 113 new UH-1Y models. Upgrades include: a new 4-bladed, composite rotor system with semi-automatic bladefold, new performance matched transmissions, T700 Engine Digital Electronic Control Units (DECUs), new 4-bladed tail rotors and drive systems, more effective stabilizers, upgraded landing gear, tail pylon structural modifications, and common, fully integrated cockpits and avionics systems. This upgrade will add 10,000 flight hours to AH-1Z/UH-1Y airframes. The fully integrated cockpits will reduce operator workload and improve situational awareness, thus increasing safety and reducing the rate of aircraft attrition. They will provide considerable growth potential for future weapon systems and avionics, which will significantly increase mission effectiveness and survivability. The cockpits will also include integration of onboard mission planning, communications, digital fire control, self-navigation, night navigation/targeting, and weapon systems management in nearly identical crew stations, which significantly reduces training requirements. This upgrade maximizes commonality between the two aircraft and provides needed improvements in crew and passenger survivability, payload, power available, endurance, range, airspeed, maneuverability and supportability.

Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Navy	DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	**R-1 ITEM NOMENCLATURE** PE 0604245N: *H-1 Upgrades*

B. Program Change Summary ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Previous President's Budget	3.772	32.830	0.000	0.000	0.000
Current President's Budget	4.044	32.694	60.498	0.000	60.498
Total Adjustments	0.272	-0.136	60.498	0.000	60.498
• Congressional General Reductions		-0.136			
• Congressional Directed Reductions		0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds		0.000			
• Congressional Directed Transfers		0.000			
• Reprogrammings	0.360	0.000			
• SBIR/STTR Transfer	-0.088	0.000			
• Program Adjustments	0.000	0.000	60.498	0.000	60.498
• Rate/Misc Adjustments	0.000	0.000	0.000	0.000	0.000

Change Summary Explanation

Technical: Not applicable.

Schedule: Bi-annual System Configuration Set (SCS) releases are planned to specifically address software upgrades & correction of deficiencies identified during OT. Schedule correction made to reflect LRIP IV Y (FY07) and FRP Y/LRIP Z (FY08/Lot 5) deliveries in 3Q FY2009 and 2Q FY2010, respectively.

FY11 from previous President's Budget is shown as zero because no FY11-15 data was presented in President's Budget 2010.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 2279: *4BW/4BN Upgrade*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
2279: *4BW/4BN Upgrade*	4.044	32.694	60.498	0.000	60.498	71.512	25.285	38.805	47.002	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

The mission of the AH-1W attack helicopter is to provide rotary wing close air support, anti-armor, armed escort, armed/visual reconnaissance, survivability enhancements, and fire support coordination capabilities under day/night and adverse weather conditions. The mission of the UH-1N utility helicopter is to provide command and control and combat assault support under day/night and adverse weather conditions and special operations support; supporting arms coordination and aeromedical evacuation. Major modifications for both aircraft include 168 AH-1W's converted to AH-1Z's, build 58 new AH-1Z's, remanufacture ten (10) H-1N helicopters and build 113 new UH-1Y models. Upgrades include: a new 4-bladed, composite rotor system with semi-automatic bladefold, new performance matched transmissions, T700 Engine Digital Electronic Control Units (DECUs), new 4-bladed tail rotors and drive systems, more effective stabilizers, upgraded landing gear, tail pylon structural modifications, and common, fully integrated cockpits and avionics systems. This upgrade will add 10,000 flight hours to AH-1Z/UH-1Y airframes. The fully integrated cockpits will reduce operator workload and improve situational awareness, thus increasing safety and reducing the rate of aircraft attrition. They will provide considerable growth potential for future weapon systems and avionics, which will significantly increase mission effectiveness and survivability. The cockpits will also include integration of onboard mission planning, communications, digital fire control, self-navigation, night navigation/targeting, and weapon systems management in nearly identical crew stations, which significantly reduces training requirements. This upgrade maximizes commonality between the two aircraft and provides needed improvements in crew and passenger survivability, payload, power available, endurance, range, airspeed, maneuverability and supportability.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Product Development	0.000	18.466	42.386	0.000	42.386
FY 2010 Plans: FY10: funding is for improvements to cuff/yoke, bladefold improvements, and avionics upgrades. Prime contractor will perform product development efforts including survivability enhancements, avionics upgrades, component testing, and fatigue testing.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2011 Base Plans: FY11: funding is for tail rotor blade improvements, fuel system upgrades, main rotor gear box run dry analysis, avionics upgrades, digital map development, and development of a Hellfire Joint Air to Ground Missile (JAGM) Launcher for the H-1. Prime contractor will perform product development efforts including survivability enhancements, avionics upgrades, component testing, and fatigue testing.					
Support Development *FY 2009 Accomplishments:* FY09 through FY11: Conduct development and test efforts to address operational testing results on both the UH-1Y and AH-1Z. *FY 2010 Plans:* FY10: UH-1Y and AH-1Z software development and test will correct deficiencies from prior test and allow incorporation of new weapons capabilities. *FY 2011 Base Plans:* FY11: Base: address AH-1Z phase III operational test results and conduct test to support additional Follow-on Operational Test and Evaluation (FOT&E).	1.324	5.991	3.462	0.000	3.462
Test and Evaluation *FY 2009 Accomplishments:* FY09: Conduct integrated test and the first FOT&E period for the UH-1Y to evaluate corrections of deficiencies discovered during OPEVAL phase II-C-2. *FY 2010 Plans:* FY10: Conduct integrated test events supporting preparations for AH-1Z OPEVAL Phase III and conduct phase III. Conduct Verification of Correction of Deficiencies on UH-1Y. Conduct integrated	0.100	2.928	4.073	0.000	4.073

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
test and the first FOT&E period for the UH-1Y to evaluate corrections of deficiencies discovered during OPEVAL phase II-C-2. *FY 2011 Base Plans:* FY11: Support integrated test of mission system enhancements and additional weapons capabilities, conduct FOT&E on both platforms.					
Program Management Support *FY 2009 Accomplishments:* FY09: Perform engineering analysis and technical support including risk analysis in support of test activities. *FY 2010 Plans:* FY10: Perform engineering analysis and technical support including risk analysis in support of development and operational test activities. *FY 2011 Base Plans:* FY11: Perform engineering analysis and technical support including risk analysis in support of development and operational test activities.	0.650	2.159	2.626	0.000	2.626
Software Support *FY 2009 Accomplishments:* FY09: Develop software solutions which correct deficiencies resulting from development and operational testing, technical data analysis, and system configuration set system development. *FY 2010 Plans:* FY10: Develop software solutions which correct deficiencies resulting from development and operational testing, technical data analysis, and system configuration set system development.	1.970	3.150	7.951	0.000	7.951

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 2279: *4BW/4BN Upgrade*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2011 Base Plans: FY11: Develop software solutions which correct deficiencies resulting from development and operational testing, technical data analysis, and system configuration set system development.					
Accomplishments/Planned Programs Subtotals	4.044	32.694	60.498	0.000	60.498

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• APN/017800: *UH-1Y/AH-1Z APN-1*	634.299	747.399	808.069	88.500	896.569	833.095	859.507	866.593	829.165	282.005	5,948.632

D. Acquisition Strategy

The USMC H-1 Upgrades is an ACAT 1D program which encompasses Engineering and Manufacturing Development of the new end-items prior to a production approval decision. The prime contract is a sole source to Bell Helicopter Textron, Inc.

E. Performance Metrics

Cuff/Yoke Step 2 funds the portion of the Cuff/Yoke to address fatigue life projections; this is part of the overall redesign effort that strives to achieve a minimum 1500 hour fatigue life for cuff/yoke and increases in static strength to restore maneuverability performance to the UH-1Y.

OPEVAL phase IIC3 on the AH-1Z will be completed in FY2010 to achieve a successful Milestone III Decision for the AH-1Z to proceed to Full Rate Production.

Complete design and development of H-1 Software Configuration Set 6.0 (SCS-6.0) provides several upgrades to H-1 capabilities including: Navigation non-editable reference point (NERP) data, Critical AFCS fixes, Aircraft Survivability Equipment (ASE) improvements, Joint Mission Planning System (JMPS) functionality, and critical Ground Proximity Warning system functionality to reduce incidents of Controlled Flight Into Terrain (CFIT). Conduct verification and validation lab, ground, and flight test of these functions with SCS-6.0 software.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	**R-1 ITEM NOMENCLATURE** PE 0604245N: *H-1 Upgrades*	**PROJECT** 2279: *4BW/4BN Upgrade*

Main Rotor Gear Box (MRGB) loss of lube prototype development and testing is an effort to meet the survivability requirement of 30-minutes of operation following a total loss of lubrication. The redesign, development, testing, qualification and deployment of the MRGB will allow the UH-1Y and AH-1Z to reduce their vulnerable area, and greatly improve upon the current 17-minute limitation. This improvement will increase the survival rate of the aircrew and aircraft, thereby improving operational availability and effectiveness of the platform to deployed aircraft.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 2279: *4BW/4BN Upgrade*

Product Development ($ in Millions)

				FY 2010		FY 2011 Base		FY 2011 OCO		FY 2011 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	SS/CPFF	BHTI Amarillo, TX	1,110.307	18.466	Dec 2009	37.937	Jan 2011	0.000		37.937	72.306	1,239.016	1,239.118
Primary Hardware Development	SS/CPFF	Various Various	0.000	0.000		3.703	Mar 2011	0.000		3.703	60.900	64.603	64.603
Systems Engineering1	Various/ Various	Various Various	3.810	0.000		0.000		0.000		0.000	0.000	3.810	Continuing
Systems Engineering2	WR	Various Various	74.674	0.000		0.000		0.000		0.000	0.000	74.674	Continuing
GFE	SS/CPFF	BHTI Amarillo, TX	24.708	0.000		0.000		0.000		0.000	0.000	24.708	24.708
		Subtotal	1,213.499	18.466		41.640		0.000		41.640	133.206	1,406.811	1,328.429

Remarks

Support ($ in Millions)

				FY 2010		FY 2011 Base		FY 2011 OCO		FY 2011 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support1	WR	Various Various	1.787	1.010	Dec 2009	1.200	Dec 2010	0.000		1.200	6.252	10.249	Continuing
Development Support2	WR	Various Various	14.487	0.000		0.000		0.000		0.000	0.000	14.487	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 2279: *4BW/4BN Upgrade*

Support ($ in Millions)

				FY 2010		FY 2011 Base		FY 2011 OCO		FY 2011 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Development	WR	NAWCAD Pax River, MD	0.000	0.900	Dec 2009	1.500	Dec 2010	0.000		1.500	8.399	10.799	Continuing
Software Development	WR	NAWCWD China Lake, CA	7.742	3.014	Dec 2009	7.939	Dec 2010	0.000		7.939	11.974	30.669	Continuing
Integrated Logistics Support	WR	Various Various	27.653	0.000		0.000		0.000		0.000	0.000	27.653	Continuing
		Subtotal	51.669	4.924		10.639		0.000		10.639	26.625	93.857	

Remarks

Test and Evaluation ($ in Millions)

				FY 2010		FY 2011 Base		FY 2011 OCO		FY 2011 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test and Evaluation	WR	NAWCAD Pax River, MD	35.322	2.928	Dec 2009	1.250	Nov 2010	0.000		1.250	15.193	54.693	Continuing
Developmental Test and Evaluation	Various/ Various	Various Various	14.906	0.000		0.000		0.000		0.000	0.000	14.906	Continuing
Operational Test and Evaluation1	WR	Various Various	19.744	4.081	Dec 2009	4.073	Nov 2010	0.000		4.073	6.267	34.165	Continuing
Operational Test and Evaluation2	WR	Various Various	2.406	0.000		0.000		0.000		0.000	0.000	2.406	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2011 Navy			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 2279: *4BW/4BN Upgrade*	

Test and Evaluation ($ in Millions)

				FY 2010		FY 2011 Base		FY 2011 OCO		FY 2011 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	72.378	7.009		5.323		0.000		5.323	21.460	106.170	

Remarks

Management Services ($ in Millions)

				FY 2010		FY 2011 Base		FY 2011 OCO		FY 2011 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Engineering Supt	C/FFP	Various Various	6.172	1.180	Oct 2009	1.430	Oct 2010	0.000		1.430	5.678	14.460	14.460
Procurement Fees	Various/ Various	Various Various	0.005	0.000		0.000		0.000		0.000	0.000	0.005	Continuing
Program Management Supt	C/CPFF	Various Various	9.649	0.775	Oct 2009	1.091	Dec 2010	0.000		1.091	5.212	16.727	16.727
Travel	WR	Various Various	3.920	0.340	Oct 2009	0.375	Oct 2010	0.000		0.375	1.889	6.524	Continuing
SBIR Assessment	WR	DEF Contractor Mgt CMD Various	0.072	0.000		0.000		0.000		0.000	0.000	0.072	Continuing
		Subtotal	19.818	2.295		2.896		0.000		2.896	12.779	37.788	31.187

Remarks

Exhibit R-3, RDT&E Project Cost Analysis: PB 2011 Navy			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 2279: *4BW/4BN Upgrade*	

	Total Prior Years Cost	FY 2010		FY 2011 Base		FY 2011 OCO		FY 2011 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,357.364	32.694		60.498		0.000		60.498	194.070	1,644.626	1,359.616

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 2279: *4BW/4BN Upgrade*

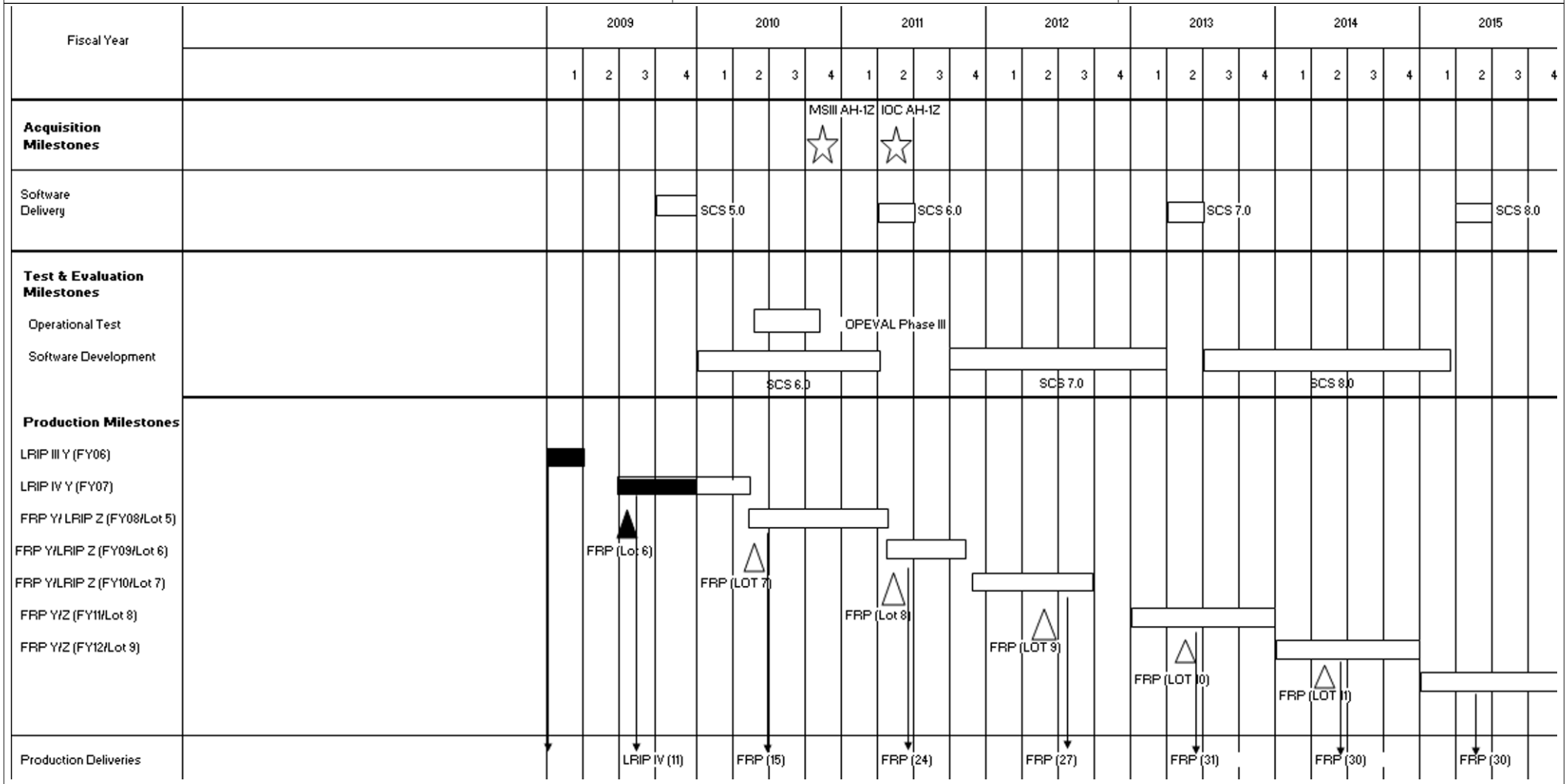

Exhibit R-4A, RDT&E Schedule Details: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 2279: *4BW/4BN Upgrade*

Schedule Details

	Start		End	
Event	Quarter	Year	Quarter	Year
Full Rate Production (FRP) Milestone III AH-1Z	4	2010	4	2010
IOC - AH-1Z	2	2011	2	2011
Operational Evaluation	2	2010	4	2010
SCS 5.0 Software Deliveries	4	2009	4	2009
SCS 6.0 Software Deliveries	2	2011	2	2011
SCS 7.0 Software Deliveries	2	2013	2	2013
SCS 8.0 Software Deliveries	2	2015	2	2015
SCS 6.0 Software Development	1	2010	1	2011
SCS 7.0 Software Development	4	2011	1	2013
SCS 8.0 Software Development	3	2013	1	2015
Low Rate Initial Production III Delivery	1	2009	1	2009
Low Rate Initial Production IV Delivery	3	2009	2	2010
Full Rate Production	3	2009	2	2014
Full Rate Production (FRP) Delivery	2	2010	4	2015