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**Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Navy** **DATE:** February 2011

<b>APPROPRIATION/BUDGET ACTIVITY</b>			<b>R-1 ITEM NOMENCLATURE</b>								
1319: <i>Research, Development, Test &amp; Evaluation, Navy</i>			PE 0604245N: <i>H-1 Upgrades</i>								
BA 5: <i>Development &amp; Demonstration (SDD)</i>											
<b>COST (\$ in Millions)</b>	<b>FY 2010</b>	<b>FY 2011</b>	<b>FY 2012 Base</b>	<b>FY 2012 OCO</b>	<b>FY 2012 Total</b>	<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
Total Program Element	31.332	60.498	72.569	-	72.569	28.060	44.711	47.537	48.297	Continuing	Continuing
2279: <i>4BW/4BN Upgrade</i>	31.332	60.498	72.569	-	72.569	28.060	44.711	47.537	48.297	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-1Ws converted to AH-1Zs, build 58 new AH-1Zs, 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 blade fold, 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. These upgrades 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. These upgrades maximize commonality between the two aircraft and provide needed improvements in crew and passenger survivability, payload, power available, endurance, range, airspeed, maneuverability and supportability.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2010</b>	<b>FY 2011</b>	<b>FY 2012 Base</b>	<b>FY 2012 OCO</b>	<b>FY 2012 Total</b>
Previous President's Budget	32.694	60.498	71.512	-	71.512
Current President's Budget	31.332	60.498	72.569	-	72.569
Total Adjustments	-1.362	-	1.057	-	1.057
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-0.504	-			
• SBIR/STTR Transfer	-0.753	-			
• Program Adjustments	-	-	1.563	-	1.563
• Section 219 Reprogramming	-0.104	-	-	-	-
• Rate/Misc Adjustments	-	-	-0.506	-	-0.506
• Congressional General Reductions Adjustments	-0.001	-	-	-	-

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<b>APPROPRIATION/BUDGET ACTIVITY</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy</i> BA 5: <i>Development &amp; Demonstration (SDD)</i>	<b>R-1 ITEM NOMENCLATURE</b> PE 0604245N: <i>H-1 Upgrades</i>
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**Change Summary Explanation**

Technical: Not applicable.

Schedule: Updated the Software Configuration Set (SCS) schedule from PB2011 to PB2012 budget submits for SCS 6.0 through SCS 8.0 to more accurately represent the entire 2 to 3 year software cycle which includes the requirements definition, design, development, verification, validation, test & evaluation, and delivery phases.

Lot 5 - Changes from 2Q10 to 3Q10 for first aircraft (AC) delivery due to a 1-month slip in contract award.

Lot 6 - Changes from 4Q11 to 4Q12 for AC delivery completions due to late receipt and award of FY09 and FY10 OCO and Supplemental funding.

Lot 7 - Changes from 2Q10 to 3Q10 for contract award due to delays associated with AH-1Z Low Rate Initial Production Acquisition Decision Memorandum approval.

Lot 7 - Changes from 3Q12 to 3Q14 for AC delivery completions due to late receipt and award of FY09 and FY10 OCO and Supplemental funding.

Lot 8 - Changes from 1Q13 to 4Q12 for first AC delivery due to current AC deliveries slightly ahead of schedule.

Lot 8 - Changes from 4Q13 to 4Q14 for AC delivery completion,

Lot 9 - Changes from 1Q14 to 1Q15 for first AC delivery, and 1Q15 to 4Q15 for delivery completion due to HMLA force structure realignment as stated in the 2011 USMC Aviation Plan (AVPLAN).

The overall procurement objective of 349 AC remains the same.

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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
2279: <i>4BW/4BN Upgrade</i>	31.332	60.498	72.569	-	72.569	28.060	44.711	47.537	48.297	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

**A. Mission Description and Budget Item Justification**

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**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
<b>Title:</b> Product Development	17.104	42.386	39.917	-	39.917
<b>Articles:</b>	0	0	0		0
<b>FY 2010 Accomplishments:</b> Completed contract for cuff and yoke analysis, main rotor gear box phase 2 analysis, and engineering analysis and reviewing proposal for testing to integrate Advanced Precision Kill Weapon System (APKWS) on the UH-1Y aircraft. Prime contractor is conducting product development efforts including survivability enhancements, weapons analysis, and fatigue analysis on air vehicle components.					
<b>FY 2011 Plans:</b> 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)					

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
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<p>Launcher for the H-1. Prime contractor will perform product development efforts including survivability enhancements, avionics upgrades, component testing, and fatigue testing.</p> <p><b>FY 2012 Base Plans:</b> Development efforts for cuff &amp; yoke redesign, tail rotor blade redesign study, main rotor gear box run dry analysis, avionics upgrades, digital map development, electronic publications development, and test and evaluation of a Target Sight System Digital Turret for the H-1. Prime contractor will perform product development efforts including survivability enhancements, cargo door redesign, avionics upgrades, air vehicle upgrades, and component fatigue testing.</p>					
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<p><b>Title:</b> Support Development</p> <p align="right"><b>Articles:</b></p> <p><b>FY 2010 Accomplishments:</b> Efforts completed include UH-1Y and AH-1Z software development and test to correct deficiencies from prior testing and allow incorporation of new weapons capabilities.</p> <p><b>FY 2011 Plans:</b> Conduct AH-1Z phase III operational test results and conduct test to support additional Follow-on Operational Test and Evaluation (FOT&amp;E).</p> <p><b>FY 2012 Base Plans:</b> Cuff and Yoke support of redesign and development efforts.</p>	5.991 0	3.462 0	1.000 0	-	1.000 0
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<p><b>Title:</b> Test and Evaluation</p> <p align="right"><b>Articles:</b></p> <p><b>FY 2010 Accomplishments:</b> Conduct integrated test events supporting preparations for AH-1Z Operational Evaluation (OPEVAL) Phase III and conduct Phase III. Conduct verification of correction of deficiencies on UH-1Y. Conduct integrated test and the first FOT&amp;E period for the UH-1Y to evaluate corrections of deficiencies discovered during OPEVAL Phase IIC2.</p> <p><b>FY 2011 Plans:</b></p>	2.928 0	4.073 0	1.750 0	-	1.750 0
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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2012 Navy				<b>DATE:</b> February 2011	
<b>APPROPRIATION/BUDGET ACTIVITY</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy</i> BA 5: <i>Development &amp; Demonstration (SDD)</i>		<b>R-1 ITEM NOMENCLATURE</b> PE 0604245N: <i>H-1 Upgrades</i>		<b>PROJECT</b> 2279: <i>4BW/4BN Upgrade</i>	
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>					
Support integrated test of mission system enhancements and additional weapons capabilities, conduct FOT&E on both platforms.					
<b>FY 2012 Base Plans:</b> Support integrated mission system enhancements and weapons capabilities. Conduct integrated FOT&E on the AH-1Z to evaluate correction of deficiencies discovered during OPEVAL phase II-C-3.					
<b>Title:</b> Program Management Support					
<b>Articles:</b>					
	2.159	2.626	3.819	-	3.819
	0	0	0		0
<b>FY 2010 Accomplishments:</b> Perform engineering analysis and technical support including risk analysis in support of development and operational test activities.					
<b>FY 2011 Plans:</b> Perform engineering analysis and technical support including risk analysis in support of development and operational test activities.					
<b>FY 2012 Base Plans:</b> Perform mission critical engineering and technical support including Cuff and Yoke analysis of technical data and review progress of development efforts.					
<b>Title:</b> Software Support					
<b>Articles:</b>					
	3.150	7.951	26.083	-	26.083
	0	0	0		0
<b>FY 2010 Accomplishments:</b> Develop software solutions which correct deficiencies resulting from development and operational testing, technical data analysis, and system configuration set system development.					
<b>FY 2011 Plans:</b> Develop software solutions which correct deficiencies resulting from development and operational testing, technical data analysis, and system configuration set system development.					
<b>FY 2012 Base Plans:</b>					

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Continue developing software solutions to correct deficiencies as part of System Configuration Set (SCS) 7.0 including digital map, data loader, tactical data communications, Aircraft Flight Control System (AFCS) and weapons upgrades/fixes.					
<b>Accomplishments/Planned Programs Subtotals</b>	31.332	60.498	72.569	-	72.569

**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
• APN/017800: <i>UH-1Y/AH-1Z</i> <i>APN-1</i>	745.983	896.569	768.616	30.000	798.616	776.368	853.029	824.918	824.321	2,652.088	10,758.359

**D. Acquisition Strategy**

The USMC H-1 Upgrades is an ACAT 1D program which encompasses Engineering and Manufacturing Development of 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.

Operational Evaluation phase IIC3 on the AH-1Z completed the 4th QTR of 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 System Configuration Set 6.0 (SCS-6.0) provides several upgrades to H-1 capabilities including: Navigation non-editable reference point 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. Conduct initial design and development efforts on H-1 SCS 7.0 including upgrades to capabilities: Data Loader; Digital Map; Tactical Digital Communication; Weapons Enhancements including JAGM and Advanced Precision Kill Weapon System (APKWS); and AFCS Maintenance Page which impacts the Mission Computer, Flight Control Computer, and Integrated Mechanical Diagnostic Health Usage Monitoring System (IMD HUMS).

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,

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<b>APPROPRIATION/BUDGET ACTIVITY</b>	<b>R-1 ITEM NOMENCLATURE</b>	<b>PROJECT</b>
1319: <i>Research, Development, Test &amp; Evaluation, Navy</i> BA 5: <i>Development &amp; Demonstration (SDD)</i>	PE 0604245N: <i>H-1 Upgrades</i>	2279: <i>4BW/4BN Upgrade</i>

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.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2012 Navy** **DATE:** February 2011

<b>APPROPRIATION/BUDGET ACTIVITY</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy</i> BA 5: <i>Development &amp; Demonstration (SDD)</i>	<b>R-1 ITEM NOMENCLATURE</b> PE 0604245N: <i>H-1 Upgrades</i>	<b>PROJECT</b> 2279: <i>4BW/4BN Upgrade</i>
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<b>Product Development (\$ in Millions)</b>				FY 2011		FY 2012 Base		FY 2012 OCO		FY 2012 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	13.097	35.040	Jan 2011	37.683	Jan 2012	-		37.683	56.393	142.213	142.213
Primary Hardware Development	SS/CPFF	Lockheed Martin:Orlando, FL	-	6.600	Jan 2011	-		-		-	0.000	6.600	6.600
Systems Engineering2	WR	NAWCAD:Pax River, MD	74.674	-		2.144	Nov 2011	-		2.144	5.129	81.947	
Prior year Cost no longer funded in the FYDP	Various	Various:Various	1,134.280	-		-		-		-	0.000	1,134.280	1,105.762
<b>Subtotal</b>			1,222.051	41.640		39.827		-		39.827	61.522	1,365.040	

<b>Support (\$ in Millions)</b>				FY 2011		FY 2012 Base		FY 2012 OCO		FY 2012 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	2.797	1.200	Dec 2010	-		-		-	0.000	3.997	
Development Support2	SS/CPFF	BHTI:Amarillo, TX	14.487	-		19.741	Dec 2011	-		19.741	74.259	108.487	108.487
Software Development	WR	NAWCAD:Pax River, MD	2.809	1.500	Dec 2010	-		-		-	0.000	4.309	
Software Development	WR	NAWCWD:China Lake, CA	11.126	7.939	Dec 2010	6.342	Dec 2011	-		6.342	25.665	51.072	
Prior year costs no longer funded in FYDP	Various	Various:Various	27.653	-		-		-		-	0.000	27.653	
<b>Subtotal</b>			58.872	10.639		26.083		-		26.083	99.924	195.518	

<b>Test and Evaluation (\$ in Millions)</b>				FY 2011		FY 2012 Base		FY 2012 OCO		FY 2012 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	38.250	1.250	Nov 2010	1.000	Nov 2011	-		1.000	0.000	40.500	
	WR		23.825	4.073	Nov 2010	1.750	Nov 2011	-		1.750	3.000	32.648	

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2012 Navy		<b>DATE:</b> February 2011
<b>APPROPRIATION/BUDGET ACTIVITY</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy</i> BA 5: <i>Development &amp; Demonstration (SDD)</i>	<b>R-1 ITEM NOMENCLATURE</b> PE 0604245N: <i>H-1 Upgrades</i>	<b>PROJECT</b> 2279: <i>4BW/4BN Upgrade</i>

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2012 Navy		<b>DATE:</b> February 2011
<b>APPROPRIATION/BUDGET ACTIVITY</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy</i> BA 5: <i>Development &amp; Demonstration (SDD)</i>	<b>R-1 ITEM NOMENCLATURE</b> PE 0604245N: <i>H-1 Upgrades</i>	<b>PROJECT</b> 2279: <i>4BW/4BN Upgrade</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>H-1 Upgrades</b>				
Acquisition Milestones: Milestones: Full Rate Production (FRP) Milestone III AH-1Z	4	2010	4	2010
Acquisition Milestones: Milestones: IOC - AH-1Z	2	2011	2	2011
Systems Development: Software Development: SCS 6.0 Software Development	1	2010	3	2011
Systems Development: Software Development: SCS 7.0 Software Development	2	2010	3	2013
Systems Development: Software Development: SCS 8.0 Software Development	1	2012	1	2015
Test & Evaluation: Operational Evaluation: Operational Evaluation	2	2010	4	2010
Production Milestones: Contract Awards: Lot 7	3	2010	3	2010
Production Milestones: Contract Awards: Lot 8	2	2011	2	2011
Production Milestones: Contract Awards: Lot 9	2	2012	2	2012
Production Milestones: Contract Awards: Lot 10	2	2013	2	2013
Production Milestones: Contract Awards: Lot 11	2	2014	2	2014
Production Milestones: Contract Awards: Lot 12	2	2015	2	2015
Production Milestones: Contract Awards: Lot 13	2	2016	2	2016
Deliveries: Software Deliveries: SCS 5.0 Software Deliveries	3	2010	3	2010
Deliveries: Software Deliveries: SCS 6.0 Software Deliveries	1	2012	1	2012
Deliveries: Software Deliveries: SCS 7.0 Software Deliveries	4	2013	4	2013
Deliveries: Software Deliveries: SCS 8.0 Software Deliveries	2	2015	2	2015
Deliveries: Aircraft Deliveries: Lot 5 FRP Y/LRIP Z	3	2010	2	2011
Deliveries: Aircraft Deliveries: Lot 6 FRP Y/LRIP Z	2	2011	4	2012
Deliveries: Aircraft Deliveries: Lot 7 FRP Y/LRIP Z	4	2011	3	2014
Deliveries: Aircraft Deliveries: Lot 8 FRP Y + Z	4	2012	4	2014

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<b>Events by Sub Project</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
Deliveries: Aircraft Deliveries: Lot 9 FRP Y + Z	1	2015	4	2015
Deliveries: Aircraft Deliveries: Lot 10 FRP Y + Z	1	2016	4	2016