Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Navy											DATE: April 2013	
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *System Development & Demonstration (SDD)*					R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*							
COST ($ in Millions)	**All Prior Years**	**FY 2012**	**FY 2013#**	**FY 2014 Base**	**FY 2014 OCO ##**	**FY 2014 Total**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**Cost To Complete**	**Total Cost**
Total Program Element	1,493.485	65.617	31.105	47.123	-	47.123	46.789	47.444	48.451	49.259	Continuing	Continuing
2279: *4BW/4BN Upgrade*	1,493.485	65.617	31.105	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1,590.207
3359: *H-1 Improvements*	0.000	0.000	0.000	47.123	-	47.123	46.789	47.444	48.451	49.259	Continuing	Continuing
MDAP/MAIS Code(s): 101												

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

Note

Efforts previously budgeted in Project 2279 are now budgeted in Project 3359 for FY 2014 through FY 2018.

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 37 AH-1Ws converted to AH-1Zs, build 152 new AH-1Zs, remanufacture ten (10) H-1N helicopters and build 150 new UH-1Y models. AH-1Z and UH-1Y models include a 4-bladed, composite rotor system with semi-automatic bladefold, performance-matched transmissions, T700 Engine Digital Electronic Control Units, 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 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, air-to-ground missile and air-launched intercept missile 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.

Follow-on improvements to sensors and weapons integration, avionics, and air vehicle components will address deficiencies, systems safety, obsolescence, reliability, supportability and cost growth issues. Improvements will include all associated System Configuration Set updates as well as integration and testing related to the aircraft platforms.

Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Navy					DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *System Development & Demonstration (SDD)*		R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*			
B. Program Change Summary ($ in Millions)	**FY 2012**	**FY 2013**	**FY 2014 Base**	**FY 2014 OCO**	**FY 2014 Total**
Previous President's Budget	67.569	31.105	47.226	-	47.226
Current President's Budget	65.617	31.105	47.123	-	47.123
Total Adjustments	-1.952	0.000	-0.103	-	-0.103
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.952	0.000			
• Rate/Misc Adjustments	0.000	0.000	-0.103	-	-0.103

Change Summary Explanation

Technical:

Cuff and Yoke (Step 3 Phase), redesign of the key life-limited components in the main rotor head system for life cycle cost savings, was curtailed when the return on investment data was evaluated with in-service data collected since EMD phase. The in-service cuff is the main life-limited component of the rotor system and has shown markedly better fatigue-life performance under demanding operating environmental conditions in theater than was predicted by the original conservative EMD modeling estimates and fatigue tests. Consequently, the in-service cuff life-limit was largely extended after review of fleet data and test data analyses. With the new cuff fatigue life-limit, the re-estimated total cost of redesign, manufacture, procurement, and supportability of the new improved system was projected to be only marginally better than the in-service design, especially if the in-service yoke capabilities are similar to the cuff. Therefore, the final activities associated with the redesign effort have been focused on additional fatigue and strength characterization of the in-service yoke component.

Mission computer hardware redesign investigation was initiated to assess the feasibility of addressing obsolescence, reliability, supportability and cost growth issues and was completed in FY 2012. The evaluation established that a Technical Refresh Mission Computer (TRMC) is needed to mitigate deficiencies, microelectronic parts obsolescence, information assurance/program security mandates and shortfalls, reduce Operation & Support costs beyond the Fiscal Year Defense Plan, and also be available for production incorporation in Lot 11 via System Configuration Set (SCS) 8.0. Consequently, TRMC redesign was commenced and a Preliminary Design Review was completed in 2Q12.

Schedule:

Software Development Schedule: Completion date for System Configuration Set (SCS) 6.0 was extended from 4Q12 to 2Q13 because of limited test aircraft availability. Rerouting of aircraft parts was required to support Operation Enduring Freedom in Afghanistan and standup of squadrons with H-1 Upgrades aircraft that were deployed OCONUS in Marine Expeditionary Units. Consequently, some functionality being developed in SCS 6.0 that required extensive flight testing, like Ground Proximity Warning System, will be moved to development and completion in SCS 7.0. Changes to SCS 8.0 PDR and Critical Design Review from 4Q13 and 2Q14 to 2Q12 & 4Q13 to reflect actual completion and current plan.

Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Navy	DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *System Development & Demonstration (SDD)*	**R-1 ITEM NOMENCLATURE** PE 0604245N: *H-1 Upgrades*

Cuff and Yoke Schedule: Preliminary Design Review, Critical Design Review, and Developmental Test are no longer required. See Technical Change Summary Explanation above.

Follow-on efforts not included in the baseline Engineering Manufacturing Development H-1 Upgrades ACAT 1C program have been moved from FY 2014 through the FYDP into Project Unit 3359, H-1 Improvements.

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy			DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *System Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 2279: *4BW/4BN Upgrade*	

COST ($ in Millions)	All Prior Years	FY 2012	FY 2013#	FY 2014 Base	FY 2014 OCO ##	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
2279: *4BW/4BN Upgrade*	1,493.485	65.617	31.105	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1,590.207
Quantity of RDT&E Articles	0	0	0	0		0	0	0	0	0		

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

Note

Efforts previously budgeted in Project 2279 are now budgeted in Project 3359 for FY 2014 through FY 2018.

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 37 AH-1Ws converted to AH-1Zs, build 152 new AH-1Zs, remanufacture ten (10) H-1N helicopters and build 150 new UH-1Y models. AH-1Z and UH-1Y models include a 4-bladed, composite rotor system with semi-automatic bladefold, performance-matched transmissions, T700 Engine Digital Electronic Control Units, 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 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, air-to-ground missile and air-launched intercept missile 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. Follow-on improvements to sensors and weapons integration, avionics, and air vehicle components will address deficiencies, obsolescence, reliability, supportability and cost growth issues. Improvements will include all associated System Configuration Set (SCS) updates as well as integration and testing related to the aircraft platforms.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2012	FY 2013	FY 2014
Title: Cuff and Yoke Redesign	1.379	0.000	0.000
Articles:	0		
FY 2012 Accomplishments:			

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *System Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 2279: *4BW/4BN Upgrade*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2012	FY 2013	FY 2014
Cuff and Yoke Redesign/Step 3 final development was curtailed. The program updated the Business Case Analysis and determined the business case no longer justified continued redesign because of increased development cost and increased projected component life of the existing cuff and yoke design.			
Title: System Configuration Set Development	38.957	17.422	0.000
Articles:	0	0	
FY 2012 Accomplishments: SCS 6.0 - complete developmental flight testing and transition to operational flight testing SCS 7.0 - continue hardware and software development efforts and begin flight testing phase SCS 8.0 - complete preliminary design review (PDR) including Technical Refresh of Mission Computer (TRMC). Continue hardware and software development efforts			
FY 2013 Plans: SCS 6.0 - complete operational flight testing SCS 7.0 - continue hardware and software development efforts and continue developmental flight testing phase SCS 8.0 - complete critical design review (CDR) of TRMC. Continue hardware and software development efforts.			
Title: Weapons and Sensors Testing and Integration	8.837	2.471	0.000
Articles:	0	0	
FY 2012 Accomplishments: Development, integration, and testing effort for Advanced Precision Kill Weapon System (APKWS) on the AH-1Z. Target Sight System (TSS) turret test and evaluation activities for hardware and infrared improvement efforts.			
FY 2013 Plans: Continue Target Sight System (TSS) turret test and evaluation activities for hardware and infrared improvement efforts. Aircraft stores development, integration, and testing effort including APKWS, the M299A1 launcher, and Air-Launched Intercept Missile on the AH-1Z.			
Title: Air Vehicle and Avionics Development	16.444	11.212	0.000
Articles:	0	0	
FY 2012 Accomplishments: Continue Tail Rotor Blade (TRB) Redesign. Main Rotor Gear Box (MRGB) "run dry" improvement. Initiate component fatigue testing of hardware components shown to have the highest return on investment for sustainment total ownership cost and cost per			

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *System Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 2279: *4BW/4BN Upgrade*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2012	FY 2013	FY 2014
flight hour management. Tech Refresh Mission Computer (TRMC) hardware redesign was commenced with a preliminary design review (PDR) completed in 2Q12. ***FY 2013 Plans:*** Continue TRB redesign efforts. Continue MRGB "run dry" and component improvement; focus on new sump, coating and filter components. Conduct avionics development & testing on Digital Map/Video Data Link, air vehicle development box, cargo door redesign, Crash Survivable Flight Incident Recorder, design of aircrew restraint system, and Full Motion Video to enhance digitization. Mission computer components obsolescence and regression testing. Continue TRMC hardware redesign with a critical design review (CDR) completed in 4Q13.			
Accomplishments/Planned Programs Subtotals	65.617	31.105	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2012	FY 2013	FY 2014 Base	FY 2014 OCO	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
• APN/017800: *UH-1Y/AH-1Z APN1*	739.971	820.391	820.962		820.962	817.518	846.874	925.548	962.579	933.874	10,881.402

Remarks

D. Acquisition Strategy

The USMC H-1 Upgrades is an ACAT 1C program which has completed Engineering and Manufacturing Development and is in Full Rate Production of UH-1Y and AH-1Z helicopters. Ongoing RDT&E projects are focused on improving reliability and maintainability of the current design, increasing warfighter capability, and enhancing safety and situational awareness characteristics of the aircraft. The prime production contract is a sole source to Bell Helicopter Textron, Inc.

E. Performance Metrics

Cuff and Yoke Redesign addresses fatigue life projections pursuant to Life Cycle Cost avoidance. Overall redesign effort strives to achieve a minimum 1500 hour fatigue life for cuff and yoke components and restores static strength to restore high-altitude performance to the UH-1Y.

Main Rotor Gear Box (MRGB) loss of lubrication 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 improvements will allow the UH-1Y and AH-1Z to reduce their vulnerable area and greatly improve upon the current 17-minute limitation. This effort will also increase the survival rate of the aircrew and aircraft through improved resistance to ballistic threats.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2014 Navy			DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *System Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 2279: *4BW/4BN Upgrade*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development2	SS/CPFF	BHTI:Amarillo, TX	12.724	2.813	May 2012	0.000		0.000		-		0.000	0.000	15.537	15.537
Systems Engineering	WR	NAWCAD:Pax River, MD	77.674	3.237	Nov 2011	1.483	Nov 2012	0.000		-		0.000	0.000	82.394	
Prior year Prod Dev Cost no longer funded in the FYDP	Various	Various:Various	1,193.750	1.973	May 2012	0.000		0.000		-		0.000	0.000	1,195.723	
		Subtotal	1,284.148	8.023		1.483		0.000		0.000		0.000	0.000	1,293.654	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Development	SS/CPFF	BHTI:Amarillo, TX	0.000	34.303	Mar 2012	3.408	Dec 2012	0.000		-		0.000	0.000	37.711	37.711
Software Development	WR	NAWCWD:China Lake, CA	19.065	10.568	Dec 2011	11.945	Dec 2012	0.000		-		0.000	0.000	41.578	
Prior year Support costs no longer funded in FYDP	Various	Various:Various	67.627	0.000		0.000		0.000		-		0.000	0.000	67.627	
		Subtotal	86.692	44.871		15.353		0.000		0.000		0.000	0.000	146.916	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test and Evaluation	WR	NAWCAD:Pax River, MD	52.550	7.969	Nov 2011	10.571	Nov 2012	0.000		-		0.000	0.000	71.090	
Operational Test and Evaluation1	WR	COMOPTEVFOR:Norfolk, VA	27.898	2.506	Nov 2011	2.333	Nov 2012	0.000		-		0.000	0.000	32.737	
Prior Year T&E cost no longer funded in FYDP	Various	Various:Various	17.312	0.000		0.000		0.000		-		0.000	0.000	17.312	
		Subtotal	97.760	10.475		12.904		0.000		0.000		0.000	0.000	121.139	

Exhibit R-3, RDT&E Project Cost Analysis: PB 2014 Navy		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *System Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 2279: *4BW/4BN Upgrade*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Engineering Supt	C/FFP	Various:Various	8.782	0.490	Dec 2011	0.490	Oct 2012	0.000		-		0.000	0.000	9.762	9.762
Program Management Supt	C/CPFF	Various:Various	11.515	1.265	Dec 2011	0.465	Dec 2012	0.000		-		0.000	0.000	13.245	13.245
Travel	WR	Various:Various	4.511	0.493	Oct 2011	0.410	Oct 2012	0.000		-		0.000	0.000	5.414	
Prior year Mgmt costs no longer funded in FYDP	Various	Various:Various	0.077	0.000		0.000		0.000		-		0.000	0.000	0.077	
		Subtotal	24.885	2.248		1.365		0.000		0.000		0.000	0.000	28.498	

	All Prior Years	FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,493.485	65.617		31.105		0.000		0.000		0.000	0.000	1,590.207	

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2014 Navy		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *System Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 2279: *4BW/4BN Upgrade*

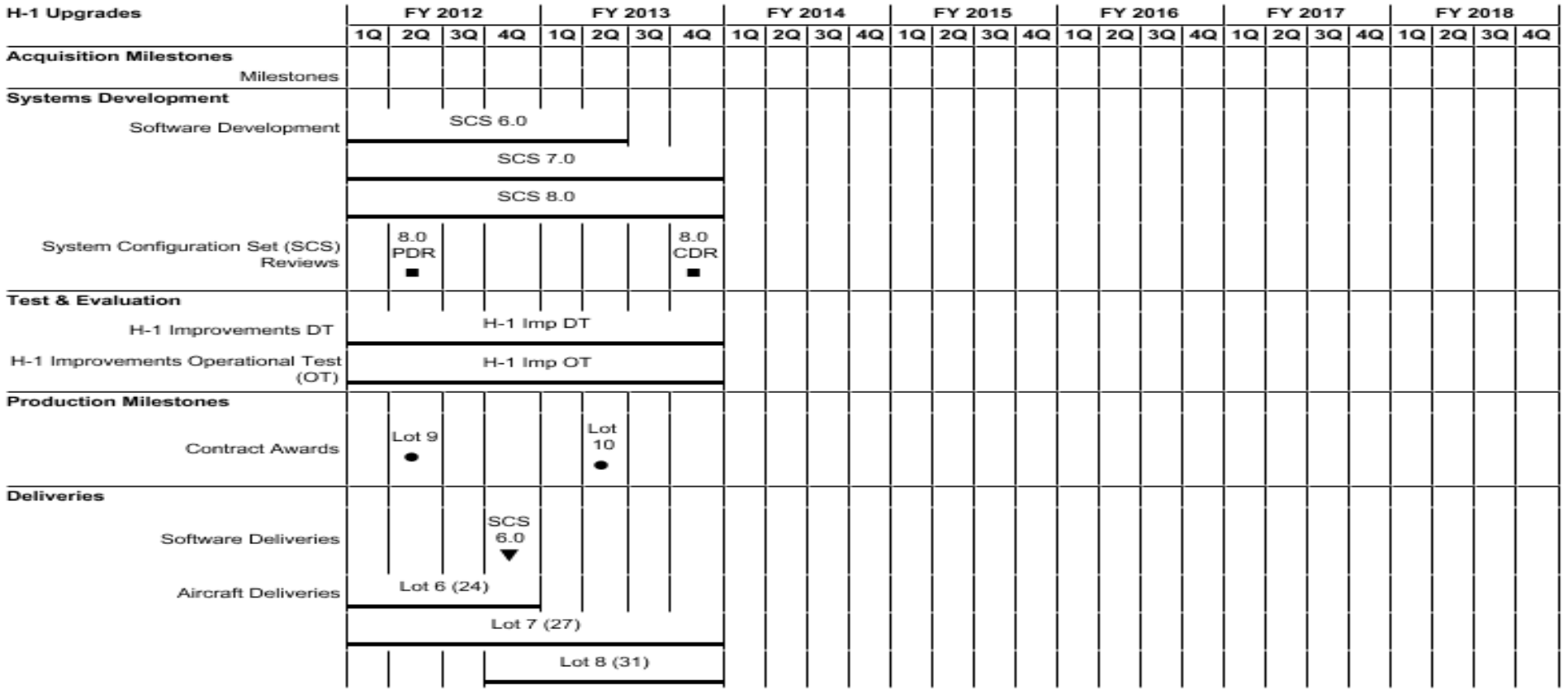

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Exhibit R-4A, RDT&E Schedule Details: PB 2014 Navy		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *System Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 2279: *4BW/4BN Upgrade*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
H-1 Upgrades				
Systems Development: Software Development: SCS 6.0 Software Development	1	2012	2	2013
Systems Development: Software Development: SCS 7.0 Software Development	1	2012	2	2014
Systems Development: Software Development: SCS 8.0 Software Development	1	2012	1	2015
Systems Development: System Configuration Set (SCS) Reviews: SCS 8.0 PDR	2	2012	2	2012
Systems Development: System Configuration Set (SCS) Reviews: SCS 8.0 CDR	4	2013	4	2013
Test & Evaluation: H-1 Improvements DT: H-1 Improvements DT	1	2012	1	2015
Test & Evaluation: H-1 Improvements Operational Test (OT): H-1 Improvements Operational Test (OT)	1	2012	4	2015
Production Milestones: Contract Awards: Lot 9	2	2012	2	2012
Production Milestones: Contract Awards: Lot 10	2	2013	2	2013
Deliveries: Software Deliveries: SCS 6.0 Software Deliveries	4	2012	4	2012
Deliveries: Software Deliveries: SCS 7.0 Software Deliveries	4	2014	4	2014
Deliveries: Software Deliveries: SCS 8.0 Software Deliveries	3	2015	3	2015
Deliveries: Aircraft Deliveries: Lot 6 FRP Y/LRIP Z	1	2012	4	2012
Deliveries: Aircraft Deliveries: Lot 7 FRP Y/LRIP Z	1	2012	4	2013
Deliveries: Aircraft Deliveries: Lot 8 FRP Y + Z	4	2012	4	2013

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy			DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *System Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 3359: *H-1 Improvements*	

COST ($ in Millions)	All Prior Years	FY 2012	FY 2013[#]	FY 2014 Base	FY 2014 OCO [##]	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
3359: *H-1 Improvements*	0.000	0.000	0.000	47.123	-	47.123	46.789	47.444	48.451	49.259	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0		0	0	0	0	0		

[#] FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

[##] The FY 2014 OCO Request will be submitted at a later date

Note

Efforts previously budgeted in Project 2279 are now budgeted in Project 3359 for FY 2014 through FY 2018.

A. Mission Description and Budget Item Justification

The objective of H-1 Improvements is to provide follow-on Research, Development, Test and Evaluation efforts in support of all H-1 aircraft.

H-1 Improvements include System Configuration Set (SCS) development and testing. SCS involves the integration of the entire set of airborne electronics connected via the 1553 data bus and includes much of the electronic hardware and software described in air vehicle, avionics, and sensors and weapons below. This includes correction of hardware and software deficiencies as identified through test and/or due to obsolescence issues.

Air vehicle improvements include analysis of structural data to formulate Damage Limits and Tolerances for structural components to reduce life cycle costs and maintenance workload; and redesign of structural components to minimize excessive and premature wear, increase reliability, and improve existing design deficiencies. Additional air vehicle upgrades include redesign of the aircraft power-generating components (generator, inverters, wiring) to support power requirements for existing and future systems (avionics, sensors and weapons) and to reduce aircraft weight.

Avionics improvements target situational awareness and pilot and aircrew safety by integrating Blue Force Tracking. Other improvements include degraded visual environment capability and joint precision landing system incorporation. Critical safety improvements include crash survivable flight incident recorder, collision avoidance, improved Embedded Global Positioning System/inertial navigation system for required navigation performance/area navigation, mission computer, digital operations & transfer systems, targeting sensor systems, digital interoperability networking, integration with aviation combat elements and Marine Air Ground Task Force using digitally aided close air support and streaming video. In addition, the goal is to reduce total ownership cost for H-1 aircraft and related support systems by improving reliability and maintainability in critical flight and avionics systems as well as by implementing fact-of-life obsolescence solutions by incorporating technology and information protection in critical avionics and sensor systems.

Sensors and weapons improvements include upgrades to Target Sight System and BRITE Star for hardware and infrared improvement efforts. Additionally, aircraft stores development, integration, and testing efforts including Advanced Precision Kill Weapon System, the M299A1 launcher, and Air-launched Intercept Missile on the AH-1Z are included.

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *System Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 3359: *H-1 Improvements*

These improvements will provide considerable growth potential for future weapon systems, air vehicle improvements, software improvements, and avionics upgrades, which will significantly increase mission effectiveness & survivability, while potentially reducing life cycle costs. The cockpits will also include integration of onboard mission planning, communications, digital fire control, self-navigation, night navigation/targeting, precision guided munitions, and air-launched intercept missile weapon systems management in nearly identical crew stations, which significantly reduce training requirements. These upgrades maximize commonality between all H-1 Type/Model/Series aircraft and provide needed improvements in crew and passenger reliability, survivability, payload, power available, endurance, range, airspeed, maneuverability and supportability.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2012	FY 2013	FY 2014
Title: System Configuration Set Development ***Articles:*** ***FY 2014 Plans:*** SCS 8.0- continue requirements definition and completion of design/development process. Correction of hardware and software correction of deficiencies as identified through test and/or due to obsolescence issues.	0.000	0.000	22.295 0
Title: Weapons and Sensors Testing and Integration ***Articles:*** ***FY 2014 Plans:*** Continue Target Sight System turret test and evaluation for hardware and infrared improvement efforts; initiate aircraft stores development, integration, and testing efforts including Advanced Precision Kill Weapon System, the M299A1 launcher, and Air-Launched Intercept Missiles on the AH-1Z.	0.000	0.000	6.787 0
Title: Air Vehicle Development and Testing ***Articles:*** ***FY 2014 Plans:*** Initiate redesign of structural components including UH-1Y floor boards attach beams/belly access panels, the elevator, the landing gear skid tubes, UH-1Y cargo doors, and the Improved Defensive Armament System; Environmental Control System/ Thermal Redesign to support cooling of Tech Refresh Mission Computer (TRMC)/Mission Computer (MC); redesign of the aircraft power generating components (generator, inverters, wiring) to support power requirements for existing and future system (avionics, sensors and weapons) and to reduce aircraft weight; and redesign of the environmental control system for cooling of the TRMC/MC, and redesign of the drive system components to increase reliability and reduce high cost and/or failure deficiencies.	0.000	0.000	15.356 0
Title: Avionics Development and Testing ***Articles:*** ***FY 2014 Plans:*** Continue avionics development & testing on Digital Map and data storage capability, avionics components obsolescence and regression testing begun in H2279; initiate development efforts on Terrain Awareness Warning System, which determines whether	0.000	0.000	2.685 0

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *System Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 3359: *H-1 Improvements*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2012	FY 2013	FY 2014
there is high risk of controlled flight into terrain in support of the Ground Proximity Warning System. Continue Full Motion Video design/development and digital interoperability efforts.			
Accomplishments/Planned Programs Subtotals	0.000	0.000	47.123

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Both UH-1Y and AH-1Z are currently in the follow on test and evaluation period. Planning and testing has begun to evaluate enhancements such as incorporating improvements to address critical reliability deficiencies, avionics upgrades to improve existing capability including sending/receiving data in battlefield conditions, additional weapons and sensor capabilities, and Engineering Change Proposals as they are funded and approved. Test and Evaluation Master Plan revisions will be developed in support of testing for future enhancements. Future engineering changes will be funded to correct deficiencies as identified by test and fleet usage. Additional upgrades to the aircraft will be completed incrementally as requirements are defined and funded.

E. Performance Metrics

System Configuration Set (SCS) 7.0 software delivery 2Q FY 2014. SCS 8.0 software delivery 2Q FY 2015. SCS 9.0 software delivery 2Q FY 2017. Successfully complete Developmental Test and Operational Test for H-1 Improvements.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2014 Navy			DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *System Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 3359: *H-1 Improvements*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	SS/CPFF	BHTI:Amarillo, TX	0.000	0.000		0.000		8.866	Jan 2014	-		8.866	8.900	17.766	17.766
Systems Engineering	WR	NAWCAD:Patuxent River, MD	0.000	0.000		0.000		0.951	Nov 2013	-		0.951	7.693	8.644	
		Subtotal	0.000	0.000		0.000		9.817		0.000		9.817	16.593	26.410	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Development	SS/CPFF	BHTI:Amarillo, TX	0.000	0.000		0.000		11.475	Feb 2014	-		11.475	40.269	51.744	51.744
Software Development	WR	NAWCWD:China Lake, CA	0.000	0.000		0.000		11.885	Dec 2013	-		11.885	60.270	72.155	
		Subtotal	0.000	0.000		0.000		23.360		0.000		23.360	100.539	123.899	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Operational Test and Evaluation	WR	COMOPTEVFOR:Norfolk, VA	0.000	0.000		0.000		2.163	Dec 2013	-		2.163	15.703	17.866	
Development Test and Evaluation	WR	NAWCAD:Patuxent River, MD	0.000	0.000		0.000		10.585	Nov 2013	-		10.585	53.811	64.396	
		Subtotal	0.000	0.000		0.000		12.748		0.000		12.748	69.514	82.262	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Engineering Support	Various	Various:Various	0.000	0.000		0.000		0.318	Jan 2014	-		0.318	1.271	1.589	1.589

Exhibit R-3, RDT&E Project Cost Analysis: PB 2014 Navy			DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *System Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 3359: *H-1 Improvements*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPFF	Various:Various	0.000	0.000		0.000		0.671	Dec 2013	-		0.671	2.685	3.356	3.356
Travel	WR	Various:Various	0.000	0.000		0.000		0.209	Aug 2014	-		0.209	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		0.000		1.198		0.000		1.198			

	All Prior Years	FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.000		47.123		0.000		47.123			

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2014 Navy		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *System Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 3359: *H-1 Improvements*

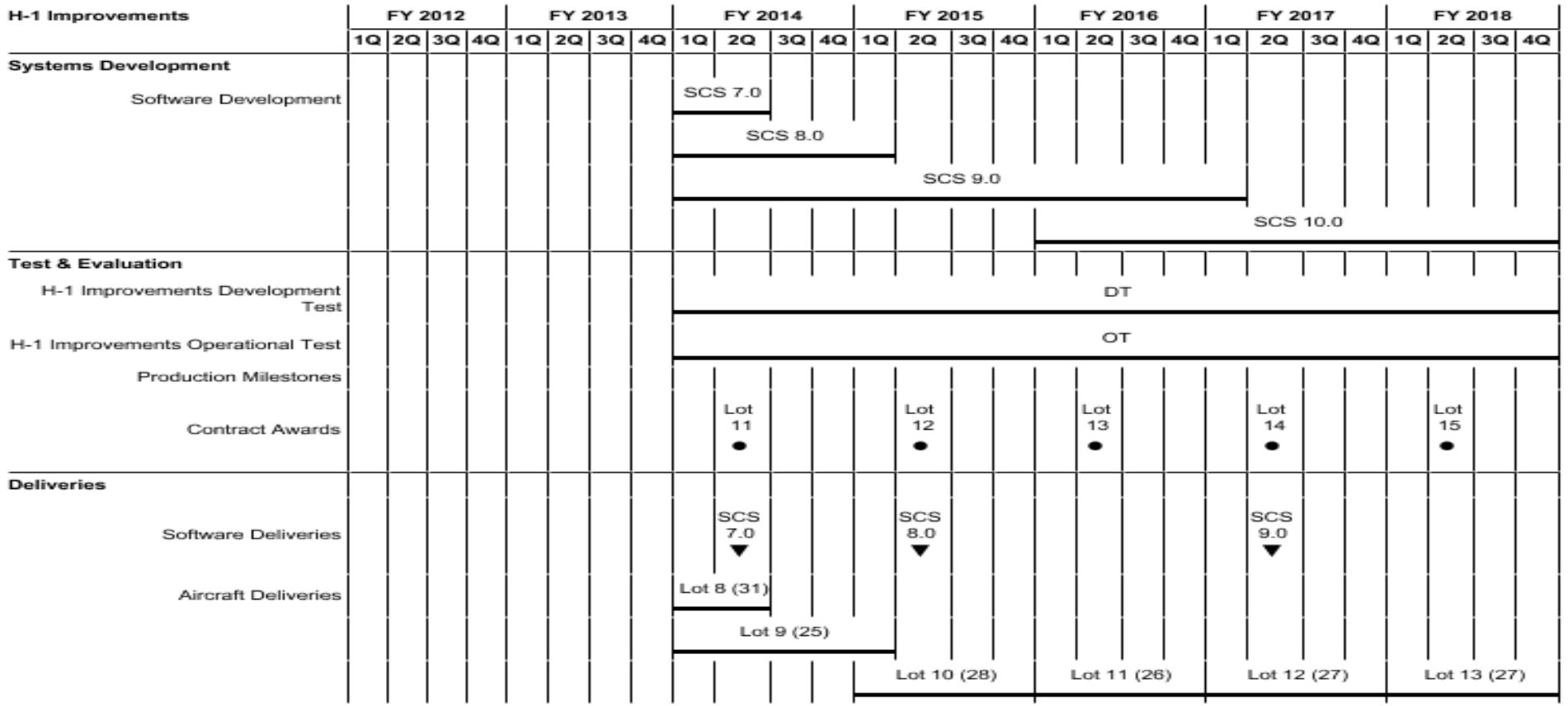

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Exhibit R-4A, RDT&E Schedule Details: PB 2014 Navy		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *System Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604245N: *H-1 Upgrades*	PROJECT 3359: *H-1 Improvements*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
H-1 Improvements				
Systems Development: Software Development: SCS 7.0 Software Development	1	2014	2	2014
Systems Development: Software Development: SCS 8.0 Software Development	1	2014	1	2015
Systems Development: Software Development: SCS 9.0 Software Development	1	2014	1	2017
Systems Development: Software Development: SCS 10.0 Software Development	1	2016	4	2018
Test & Evaluation: H-1 Improvements Development Test: H-1 Improvements Development Test	1	2014	4	2018
Test & Evaluation: H-1 Improvements Operational Test: H-1 Improvements Operational Test	1	2014	4	2018
Test & Evaluation: Contract Awards: Lot 11	2	2014	2	2014
Test & Evaluation: Contract Awards: Lot 12	2	2015	2	2015
Test & Evaluation: Contract Awards: Lot 13	2	2016	2	2016
Test & Evaluation: Contract Awards: Lot 14	2	2017	2	2017
Test & Evaluation: Contract Awards: Lot 15	2	2018	2	2018
Deliveries: Software Deliveries: SCS 7.0	2	2014	2	2014
Deliveries: Software Deliveries: SCS 8.0	2	2015	2	2015
Deliveries: Software Deliveries: SCS 9.0	2	2017	2	2017
Deliveries: Aircraft Deliveries: Lot 8 FRP Y + Z	1	2014	2	2014
Deliveries: Aircraft Deliveries: Lot 9 FRP Y + Z	1	2014	1	2015
Deliveries: Aircraft Deliveries: Lot 10 FRP Y + Z	1	2015	4	2015
Deliveries: Aircraft Deliveries: Lot 11 FRP Y + Z	1	2016	4	2016
Deliveries: Aircraft Deliveries: Lot 12 FRP Y + Z	1	2017	4	2017
Deliveries: Aircraft Deliveries: Lot 13 FRP Y + Z	1	2018	4	2018