Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319: Research, Development, Test & Evaluation, Navy I BA 5: System

R-1 Program Element (Number/Name)PE 0604212N *I Other Helicopter Development*

Development & Demonstration (SDD)

,												
COST (\$ in Millions)	Prior			FY 2019	FY 2019	FY 2019					Cost To	Total
COST (\$ III MIIIIOTIS)	Years	FY 2017	FY 2018	Base	oco	Total	FY 2020	FY 2021	FY 2022	FY 2023	Complete	Cost
Total Program Element	87.883	5.889	26.786	32.128	-	32.128	33.940	52.813	135.992	148.325	Continuing	Continuing
1109: <i>CH/MH-53</i>	53.448	4.554	17.500	16.969	-	16.969	16.042	9.120	2.601	2.662	Continuing	Continuing
2460: VH-3/VH-60	34.435	1.335	1.309	1.310	-	1.310	0.000	0.000	0.000	0.000	0.000	38.389
3406: Attack and Utility Replacement Aircraft	0.000	0.000	7.977	13.849	-	13.849	17.898	43.693	133.391	145.663	Continuing	Continuing

Program MDAP/MAIS Code: Project MDAP/MAIS Code(s): 390

A. Mission Description and Budget Item Justification

This Program Element includes funding for the development support for improvements to current systems for CH/MH-53, MH-60 development, VH-3/VH-60, and new development of Future Vertical Lift (FVL) capability. The H-53 is the premier heavy lift helicopter for the Marine Corps and the only operational airborne mine sweeping platform for the Navy. H-53 RDT&E efforts focus on trade studies and risk reduction measures to identify candidate survivability, safety, avionics, cargo handling, cockpit and other airframe specific improvements to extend the service life. The VH-3/VH-60 is required to provide safe and timely transportation for the President and Vice President of the United States, heads of state and others as directed by the White House Military Office. Future Vertical Lift (FVL) is a Joint Department initiative to address vertical lift capability requirements and determine feasible and affordable solutions in support of the Joint Warfighter.

B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	6.268	26.786	32.685	-	32.685
Current President's Budget	5.889	26.786	32.128	-	32.128
Total Adjustments	-0.379	0.000	-0.557	-	-0.557
 Congressional General Reductions 	-	-			
 Congressional Directed Reductions 	-	-			
 Congressional Rescissions 	-	-			
Congressional Adds	-	-			
 Congressional Directed Transfers 	-	-			
Reprogrammings	-	-			
SBIR/STTR Transfer	-0.079	0.000			
Rate/Misc Adjustments	0.000	0.000	-0.557	-	-0.557
 Congressional Directed Reductions 	-0.300	-	-	-	-
Adjustments					

PE 0604212N: Other Helicopter Development

Page 1 of 24

R-1 Line #104

Navy

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	
1319: Research, Development, Test & Evaluation, Navy I BA 5: System	PE 0604212N / Other Helicopter Development	
Development & Demonstration (SDD)		

Change Summary Explanation

The FY 2019 funding request was reduced by \$0.523 million to account for the availability of prior year execution balances.

Cost/Technical/Schedule:

1109 CH/MH-53: Not Applicable

2460 VH-3/VH-60: Not Applicable

3406 Attack and Utility Replacement Aircraft: Not Applicable

PE 0604212N: Other Helicopter Development Navy

Page 2 of 24

Exhibit R-2A, RDT&E Project Ju	stification:	PB 2019 N	lavy							Date: Febr	ruary 2018	
Appropriation/Budget Activity 1319 / 5					_	am Elemen 12N / Other ent	•	Project (N 1109 / CH/	t (Number/Name) CH/MH-53			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
1109: <i>CH/MH-53</i>	53.448	4.554	17.500	16.969	-	16.969	16.042	9.120	2.601	2.662	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 390

A. Mission Description and Budget Item Justification

The H-53 helicopter is the premier heavy lift helicopter for the Marine Corps and the only operational airborne mine sweeping platform for the Navy. H-53 efforts will continue to develop and qualify components, prior to production and approval decisions, in order to replace obsolete system components. Emphasis will be placed on supportability improvement modifications that will sustain the H-53 aircraft until the transition of the H-53K is complete. These efforts combined, will significantly improve the readiness of the H-53 fleet while reducing long term operational and supportability costs. Survivability efforts to address improved situational awareness to pilots will include improved Digital Interoperability and improve Degraded Visual Environment Awareness. Modeling and simulation will be used to the maximum practical extent throughout this effort. Manned Flight Simulator will be utilized to develop, install and test interim modifications to existing H-53 legacy avionics, while maintaining the original basic system footprint and functionality. As a part of this effort, a complete Electro Magnetic Vulnerability assessment will be required for the affected and/or modified systems.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)			FY 2019	FY 2019	FY 2019
	FY 2017	FY 2018	Base	oco	Total
Title: H-53 Avionics	1.480	2.848	3.716	0.000	3.716
Articles:	-	-	-	-	-
FY 2018 Plans:					
Integrate software applications for cockpit and avionics improvements, to include the development of new sensors. Investigate solutions to address the degraded visual environment. Develop flight control computer and test set design modifications to address anticipated obsolescence issues. Conduct Business Case Analyses to determine impact of high Operation and Support cost drivers and address alternatives to mitigate identified issues. Create basis for APR-39D(V)2 to improve digital interoperability and detection against radar guided threats.					
FY 2019 Base Plans: Integrate software applications for cockpit and avionics improvements, to include the development of new sensors. Develop flight control computer and test set design modifications to address anticipated obsolescence issues. Conduct Business Case Analyses to determine impact of high Operation and Support cost drivers and					

PE 0604212N: Other Helicopter Development

Navy

UNCLASSIFIED
Page 3 of 24

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: Febr	uary 2018		
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/I PE 0604212N / Other Helicopter Development	Project (Number/Name) 1109 / CH/MH-53					
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in	<u>ı Each)</u>	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
address alternatives to mitigate identified issues. Development and Integration Environmental Awareness to include coupled flight control capability.	of improved Degraded Visual						
FY 2019 OCO Plans: N/A							
FY 2018 to FY 2019 Increase/Decrease Statement: Increase of \$0.868M from FY 2018 to FY 2019 is due the test sets and develop Degraded Visual Environment integration.	ment efforts required for						
Title: H-53 Survivability	Articles:	0.440	1.296 -	1.472 -	0.000	1.472 -	
FY 2018 Plans: Perform trade studies, risk reduction, design, development, model, integration a survivability to include increased situational awareness via digital interoperability.							
FY 2019 Base Plans: Perform trade studies, risk reduction, design, development, model, integration a survivability to include increased situational awareness via digital interoperability							
FY 2019 OCO Plans: N/A							
FY 2018 to FY 2019 Increase/Decrease Statement: Increase of \$0.176M from FY 2018 to FY 2019 is due to the increase of require in the H-53E aircraft.	ments for situational awareness						
Title: H-53 Propulsion	Articles:	0.433	0.442	0.450	0.000	0.450	
FY 2018 Plans: Conduct Business Case Analyses to determine impact of high Operation and S and address alternatives to mitigate, as well as developing/integrating proposed with #2 engine fires.	upport Propulsion cost drivers						
FY 2019 Base Plans:							

PE 0604212N: Other Helicopter Development Navy

UNCLASSIFIED Page 4 of 24

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			,	Date: Febr				
	R-1 Program Element (Number /l PE 0604212N / Other Helicopter Development	Name)		ct (Number/Name) I CH/MH-53				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in	Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total		
Conduct Business Case Analyses to determine impact of high Operation and Si Develop, manufacture and test the new production T-64 fuel control prototype to reliability, while eliminating obsolescence issues.								
FY 2019 OCO Plans: N/A								
FY 2018 to FY 2019 Increase/Decrease Statement: There is no significant difference between FY 2018 and FY 2019.								
Title: Project Management Support	Articles:	0.726	1.620 -	1.652 -	0.000	1.652 -		
FY 2018 Plans: Provide in-house, field activity, and contractor support of IPTs to allow for studie of acquisition documentation and examination of equipment and avionics for the not limited to, government development support, engineering support, product regineering and logistics support, and travel for the H-53 program.	H-53. Efforts include, but are							
FY 2019 Base Plans: Provide in-house, field activity, and contractor support of IPTs to allow for studie of acquisition documentation and examination of equipment and avionics for the not limited to, government development support, engineering support, product rengineering and logistics support, and travel for the H-53 program.	H-53. Efforts include, but are							
FY 2019 OCO Plans: N/A								
FY 2018 to FY 2019 Increase/Decrease Statement: Increase of \$0.032M from FY 2018 to FY 2019 is due to the increase of system the fielding of Automated Logistics Environment and Degraded Visual Environment	• • • • •							
Title: H-53 Airframe	Articles:	1.475 -	2.175 -	1.554 -	0.000	1.554 -		
FY 2018 Plans: Develop software tool to support aircraft diagnostics, health monitoring and Fati will interface with Naval Enterprise Logistics Support Systems. The systems will	• · · · · ·							

PE 0604212N: Other Helicopter Development Navy

UNCLASSIFIED Page 5 of 24

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			·	Date: Febr	uary 2018			
complishments/Planned Programs (\$ in Millions, Article Quessing data, troubleshooting and documenting the technical nue to develop tools to study/analyze and qualify components, er to replace obsolete system components. Perform trade stuation and test activities for the H-53 airframe to include, but not ft structure, drive train, and various dynamic components. In pase Plans: I	R-1 Program Element (Number/I PE 0604212N / Other Helicopter Development	Name)	Project (Number/Name) 1109 / CH/MH-53					
B. Accomplishments/Planned Programs (\$ in Millions, Article Q	uantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total		
for processing data, troubleshooting and documenting the technical Continue to develop tools to study/analyze and qualify components, in order to replace obsolete system components. Perform trade stuintegration and test activities for the H-53 airframe to include, but no aircraft structure, drive train, and various dynamic components.	prior to production and approval decisions, dies, risk reduction, design, development,							
FY 2019 Base Plans: Develop software tool to support aircraft diagnostics, health monitor will interface with Naval Enterprise Logistics Support Systems. The for processing data, troubleshooting and documenting the technical Continue to develop tools to study/analyze and qualify components, in order to replace obsolete system components. Perform trade stu integration and test activities for the H-53 airframe to include, but no aircraft structure, drive train, and various dynamic components.	systems will provide a seamless environment updates required for the H-53 airframe. prior to production and approval decisions, dies, risk reduction, design, development,							
FY 2019 OCO Plans: N/A								
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease of \$0.621M from FY 2018 to FY 2019 is due to the comple	etion of ALE tasks in FY 2019.							
Title: APR-39D(V)2	Articles:	0.000	9.119	8.125 -	0.000	8.12		
FY 2018 Plans: Provide ability for consolidating digital interoperability and improve to guided threats. Corrects deficiencies from previous receiver by enable on the battlefield.								
FY 2019 Base Plans: Continue development and integration of APR-39D(V)2 to consolida probability of detection against radar guided threats. Corrects deficiently self protection from radar guided threats on the battlefield.								
FY 2019 OCO Plans:								

PE 0604212N: Other Helicopter Development Navy

UNCLASSIFIED Page 6 of 24

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (N	umber/Name)
1319 / 5	PE 0604212N / Other Helicopter	1109 <i>I CH/</i>	MH-53
	Development		

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A FY 2018 to FY 2019 Increase/Decrease Statement: Decrease of \$1.117M from FY 2018 to FY 2019 is due to the development efforts required by the Prime Contractor for APR-39D(V)2.					
Accomplishments/Planned Programs Subtotals	4.554	17.500	16.969	0.000	16.969

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

			FY 2019	FY 2019	FY 2019					Cost To	
<u>Line Item</u>	FY 2017	FY 2018	Base	000	<u>Total</u>	FY 2020	FY 2021	FY 2022	FY 2023	Complete	Total Cost
 APN/0528: H-53 Series 	61.665	39.662	70.997	-	70.997	63.509	54.582	66.231	74.253	148.869	2,117.080

Remarks

D. Acquisition Strategy

This is a non-ACAT program. H-53 RDT&E efforts will focus on trade studies and risk reduction measures to identify candidate survivability, interoperability, safety, avionics, cargo handling, cockpit and other airframe specific improvements to extend the service life.

E. Performance Metrics

Successfully perform studies, analysis and develop software to address emergent H-53 issues. Successfully support developmental and operation test activities to qualify aircraft modifications/upgrades.

PE 0604212N: Other Helicopter Development

Navy Page 7 of 24

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy Date: February 2018 Appropriation/Budget Activity R-1 Program Element (Number/Name) Project (Number/Name) 1319 / 5

PE 0604212N / Other Helicopter

Development

1109 *I CH/MH-53*

Product Developmen	t (\$ in Mi	illions)		FY 2	2017	FY 2	2018	FY 2 Ba	2019 se	FY 2		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To	Total Cost	Target Value of Contract
Systems Engineering	WR	NAWC AD : Patuxent River, MD	4.953	1.464	Nov 2016	1.618	Nov 2017	0.784	Nov 2018	-		0.784	Continuing	Continuing	Continuing
Systems Engineering Contract	C/CPFF	Sikorsky : Stratford, CT	0.482	0.614	Feb 2017	0.500	Feb 2018	0.000		-		0.000	0.000	1.596	1.596
Systems Engineering	WR	Various : Various	0.000	0.344	Nov 2016	0.600	Nov 2017	2.075	Nov 2018	-		2.075	Continuing	Continuing	Continuing
Design and Development	TBD	TBD : TBD	0.000	0.000		4.995	Mar 2018	2.218	Mar 2019	-		2.218	0.000	7.213	-
Systems Engineering Contract	TBD	TBD : TBD	0.000	0.000		0.000		2.100	Feb 2019	-		2.100	0.000	2.100	-
Prior Year Prod Dev no longer funded in the FYDP	TBD	TBD : TBD	19.475	0.000		0.000		0.000		-		0.000	0.000	19.475	-
		Subtotal	24.910	2.422		7.713		7.177		-		7.177	Continuing	Continuing	N/A

Support (\$ in Millions	s)			FY 2	2017	FY 2	2018	FY 2 Ba	2019 ise	FY 2	2019 CO	FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Development	Various	Various : Various	3.885	0.786	Dec 2017	4.876	Mar 2018	3.277	Mar 2019	-		3.277	Continuing	Continuing	Continuing
GFE	Various	NAWC AD : Patuxent River, MD	3.581	0.319	Nov 2016	0.137	Nov 2017	0.280	Nov 2018	-		0.280	Continuing	Continuing	Continuing
	Subtotal 7.4					5.013		3.557		-		3.557	Continuing	Continuing	N/A

Test and Evaluation	(\$ in Milli	ons)		FY 2	2017	FY 2	2018	FY 2 Ba	2019 ise	FY 2		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To	Total Cost	Target Value of Contract
Developmental Test & Evaluation	Various	Various : Various	7.980	0.407	Mar 2017	1.674	Mar 2018	3.065	Mar 2019	-		3.065	Continuing	Continuing	Continuing
		Subtotal	7.980	0.407		1.674		3.065		-		3.065	Continuing	Continuing	N/A

PE 0604212N: Other Helicopter Development Navy

UNCLASSIFIED Page 8 of 24

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy Date: February 2018 Appropriation/Budget Activity R-1 Program Element (Number/Name) Project (Number/Name)

1319 *l* 5 PE 0604212N / Other Helicopter

Development

1109 *I CH/MH-53*

Management Service	es (\$ in M	lillions)		FY 2	2017	FY 2	2018		2019 ase		2019 CO	FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering Support	WR	NAWC AD : Patuxent River, MD	6.514	0.538	Nov 2016	2.950	Nov 2017	2.920	Nov 2018	-		2.920	Continuing	Continuing	Continuing
Travel	Various	Various : Various	1.904	0.082	Oct 2016	0.150	Oct 2017	0.250	Oct 2018	-		0.250	Continuing	Continuing	Continuing
Prior Year Mgmt no longer funded in the FYDP	Various	Various : Various	4.674	0.000		0.000		0.000		-		0.000	0.000	4.674	-
		Subtotal	13.092	0.620		3.100		3.170		-		3.170	Continuing	Continuing	N/A
			Prior Years	FY 2	2017	FY	2018		2019 ase		2019 CO	FY 2019 Total	Cost To	Total Cost	Target Value of Contract
		Project Cost Totals	53.448	4.554		17.500		16.969		-		16.969	Continuing	Continuing	N/A

Remarks

PE 0604212N: Other Helicopter Development Navy

UNCLASSIFIED Page 9 of 24

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CH/MH-53			201				2018				2019				020			FY 202				FY 202					202	
	1Q	2Q	3Q	4Q	10	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q 2	<u> </u>	3Q	4Q	1Q	2Q	3Q	40	1Q	2Q	3Q	4Q	1Q	2Q	3Q	40
Acqusition Milestones Engineering Milestones		 	 	╢	╂	╢	┼				-	\dashv		ᆛ					┞	╀	-	<u> </u>		Н	 	 	╀	╀
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	Legacy P3I Efforts																											
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	Safety Upgrades																											
Test & Evaluation			1]	7	7	7]						П	\neg				П	Τ	7]]	7	1
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PE 0604212N: Other Helicopter Development Navy

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
ļ · · · · · · · · · · · · · · · · · · ·	R-1 Program Element (Number/Name) PE 0604212N / Other Helicopter Development	Project (N 1109 / CH/	umber/Name) /MH-53

Schedule Details

	St	art	E	nd
Events by Sub Project	Quarter	Year	Quarter	Year
CH/MH-53				
Engineering Milestones: - Obsolescence Issues/Studies	1	2017	4	2023
Engineering Milestones: - Survivability Analysis	1	2017	4	2023
Engineering Milestones: - Legacy P3I Efforts	1	2017	4	2023
Engineering Milestones: - Safety Upgrades	1	2017	4	2023
Test & Evaluation: APR-39D(V)2 Prototype Development	1	2018	4	2019
Test & Evaluation: APR-39D(V)2 Capability Analysis, Development & Integration	3	2019	2	2021
Production Milestones: Retrofit Kits-Base	2	2021	2	2021
Production Milestones: Retrofit Kits-Option	2	2022	2	2022
Deliveries: Kit Deliveries (APN)	2	2022	4	2022

Exhibit R-2A, RDT&E Project J	ustification:	: PB 2019 N	lavy							Date: Febi	ruary 2018	
Appropriation/Budget Activity 1319 / 5					_	12N / Other	i t (Number / Helicopter	Name)	Project (N 2460 / VH-	umber/Nar 3/VH-60	ne)	
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
2460: VH-3/VH-60	34.435	1.335	1.309	1.310	-	1.310	0.000	0.000	0.000	0.000	0.000	38.389
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Marine Helicopter Squadron One (HMX-1) is required to provide safe and timely transportation for the President and Vice President of the United States, heads of state and others as directed by the White House Military Office. Currently two Type, Model, Series aircraft are used by HMX-1 for the Presidential support mission - the VH-3D and the VH-60N. This project currently funds the VH Executive Helicopter's Aircraft Life Management Program (ALMP).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)			FY 2019	FY 2019	FY 2019
	FY 2017	FY 2018	Base	oco	Total
Title: VH Executive Helicopter Aircraft Life Management Program	1.335	1.309	1.310	0.000	1.310
Articles:	-	-	-	-	-
Description: VH Executive Helicopter Aircraft Life Management Program: Provides for management and improvement of all Executive Helicopter systems readiness including safety, operational weight, mission availability, structural integrity, component reliability, maintainability, software, and obsolescence issues as they arise.					
FY 2018 Plans: Provide government program management and engineering support for efforts associated with the Aircraft Life Management Program ensuring aircraft availability and mission readiness to the VH Executive Helicopters.					
FY 2019 Base Plans: Provide government program management and engineering support for efforts associated with the Aircraft Life Management Program ensuring aircraft availability and mission readiness to the VH Executive Helicopters.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: There is no significant difference between FY 2018 and FY 2019.					
Accomplishments/Planned Programs Subtotals	1.335	1.309	1.310	0.000	1.310

PE 0604212N: Other Helicopter Development Navy

UNCLASSIFIED
Page 12 of 24

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604212N / Other Helicopter Development	Project (Number/Name) 2460 / VH-3/VH-60
C. Other Program Funding Summary (\$ in Millions)	,	

			FY 2019	FY 2019	FY 2019					Cost To	
Line Item	FY 2017	FY 2018	Base	000	Total	FY 2020	FY 2021	FY 2022	FY 2023	Complete	Total Cost
 APN/056600: Executive 	63.754	38.787	23.566	-	23.566	8.930	28.795	60.897	77.239	Continuing	Continuing
Helicopters Series											

Remarks

Results of the Aircraft Life Management Program trade studies and risk reduction efforts will lead to modifications to be addressed through the program's Obsolescence Management Program and VH Comm Suite Upgrade Operational Safety and Improvement Programs as directed by the Deputy Secretary of Defense.

D. Acquisition Strategy

VH Executive Helicopter ALMP will include trade studies and risk reduction efforts necessary to address safety, operational weight, mission availability, structural integrity, component reliability, maintainability, software, and obsolescence issues as they arise.

E. Performance Metrics

Completion of VH Executive Helicopter Aircraft Life Management Program efforts.

PE 0604212N: Other Helicopter Development Navy

Page 13 of 24

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy

Appropriation/Budget Activity R-1 Program Element (Number/Name) Project (Number/Name)

1319 / 5 PE 0604212N / Other Helicopter 2460 / VH-3/VH-60

Development

FY 2019 FY 2019 FY 2019 **Product Development (\$ in Millions)** FY 2017 FY 2018 Base oco Total Contract Target Method Performing Prior Award Award Award Award **Cost To** Total Value of **Cost Category Item Activity & Location** Date Complete & Type Years Cost Cost Date Cost Date Cost Date Cost Cost Contract Sikorsky: Stratford, Systems Engineering SS/CPFF 8.675 0.000 0.000 0.000 0.000 0.000 8.675 8.675 Sikorsky: Stratford, Primary HW Development SS/CPFF 0.899 0.000 0.000 0.000 0.000 0.000 0.899 0.899 Rockwell Collins: Software Development SS/FFP 2.425 0.000 0.000 0.000 0.000 0.000 2.425 2.425 Cedar Rapids, IA NAWCAD : Patuxent Systems Engineering WR 1.987 0.000 0.000 0.000 0.000 0.000 1.987 River, MD

Test and Evaluation	(\$ in Milli	ons)		FY 2	2017	FY 2	2018	FY 2 Ba	2019 ise	FY 2		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Test & Evaluation-WBLoS	WR	NAWCAD : Patuxent River, MD	1.875	0.227	Nov 2016	0.299	Nov 2017	0.304	Nov 2018	-		0.304	0.000	2.705	-
		Subtotal	1.875	0.227		0.299		0.304		-		0.304	0.000	2.705	N/A

0.000

0.000

0.000

0.000

0.000

0.000

Management Service	s (\$ in M	illions)		FY 2	2017	FY 2	2018	FY 2 Ba		FY 2		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering Support	WR	NAWCAD : Patuxent River, MD	9.493	0.000	Nov 2016	0.000	Nov 2017	0.000	Nov 2018	-		0.000	0.000	9.493	-
Program Management Support	WR	NAWCAD : Patuxent River, MD	2.208	1.026	Nov 2016	0.960	Nov 2017	0.958	Nov 2018	-		0.958	0.000	5.152	-

PE 0604212N: Other Helicopter Development

Various

Various

Various : Various

Various: Various

Subtotal

0.607

5.321

19.914

0.000

0.000

0.000

Systems Engineering

Navy

Prior Year Prod Dev no

longer funded in the FYDP

UNCLASSIFIED
Page 14 of 24

R-1 Line #104

0.000

0.000

0.000

0.000

0.000

0.000

0.607

5.321

19.914

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy

Appropriation/Budget Activity

R-1 Program Element (Number/Name)

Project (Number/Name)

PE 0604212N / Other Helicopter

nnment

Development

2460 I VH-3/VH-60

Management Servic	es (\$ in M	illions)		FY 2	2017	FY 2	2018	FY 2 Ba	2019 ise	FY 2	2019 CO	FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
System Engineering	SS/CPFF	NAVSEA : Washington Navy Yard, DC	0.600	0.030	Nov 2016	0.020	Nov 2017	0.020	Nov 2018	-		0.020	0.000	0.670	0.671
Travel	Various	Various : Various	0.345	0.052	Oct 2016	0.030	Oct 2017	0.028	Oct 2018	-		0.028	0.000	0.455	-
		Subtotal	12.646	1.108		1.010		1.006		-		1.006	0.000	15.770	N/A
									1						Target

	Prior Years	FY 2017	FY 2	018	FY 2 Ba	FY 2		9 Cost To		Target Value of Contract
Project Cost Totals	34.435	1.335	1.309		1.310	-	1.3	10 0.000	38.389	N/A

Remarks

1319 / 5

PE 0604212N: Other Helicopter Development Navy

UNCLASSIFIED
Page 15 of 24

hibit R-4, RDT&E Schedule Profile: PB 2019 N	avy																			Date	: Fel	brua	ary 2	018		
propriation/Budget Activity 19 / 5						PE	060	ogran 4212 omen	N / O					Nan	ne)				t (Number/Name) VH-3/VH-60							
	FY	2017	7		FY 20	18		FY 2	2019			FY 2	2020		F	Y 2	021		ı	FY 2	2022		F	Y 20	23	
	1 2	2 3	4	1	2 3	3 4	. 1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3 4	4
VH-3/VH-60		· ·														,	,									
Engineering Milestones: VH-3D / VH-60N ALMP																										-
Engineering Milestones: Systems Development: VH Comms Upgrade Aircraft Prototype Engineering and Flight Test																										
Engineering Milestones: Systems Development: VH Comms Upgrade System Integration																										
Engineering Milestones: Systems Development: VH Comms Upgrade Software Integration																										

PE 0604212N: Other Helicopter Development Navy

UNCLASSIFIED Page 16 of 24

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 5	,	Project (N 2460 / VH-	umber/Name) 3/VH-60

Schedule Details

	St	art	E	nd
Events by Sub Project	Quarter	Year	Quarter	Year
VH-3/VH-60		-		
Engineering Milestones: VH-3D / VH-60N ALMP	1	2017	4	2019
Engineering Milestones: Systems Development: VH Comms Upgrade Aircraft Prototype Engineering and Flight Test	1	2017	2	2017
Engineering Milestones: Systems Development: VH Comms Upgrade System Integration	1	2017	3	2017
Engineering Milestones: Systems Development: VH Comms Upgrade Software Integration	1	2017	3	2017

Exhibit R-2A, RDT&E Project Ju	ustification:	PB 2019 N	lavy							Date: Febr	uary 2018	
Appropriation/Budget Activity 1319 / 5					R-1 Progra PE 060421 Developme	12N / Other	•	Name)	,	umber/Nan	ne) ty Replacen	nent
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3406: Attack and Utility Replacement Aircraft	0.000	0.000	7.977	13.849	-	13.849	17.898	43.693	133.391	145.663	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Future Vertical Lift (FVL) is a Joint Department initiative to address vertical lift capability requirements and determine feasible and affordable solutions in support of the Joint Warfighter. The FVL Capability Set 3 (CS3) program, led by the Department of the Army, will develop and field a replacement for US Army and USMC aircraft with a more capable, maintainable, and reliable rotorcraft to meet the needs of the services. FVL will provide unmatched strategic, operational, and tactical agility to perform a multitude of missions currently unachievable by any conventionally configured rotorcraft. FVL will be a force multiplier with superior performance, payload, survivability, agility, endurance, and reliability that enables warfighters to win in a complex world. FVL offers revolutionary operational opportunities over current Vertical Take Off Landing (VTOL) aircraft and will field by 2031.

The Marine Corps FVL requirements emphasize range and speed similar to the MV-22. FVL will increase the Marine Air Ground Task Force's (MAGTF) capacity of long-range fires. FVL will utilize DOTmLPF-P that will include all facets of a program with particular focus on life-cycle cost reductions through common processes, support equipment, logistic support and component commonality utilizing non-materiel solutions, such as maintenance strategies, training solutions, and infrastructure requirements. The air vehicle will include primary mechanical, electrical, pneumatic, and structural components such as drivetrain, generators, landing gear, pumps, controls, seats, etc. The mission subsystems will include all on- and off-board components with embedded control software for those components that provide all mission functionality, cockpit displays, cockpit hardware subsystem controllers, and interfaces. The architecture will include the fundamental organization of the complete system, the processing method/component(s), the system level software, the operating environment, and the on-aircraft infrastructure to facilitate integration of all subsystems and platform.

FVL is a new start in FY2018.

Navy

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)			FY 2019	FY 2019	FY 2019
	FY 2017	FY 2018	Base	oco	Total
Title: Future Vertical Lift	0.000	7.977	13.849	0.000	13.849
Articles:	-	-	-	-	-
FY 2018 Plans:					
Provide initial support for Future Vertical Lift (FVL) Analysis of Alternatives (AoA) to assess the technical					
feasibility, technical risk, and affordability of potential strategic solutions with the intent to develop the next					
generation of rotary wing aircraft supporting new Vertical Take Off Landing capabilities common with the US					
Army. Tasks to be performed include but are not limited to: AoA support, Acquisition Program Management					

PE 0604212N: Other Helicopter Development

UNCLASSIFIED
Page 18 of 24

EXHIBIT N-ZA, ND I &E PTOJECT JUSTINICATION. FD 20 19 NAVY				Date: February 2018				
ions, Engineering modeling and analysis, TEMP development, elopment Document development, and design trade studies an ciated systems. These efforts will include but not be limited to typing of Air Vehicle, Avionics, Propulsion and Dynamics, Confire Control, Human Systems Integration, Survivability and Vulagement, Reliability and Maintainability, Training, Logistics, Se /Flight Control, and Software/Hardware architecture. Support stry and academia such as Naval Research Labs, DARPA, John FVL contract awards for FY18 could be contract support serventract actions will be smaller scale efforts to support the overal modeling and support for Future Vertical Lift (FVL) Analysis of Alterbility, technical risk, and affordability of potential strategic solutination of rotary wing aircraft supporting new Vertical Take Off Information of rotary wing aircraft supporting new Vertical Take Off Information. Tasks to be performed include but are not limited to: AoA scions, Engineering modeling and analysis, TEMP development, elopment Document development, and design trade studies an	R-1 Program Element (Number/Na PE 0604212N / Other Helicopter Development	ame)						
B. Accomplishments/Planned Programs (\$ in Millions, Article		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total		
functions, Engineering modeling and analysis, TEMP development Development Document development, and design trade studies a associated systems. These efforts will include but not be limited to prototyping of Air Vehicle, Avionics, Propulsion and Dynamics, Cotand Fire Control, Human Systems Integration, Survivability and V Management, Reliability and Maintainability, Training, Logistics, SVMS/Flight Control, and Software/Hardware architecture. Support industry and academia such as Naval Research Labs, DARPA, John Initial FVL contract awards for FY18 could be contract support set All contract actions will be smaller scale efforts to support the over FY 2019 Base Plans: FY 2019 Base Plans: FY 2019 BASE PLANS WEAPONS AND SENSORS TESTING A Continue initial support for Future Vertical Lift (FVL) Analysis of A feasibility, technical risk, and affordability of potential strategic sol generation of rotary wing aircraft supporting new Vertical Take Of Army. Tasks to be performed include but are not limited to: AoA functions, Engineering modeling and analysis, TEMP development Development Document development, and design trade studies a associated systems. These efforts will include but not be limited to prototyping of Air Vehicle, Avionics, Propulsion and Dynamics, Coand Fire Control, Human Systems Integration, Survivability and V Management, Reliability and Maintainability, Training, Logistics, SVMS/Flight Control, and Software/Hardware architecture. Support industry and academia such as Naval Research Labs, DARPA, Jopartners. Continued FVL contract awards for FY19 could be contract support industry and academia such as Naval Research Labs, DARPA, Jopartners.	and prototyping on the Air Vehicle and all o studies, virtual simulation, conceptual design, immunications and Navigation, Weapons ulnerability, Missions and Missions Systems ensor, Pilotage and Targeting Systems, it for these efforts will come from government, ohn Hopkins APL, various industry partners. Vices, academia, or industry quick turn studies. rall initial AoA effort. ND INTEGRATION: Iternatives (AoA) to assess the technical utions with the intent to develop the next of Landing capabilities common with the US support, Acquisition Program Management in the System Specification and Draft Capability and prototyping on the Air Vehicle and all o studies, virtual simulation, conceptual design, immunications and Navigation, Weapons ulnerability, Missions and Missions Systems ensor, Pilotage and Targeting Systems, it for these efforts will come from government, ohn Hopkins APL, and various industry							

PE 0604212N: Other Helicopter Development Navy

UNCLASSIFIED
Page 19 of 24

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		'	Date: February 2018
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604212N / Other Helicopter Development	, ,	umber/Name) ack and Utility Replacement

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A FY 2018 to FY 2019 Increase/Decrease Statement: Increase of \$5.872M from FY 2018 to FY 2019 is due to Future Vertical Lift (FVL) requirements for the Marine Air Ground Task Force's (MAGTF).					
Accomplishments/Planned Programs Subtotals	0.000	7.977	13.849	0.000	13.849

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

N/A

Navy

Remarks

D. Acquisition Strategy

The Army plans to initiate an Analysis of Alternatives (AoA) in the 3rd Quarter FY 2017 to begin the assessment of the technical feasibility, operational feasibility, technical risk, and affordability of potential solutions. The AoA will take advantage of previous studies, ongoing Advanced Technology Development Science & Technology (S&T) projects, and input from Government, Industry and Academia. The results of the AoA and Technology Readiness Assessments will be used to assist in determining if a Milestone A or Milestone B entry is appropriate. Once the appropriate Milestone entry point has been determined, the program will enter at the appropriate Milestone with an appropriate RFP Release. The program will complete development and testing of the most cost effective system before entering the Production and Deployment phase in the FY2031 timeframe.

E. Performance Metrics

A studies and analysis contract will be awarded 2Q FY 2018.

PE 0604212N: Other Helicopter Development

Page 20 of 24

UNCLASSIFIED

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Exhibit R-3, RDT&E	Project C	ost Analysis: PB 2	019 Navy	,								Date:	February	2018	
Appropriation/Budg 1319 / 5	et Activity	1					4212N / C		lumber/Na icopter	ame)		(Number Attack and	,	eplaceme	nt
Product Developme	ent (\$ in M	illions)		FY 2	017	FY 2	2018	FY 2	2019 ise		2019 CO	FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To	Total Cost	Target Value of Contrac
Primary Hardware Development	C/CPFF	TBD : TBD	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuir
		Subtotal	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	N/A
Support (\$ in Million	ns)			FY 2	017	FY 2	2018	FY 2	2019 ise		2019 CO	FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To	Total Cost	Target Value of Contract
D 1 10 1	WR	TBD : TBD	0.000	0.000		4.850	Mar 2018	3.740	Jan 2019	-		3.740	Continuing	Continuing	Continuin
Development Support	VVIX	100.100	0.000												
Development Support	VVIX	Subtotal	0.000	0.000		4.850		3.740		-		3.740	Continuing	Continuing	N/A
Test and Evaluation		Subtotal			017	4.850 FY 2	2018	FY 2			2019 CO	3.740 FY 2019 Total	Continuing	Continuing	N/A
		Subtotal		0.000	017 Award Date		2018 Award Date	FY 2	2019			FY 2019	Cost To Complete	Continuing Total Cost	Target Value of
Test and Evaluation	(\$ in Milli Contract Method	Subtotal Ons) Performing	0.000	0.000 FY 2	Award	FY 2	Award	FY 2 Ba	2019 ase Award	00	CO Award	FY 2019 Total	Cost To	Total Cost	Target Value of Contract
Test and Evaluation Cost Category Item Development Test and	Contract Method & Type	Ons) Performing Activity & Location	0.000 Prior Years	0.000 FY 2 Cost	Award	FY 2 Cost 0.575	Award Date	FY 2 Ba	Award Date Nov 2018	00	CO Award	FY 2019 Total Cost	Cost To Complete	Total Cost Continuing	Target Value of Contract
Test and Evaluation Cost Category Item Development Test and Evaluation	Contract Method & Type WR	Ons) Performing Activity & Location TBD : TBD	O.000 Prior Years 0.000	0.000 FY 2 Cost 0.000	Award	FY 2 Cost 0.575	Award Date Mar 2018	FY 2 Ba Cost 0.587	Award Date Nov 2018 Jan 2019	Cost	CO Award	FY 2019 Total Cost 0.587 6.929	Cost To Complete Continuing	Total Cost Continuing	Target Value of Contract Continuin
Test and Evaluation Cost Category Item Development Test and Evaluation	Contract Method & Type WR C/CPFF	Performing Activity & Location TBD : TBD TBD : TBD Subtotal	0.000 Prior Years 0.000 0.000	0.000 FY 2 Cost 0.000 0.000	Award Date	Cost 0.575 0.175	Award Date Mar 2018 Mar 2018	FY 2 Ba Cost 0.587 6.929 7.516	Award Date Nov 2018 Jan 2019	Cost -	CO Award	FY 2019 Total Cost 0.587 6.929	Cost To Complete Continuing	Total Cost Continuing	Target Value of Contract Continuin
Test and Evaluation Cost Category Item Development Test and Evaluation Studies and Anaylsis	Contract Method & Type WR C/CPFF	Performing Activity & Location TBD : TBD TBD : TBD Subtotal	0.000 Prior Years 0.000 0.000	0.000 FY 2 Cost 0.000 0.000 0.000	Award Date	Cost 0.575 0.175 0.750	Award Date Mar 2018 Mar 2018	FY 2 Ba Cost 0.587 6.929 7.516	2019 ase Award Date Nov 2018 Jan 2019	Cost -	Award Date	FY 2019 Total Cost 0.587 6.929 7.516 FY 2019	Cost To Complete Continuing	Total Cost Continuing	Target Value of Contract Continuin N// Target Value of
Test and Evaluation Cost Category Item Development Test and Evaluation Studies and Anaylsis Management Service	Contract Method & Type WR C/CPFF ces (\$ in M	Performing Activity & Location TBD : TBD TBD : TBD Subtotal illions)	0.000 Prior Years 0.000 0.000 0.000	0.000 FY 2 Cost 0.000 0.000 0.000	Award Date	Cost 0.575 0.175 0.750 FY 2	Award Date Mar 2018 Mar 2018 2018 Award	Cost 0.587 6.929 7.516 FY 2 Ba	Award Date Nov 2018 Jan 2019 2019 ase Award	Cost	Award Date	FY 2019 Total Cost 0.587 6.929 7.516 FY 2019 Total Cost	Cost To Complete Continuing Continuing Continuing	Total Cost Continuing Continuing Continuing Total Cost	Target Value of Contract Continuin N// Target Value of Contract
Test and Evaluation Cost Category Item Development Test and Evaluation Studies and Anaylsis Management Service Cost Category Item Contractor Engineering	Contract Method & Type WR C/CPFF ces (\$ in M Contract Method & Type	Subtotal Ons) Performing Activity & Location TBD : TBD TBD : TBD Subtotal illions) Performing Activity & Location	Prior Years 0.000 0.000 0.000 Prior Years	0.000 FY 2 Cost 0.000 0.000 FY 2 Cost	Award Date	FY 2 Cost 0.575 0.175 0.750 FY 2 Cost 0.100	Award Date Mar 2018 Mar 2018 2018 Award Date	FY 2 Ba Cost 0.587 6.929 7.516 FY 2 Ba Cost 0.000	Award Date Nov 2018 Jan 2019 2019 ase Award Date	Cost Cost Cost	Award Date	FY 2019 Total Cost 0.587 6.929 7.516 FY 2019 Total Cost 0.000	Cost To Complete Continuing Continuing Continuing Continuing	Total Cost Continuing Continuing Continuing Total Cost Continuing	Target Value of Contract Continuin N// Target Value of Contract Continuin

PE 0604212N: Other Helicopter Development Navy

UNCLASSIFIED Page 21 of 24

Exhibit R-3, RDT&E	Project Co	ost Analysis: PB 2	:019 Navy	/								Date:	February	/ 2018	
Appropriation/Budget Activity 1319 / 5							4212N / (ement (N Other Heli		ame)		: (Numbe i Attack and	,	eplaceme	nt
Management Servic	es (\$ in M	illions)		FY 2	017	FY 2	2018	FY 2 Ba			2019 CO	FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To	Total Cost	Target Value of Contrac
		Subtotal	0.000	0.000		2.377		2.593		-		2.593	Continuing	Continuing	N/A
			Prior Years	FY 2	017	FY 2	018	FY 2 Ba			2019 CO	FY 2019 Total	Cost To	Total Cost	Target Value of Contract
	Project Cost Totals 0.000			0.000		7.977 13.849			-		13.849	Continuing	Continuing	N/	

Remarks

PE 0604212N: Other Helicopter Development Navy

Page 22 of 24

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Exhibit R-4, RDT&E Schedule Prof	ile:	PB 2	2019	Nav	у																				Dat	e: Fe	ebrua	ary 2	018	
Appropriation/Budget Activity 1319 / 5		R-1 Program Element (Number/Name) PE 0604212N / Other Helicopter Development									Project (Number/Name) 3406 I Attack and Utility Replacement Aircraft																			
Proj 3406	FY 2017		,	FY 2018				FY 2019			FY 2020				FY 2021					FY 2022				FY 2023						
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	10	2	Q 3	ia 4	10	1Q	2Q	3Q	4Q	1Q	2Q	3Q	40	10	20	30	40	1
MSA Phase			MSA phase																											
RFP																		MS A												
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Technology Maturation & Risk Reduction (TM&RR) Phase																	Preliminary					ry Design								
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2019DON - 0604212N - 3406																														

PE 0604212N: Other Helicopter Development Navy

UNCLASSIFIED
Page 23 of 24

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018				
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (N	umber/Name)			
1319 / 5	PE 0604212N / Other Helicopter	3406 / Atta	nck and Utility Replacement			
	Development	Aircraft				

Schedule Details

	St	art	End				
Events by Sub Project	Quarter	Year	Quarter	Year			
Proj 3406							
MSA Phase: Capability Refinement	2	2018	4	2020			
RFP: Milestone A	1	2021	1	2021			
RFP: Request for Proposal	1	2021	3	2021			
Technology Maturation & Risk Reduction (TM&RR) Phase: TM&RR	1	2021	4	2022			