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 0605450M I Joint Air-to-ground Missile (JAGM)

Development & Demonstration (SDD)

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
Total Program Element	0.000	0.000	0.000	6.759	-	6.759	0.196	0.222	0.228	0.234	Continuing	Continuing
2211: Joint Air-to-Ground Missile	0.000	0.000	0.000	6.759	-	6.759	0.196	0.222	0.228	0.234	Continuing	Continuing

Program MDAP/MAIS Code:

Project MDAP/MAIS Code(s): P355

Note

Prior to FY 2019, funding for Joint Air-to-Ground Missile (JAGM) was aligned to PE 0605450N. FY 2017 budget value is \$17.834M; FY 2018 budget value is \$15.473M.

A. Mission Description and Budget Item Justification

The Joint Air-to-Ground Missile (JAGM) is an air-launched missile system that will utilize dual-mode seeker technology providing advanced line-of-sight and beyond-line-of-sight

capabilities, including precision point and fire-and-forget seeker targeting and increased lethality against soft, hardened, moving, stationary, land, maritime threats. JAGM will

additionally provide robust capability in adverse weather, day or night and in obscured/countermeasure environments. The JAGM Increment 1 system will replace aviation-launched:

tube-launched, optically-tracked, wire-guided (TOW), and Helicopter Launched Fire-&-Forget Missile (HELLFIRE) Systems. JAGM is an Army-led joint program that addresses

rotary wing, fixed wing, and unmanned aerial vehicle requirements. The Department of Navy threshold platform is the AH-1Z. The JAGM system includes missile, trainers, containers,

support equipment and software modifications to the M-299 launcher.

The JAGM program is part of the Navy's Integrated Fire Control (IFC) approach to address advanced threat capabilities in the Anti-Access/Area-Denial (A2AD) environment. IFC

solutions enable individual system capabilities to be leveraged across an effects chain, placing the full spectrum of tactical capability in the hands of the warfighter. IFC solutions that

push engagement distances beyond the launch platform's radar horizon and allow the United States Navy to operate in, and control, contested battle space in littoral waters and A2/AD

environments are increasingly critical as more and more scenarios require compressed and coordinated fire control timelines.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under system development and demonstration because it includes those projects that have passed Milestone B

approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

PE 0605450M: Joint Air-to-ground Missile (JAGM)

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 0605450M / Joint Air-to-ground Missile (JAGM)

Development & Demonstration (SDD)

B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	6.759	-	6.759
Total Adjustments	0.000	0.000	6.759	-	6.759
 Congressional General Reductions 	-	-			
 Congressional Directed Reductions 	-	-			
 Congressional Rescissions 	-	-			
 Congressional Adds 	-	-			
 Congressional Directed Transfers 	-	-			
 Reprogrammings 	-	-			
SBIR/STTR Transfer	-	-			
Rate/Misc Adjustments	0.000	0.000	6.759	-	6.759

Change Summary Explanation

The FY 2019 funding request was reduced by \$0.242 million to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.

In FY 2019 funding for Joint Air-to-Ground Missile (JAGM) was realigned from PE 0605450N.

Technical: Not applicable. Schedule: Not applicable.

stification:	PB 2019 N	lavy							Date : Febr	uary 2018	
				_		•	• •	•			
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
0.000	0.000	0.000	6.759	-	6.759	0.196	0.222	0.228	0.234	Continuing	Continuing
	-	-	-	-	-	-	-	-	-		
	Prior Years	Prior Years FY 2017 0.000 0.000	Years FY 2017 FY 2018 0.000 0.000 0.000	Prior Years FY 2017 FY 2018 FY 2019 Base 0.000 0.000 0.000 6.759	Prior Years FY 2017 FY 2018 Base OCO 0.000 0.000 0.000 6.759 -	R-1 Program Element PE 0605450M Joint A (JAGM) Prior FY 2019 FY 2019 FY 2019 Total	R-1 Program Element (Number/II PE 0605450M Joint Air-to-ground (JAGM)	R-1 Program Element (Number/Name) PE 0605450M Joint Air-to-ground Missile (JAGM) Prior Years FY 2017 FY 2018 Base OCO Total FY 2020 FY 2021	R-1 Program Element (Number/Name) Project (N 2211 Join Joint Air-to-ground Missile (JAGM) Prior Years FY 2017 FY 2018 Base OCO Total FY 2020 FY 2021 FY 2022 0.000 0.000 0.000 6.759 - 6.759 0.196 0.222 0.228	R-1 Program Element (Number/Name) Project (Number/Name) PE 0605450M Joint Air-to-ground Missile (JAGM) 2211 Joint Air-to-Ground Missile (JAGM) 2211 Joint Air-to-Ground Missile (JAGM) Prior Years FY 2017 FY 2018 Base OCO Total FY 2020 FY 2021 FY 2022 FY 2023 0.000 0.000 0.000 6.759 - 6.759 0.196 0.222 0.228 0.234	R-1 Program Element (Number/Name) Project (Number/Name) 2211 / Joint Air-to-Ground Missile (JAGM) Prior Years FY 2017 FY 2018 Base OCO Total FY 2020 FY 2021 FY 2022 FY 2023 Complete O.000 O.000

Project MDAP/MAIS Code: P355

Note

Prior to FY 2019, funding for Joint Air-to-Ground Missile (JAGM) was aligned to PE 0605450N.

A. Mission Description and Budget Item Justification

The Joint Air-to-Ground Missile (JAGM) is an air-launched missile system that will utilize dual-mode seeker technology providing advanced line-of-sight and beyond-line-of-sight

capabilities, including precision point and fire-and-forget seeker targeting and increased lethality against soft, hardened, moving, stationary, land, maritime threats. JAGM will

additionally provide robust capability in adverse weather, day or night and in obscured/countermeasure environments. The JAGM Increment 1 system will replace aviation-launched:

tube-launched, optically-tracked, wire-guided (TOW), and Helicopter Launched Fire-&-Forget Missile (HELLFIRE) Systems. Later increments of JAGM will be fixed wing compatible.

JAGM is an Army-led joint program that addresses rotary wing, fixed wing and unmanned aerial vehicle requirements. The Department of Navy threshold platform is the AH-1Z. The

JAGM system includes missile, trainers, containers, support equipment and software modifications to the M-299 launcher.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)			FY 2019	FY 2019	FY 2019
	FY 2017	FY 2018	Base	oco	Total
Title: JAGM Engineering and Manufacturing Development (EMD) Phase	0.000	0.000	6.759	0.000	6.759
Articles:	-	-	-	-	-
FY 2018 Plans: FY 2018 plans are reflected in PE 0605450N					
FY 2019 Base Plans: FY 2019 plans include continued execution of EMD phase and AH-1Z integration activities, including continued					

PE 0605450M: Joint Air-to-ground Missile (JAGM) Navy Page 3 of 9

R-1 Line #169

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 5	,	, ,	lumber/Name) nt Air-to-Ground Missile

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
airworthiness certification, software development, fixed wing studies & analysis, Developmental Testing (DT), Integration Testing (IT) and Operational Testing (OT). AH-1Z software development and test efforts will continue in support of fleet software release planned for the FY 2020 Initial Operational Capability (IOC).					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 funding was realigned from PE 0605450N. FY 2018 budget value is \$15.473. The program is transition from the Engineering and Manufacturing Development phase to the Production and Deployment Phase, following the Milestone C decision anticipated in May, 2018					
Accomplishments/Planned Programs Subtotals	0.000	0.000	6.759	0.000	6.759

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

<u> </u>	J (+	,									
			FY 2019	FY 2019	FY 2019					Cost To	
<u>Line Item</u>	FY 2017	FY 2018	<u>Base</u>	OCO	<u>Total</u>	FY 2020	FY 2021	FY 2022	FY 2023	Complete	Total Cost
• RDT&E ARMY, 0605450A: <i>JAGM</i>	47.446	34.626	11.900	-	11.900	3.000	2.000	0.000	0.000	Continuing	Continuing
 MPA, ARMY, C70302: JAGM 	99.011	178.432	276.462	-	276.462	296.589	302.019	305.112	414.099	3,096.995	4,996.457
 WPN. NAVY, 2248: JAGM 	21.922	3.789	24.109	_	24.109	24.142	49.438	50.423	76.253	1,302.797	1,552.873

Remarks

Navy

D. Acquisition Strategy

The Joint Air-to-Ground Missile (JAGM) system is an ACAT-1C Joint Army/Navy Major Defense Acquisition Program (MDAP) with the Army designated as lead service. Milestone B was achieved in July 2015 with Milestone C planned for 3QFY 2018. The Engineering, Manufacturing and Development contract was a full and open competition and was awarded July 2015. The vendor, Lockheed Martin, is responsible for the production of a technically mature and fully producible JAGM Guidance Section (GS) as well as the integration of the GS with the current HELLFIRE-R missile warhead and motor section for Increment 1 capability. The Army is responsible for the development and production of the JAGM missile and integration on the AH-64 Apache. The Navy is responsible for integration of the JAGM on the United States Marine Corps AH-1Z with an Initial Operational Capability (IOC) in FY 2020.

E. Performance Metrics

Milestone C in FY 2018; IOC in FY 2020

PE 0605450M: Joint Air-to-ground Missile (JAGM)

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R-1 Line #169

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

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

PE 0605450M / Joint Air-to-ground Missile (JAGM)

Project (Number/Name) 2211 *I Joint Air-to-Ground Missile*

Product Developmen	t (\$ in Mi	Ilions)		FY 2	017	FY 2	018		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 o Contrac
Systems Engineering	WR	NAWCWD : China Lake, CA	0.000	0.000		0.000		0.901	Nov 2018	-		0.901	2.704	3.605	-
Systems Engineering	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.000		0.459	Nov 2018	-		0.459	1.299	1.758	-
Aircraft Integration	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.000		0.372	Nov 2018	-		0.372	0.524	0.896	-
Aircraft Integration (AH-1Z)	Various	NAWCWD : China Lake, CA	0.000	0.000		0.000		1.114	Nov 2018	-		1.114	5.532	6.646	-
Contractor Aircraft	Various	Northrup Gru : Woodlawn Hills, CA	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Integration & Test	Various	JAMS : Huntsville, AL	0.000	0.000		0.000		0.271	Jan 2019	-		0.271	1.716	1.987	-
Contractor Integration & Test	C/FPIF	Lockheed Martin : Orlando, FL	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Studies and Analysis	WR	NAWCWD : China Lake, CA	0.000	0.000		0.000		0.000		-		0.000	0.200	0.200	-
Prior year cost Prod Dev no	Various	Various : Various	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
		Subtotal	0.000	0.000		0.000		3.117		-		3.117	11.975	15.092	N/

Remarks

Funding for FY2017 and FY2018 is reflected in PE 0605450N.

Contractor Aircraft Integration (AH-1Z) - Funding in this line includes software support associated with the integration of JAGM on the AH-1Z.

Integration & Test - Funding in this line includes integration & test support, modeling & simulation and telemetry kits.

Contractor Integration & Test - Funding in this line includes hardware and support associated with the Engineering and Manufacturing Development (EMD) contract.

Support (\$ in Millions		FY 2	:017	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
Integrated Logistics Support	WR	NAWCWD : China Lake, CA	0.000	0.000		0.000		0.163	Nov 2018	-		0.163	0.278	0.441	-

PE 0605450M: *Joint Air-to-ground Missile (JAGM)* Navy

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy			Date: February 2018
ļ · · · ·	R-1 Program Element (Number/Name) PE 0605450M / Joint Air-to-ground Missile (JAGM)	,	umber/Name) tt Air-to-Ground Missile

Support (\$ in Millions	s)			FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		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
Integrated Logistics Support	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.000		0.076	Nov 2018	-		0.076	0.153	0.229	-
Prior year Support cost no	Various	Various : Various	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
		Subtotal	0.000	0.000		0.000		0.239		-		0.239	0.431	0.670	N/A

Test and Evaluation	(\$ in Milli	ons)		FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		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
Test & Evaluation	Various	NAWCAD : Patuxent River, MD	0.000	0.000		0.000		0.341	Nov 2018	-		0.341	1.958	2.299	-
Test & Evaluation	Various	NAWCWD : China Lake, CA	0.000	0.000		0.000		0.000		-		0.000	0.127	0.127	-
Test & Evaluation	Various	USMC : MCAS Yuma, AZ	0.000	0.000		0.000		1.638	Mar 2019	-		1.638	0.375	2.013	-
Test & Evaluation	Various	Various : Various	0.000	0.000		0.000		0.132	Nov 2018	-		0.132	0.000	0.132	-
Prior year T&E cost no	Various	Various : Various	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
		Subtotal	0.000	0.000		0.000		2.111		-		2.111	2.460	4.571	N/A

Management Services (\$ in Millions)			FY 2	2017	FY 2	2018		2019 ise		2019 CO					
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
Contr Eng Supt - ETS (NONFFRDC)	Various	Various : Various	0.000	0.000		0.000		0.936	Feb 2019	-		0.936	0.808	1.744	-
Management Services	Various	NAWCAD : Patuxent River, MD	0.000	0.000		0.000		0.296	Nov 2018	-		0.296	0.592	0.888	-
Travel	Various	NAWCAD : Patuxent River, MD	0.000	0.000		0.000		0.060	Oct 2018	-		0.060	Continuing	Continuing	Continuing
Prior year Mngt Svcs cost no	Various	Various : Various	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-

PE 0605450M: *Joint Air-to-ground Missile (JAGM)* Navy

UNCLASSIFIED

R-1 Line #169

Exhibit R-3, RDT&E	Project C	ost Analysis: PB 2	2019 Navy	1								Date:	February	/ 2018	
Appropriation/Budg 1319 / 5	1	5450M / 、	•	umber/N o-ground	_	Project (Number/Name) 2211 / Joint Air-to-Ground Missile									
Management Services (\$ in Millions)				FY 2	2017	FY 2018		FY 2019 Base			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
		Subtotal	0.000	0.000		0.000		1.292		-		1.292	Continuing	Continuing	N/A
			Prior					FY 2	2019	FY	2019	FY 2019	Cost To	Total	Target Value of

FY 2018

0.000

Base

6.759

Remarks

1) Program acquisition milestones (minus unique Initial Operating Capability) and production milestones are joint program milestones for both Army and Navy.

Years

0.000

Project Cost Totals

FY 2017

0.000

PE 0605450M: *Joint Air-to-ground Missile (JAGM)* Navy

oco

Total

Complete

6.759 Continuing Continuing

Cost

Contract

N/A

Exhibit R-4, RDT&E Schedule Pro	file:	PB	20	191	Navy																	Date	e: F	ebru	ıary	201	8
Appropriation/Budget Activity 1319 / 5									R-1 Program Element (Number/Name) PE 0605450M / Joint Air-to-ground Missile (JAGM) Project (Number/Name) 2211 / Joint Air-to-Ground Missile												ile						
JAGM	FY 2017						1.40	FY 20 ⁻			9 4Q	FY 2020					Y 20		1	FY 202		022 F			2023		
Acquisition Milestones		20	30	40	-IQ	_2Q	MS-C	40	l	20	30	FRPD	i i i	IOC	30	40	iu .			110	20	Ju	40	10	202	30	40
Reviews	╁╌╏	一	H	一			i	i—	╁	 	一		 	i	H	一				┪	┧─	 	H	\vdash	-	i	\dashv
Test and Evaluation Integration AH-1Z Integration	i .	j	AH	1-Z	Integ	ration	j I	j 	j I] 						İ	_j-			j						
Software Development Testing/Integration Testing					DT A	ssist		• [I DT/I	IT I						İ	İ	İ			İ		Ιİ				
Operational Testing		İ		İ						l [ОТ				İ	j	İ	İ	İ	İ		Ιİ	ıİ			İ
		İ		j	İ		ĺ					OT Reporting					İ	İ	İ								İ
Software Integration Lab Testing	·			SIL	Testi	ng																					
Production Milestones Contract Awards							LRIP 1 (Army Only)																				
Deliveries					DT Test / Qty (RDT	Asset 44	LRIP 2 (WPN) OT T Asset 8 (RDTE	est Qty E,N)		LRIP 3 (WPN)			FRP (WPN) •	(WPN	4)					RIP 3		F	RP ((WPI	2)		
2019PB - 0605450M - 2211	' '		' '		'	ı	•											-				•					'

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018	
,	,	, ,	umber/Name) nt Air-to-Ground Missile

Schedule Details

	Sta	art	En	d
Events by Sub Project	Quarter	Year	Quarter	Year
JAGM				
Acquisition Milestones: Milestone C	3	2018	3	2018
Acquisition Milestones: IOC	2	2020	2	2020
Acquisition Milestones: FRP Decision	4	2019	4	2019
Test and Evaluation: AH-1Z Integration: AH-1Z Integration	1	2017	3	2018
Test and Evaluation: Software Development Testing/Integration Testing: DT Assist	1	2018	2	2018
Test and Evaluation: Software Development Testing/Integration Testing: DT/IT	3	2018	3	2019
Test and Evaluation: Operational Testing: OT	3	2019	4	2019
Test and Evaluation: Operational Testing: OT Reporting	4	2019	4	2019
Test and Evaluation: Software Integration Lab Testing: SIL Testing	1	2017	3	2018
Production Milestones: Contract Awards: LRIP 1 (Army Only)	3	2018	3	2018
Production Milestones: Contract Awards: LRIP 2 (WPN)	3	2018	3	2018
Production Milestones: Contract Awards: LRIP 3 (WPN)	2	2019	2	2019
Production Milestones: Contract Awards: FRP (WPN)	1	2020	1	2020
Production Milestones: Deliveries: DT/IT Test Asset	1	2018	2	2018
Production Milestones: Deliveries: OT Test Asset	3	2018	4	2018
Production Milestones: Deliveries: LRIP 1 (Army Only)	4	2018	2	2019
Production Milestones: Deliveries: LRIP 2 (WPN)	3	2019	2	2021
Production Milestones: Deliveries: LRIP 3 (WPN)	3	2021	2	2022
Production Milestones: Deliveries: FRP (WPN)	3	2022	2	2023