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 Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604280N *I JT Tact Radio Sys (JTRS)*

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	38.878	2.295	4.310	3.272	-	3.272	3.271	3.015	3.029	6.437	Continuing	Continuing
3078: *Digital Modular Radio*	38.878	2.295	4.310	3.272	-	3.272	3.271	3.015	3.029	6.437	Continuing	Continuing

A. Mission Description and Budget Item Justification

Digital Modular Radio (DMR) with Integrated Waveform (IW) and Mobile User Objective System (MUOS) capable hardware is the Navy's technical solution for the IW/ MUOS requirement. The DMR AN/USC-61(C), is the first software defined radio to become a communications system standard for the U.S. Military. The compact, multi-channel DMR provides multiple waveforms and multi-level information security for voice and data communications. DMR radios currently operate aboard U.S. Navy surface and subsurface vessels, fixed-sites and other Department of Defense communication platforms using frequencies ranging from 2 MHz to 2 GHz. Certified to pass secure voice and data at Multiple Independent Levels of Security (MILS) over High Frequency (HF), Very High Frequency (VHF), Ultra High Frequency (UHF), and Satellite Communications (SATCOM) channels, the DMR system was developed to the U.S. Navy's specifications and meets all the stringent environmental, Electromagnetic Interference (EMI) and performance requirements for use in the U.S. Fleet. This program is for continued development/integration of the IW and MUOS waveforms into the DMR. Additionally, the enhancements of High Frequency Distribution Amplifier Group (HFDAG) and HF Automated Link Establishment (ALE) will also be developed/integrated into the DMR. HFDAG is a follow-on HF solution to fulfill transmit and receive HF communication capability with various modes of operation, such as ALE, for Navy platforms. HFDAG will utilize the existing DMR as the exciter/receiver. Generation 3 (GEN 3) HF ALE/HF wideband provides Navy users with improved HF communications, increased transmission rates from radio to radio, and serves as a supplement to SATCOM when SATCOM networks are overloaded or unavailable. IW uses a Time Division Multiple Access (TDMA) communication system in an attempt to improve satellite bandwidth utilization over legacy SATCOM waveforms. This enables demand assigned services on UHF SATCOM networks to support new applications that require better performance and higher channel throughput. The MUOS waveform will enable MUOS satellites to provide worldwide communication satellite coverage for DoD requirements. MUOS will provide functionality comparable to commercial mobile phone systems.

The budget in FY19 provides funding to commence development of updated DMR Cryptographic Equipment Application (CEA) software to be compliant with the latest National Security Agency (NSA) THORNTON Cryptographic Modernization (TCM) specification. Upgraded DMR CEA is necessary to support SATCOM user terminals as well as the IW. The current crypto algorithm is end of life and NSA has mandated all SATCOM programs modernize to the new algorithm and be re-certified.

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 Development & Demonstration (SDD)*			R-1 Program Element (Number/Name) PE 0604280N *I JT Tact Radio Sys (JTRS)*		
B. Program Change Summary ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**
Previous President's Budget	2.365	4.310	0.015	-	0.015
Current President's Budget	2.295	4.310	3.272	-	3.272
Total Adjustments	-0.070	0.000	3.257	-	3.257
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.067	0.000			
• Program Adjustments	0.000	0.000	3.293	-	3.293
• Rate/Misc Adjustments	0.000	0.000	-0.036	-	-0.036
• Congressional General Reductions Adjustments	-0.003	-	-	-	-

Change Summary Explanation

Funding increase from PB18 to PB19 in FY 2019 is commence the next development stage for Digital Modular Radio (DMR), Cryptographic Modernization Software Development.

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 0604280N / *JT Tact Radio Sys (JTRS)*	Project (Number/Name) 3078 / *Digital Modular Radio*	

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
3078: *Digital Modular Radio*	38.878	2.295	4.310	3.272	-	3.272	3.271	3.015	3.029	6.437	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Digital Modular Radio (DMR) with Integrated Waveform (IW) and Mobile User Objective System (MUOS) capable hardware is the Navy's technical solution for the IW/ MUOS requirement. The DMR AN/USC-61(C), is the first software defined radio to become a communications system standard for the U.S. Military. The compact, multi-channel DMR provides multiple waveforms and multi-level information security for voice and data communications. DMR radios currently operate aboard U.S. Navy surface and subsurface vessels, fixed-sites and other Department of Defense communication platforms using frequencies ranging from 2 MHz to 2 GHz. Certified to pass secure voice and data at Multiple Independent Levels of Security (MILS) over High Frequency (HF), Very High Frequency (VHF), Ultra High Frequency (UHF), and Satellite Communications (SATCOM) channels, the DMR system was developed to the U.S. Navy's specifications and meets all the stringent environmental, Electromagnetic Interference (EMI) and performance requirements for use in the U.S. Fleet. This program is for continued development/integration of the IW and MUOS waveforms into the DMR in accordance with Military Standards 188-181,2,3. Additionally, the enhancements of High Frequency Distribution Amplifier Group (HFDAG) and HF Automated Link Establishment (ALE) will also be developed/integrated into the DMR. HFDAG is a follow-on HF solution to fulfill transmit and receive HF communication capability with various modes of operation, such as ALE, for Navy platforms. HFDAG will utilize the existing DMR as the exciter/receiver. Generation 3 (GEN 3) HF ALE/HF wideband provides Navy users with improved HF communications, increased transmission rates from radio to radio, and serves as a supplement to SATCOM when SATCOM networks are overloaded or unavailable. IW uses a Time Division Multiple Access (TDMA) communication system in an attempt to improve satellite bandwidth utilization over legacy SATCOM waveforms. This enables demand assigned services on UHF SATCOM networks to support new applications that require better performance and higher channel throughput. The MUOS waveform will enable MUOS satellites to provide worldwide communication satellite coverage for DoD requirements. MUOS will provide functionality comparable to commercial mobile phone systems.

The budget in FY19 provides funding to commence development of updated DMR Cryptographic Equipment Application (CEA) software to be compliant with the latest National Security Agency (NSA) THORNTON Cryptographic Modernization (TCM) specification. Upgraded DMR CEA is necessary to support SATCOM user terminals as well as the IW. The current crypto algorithm is end of life and NSA has mandated all SATCOM programs modernize to the new algorithm and be re-certified.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: DMR	2.295	4.310	3.272	0.000	3.272
Articles:	-	-	-	-	-
Description: Overall program efforts include investigation of emerging technologies through study, development and associated testing for feasibility of program insertion. DMR is the Navy's primary solution for providing the UHF SATCOM IW and MUOS waveform to the Fleet.					
FY 2018 Plans:					

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 0604280N / *JT Tact Radio Sys (JTRS)*	**Project (Number/Name)** 3078 / *Digital Modular Radio*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Complete at-sea development testing and waveform conformance testing of the Integrated Waveform (IW)/ Mobile User Objective System (MUOS) waveforms into the Digital Modular Radio (DMR) system. Conduct a Government Run for Record in support of IW/MUOS and High Frequency Amplifier Link Establishment (HF ALE) software. Complete the development of IW/MUOS software and DMR HF ALE Generation 3 (GEN3) Software efforts and Joint Integration Test Command (JITC) interoperability certification. Receive MUOS and HF ALE GEN3 software drops from vendor for testing and Release Requirements Review (RRR) efforts. ***FY 2019 Base Plans:*** Commence the software development effort needed to ensure DMR Cryptographic Equipment Application (CEA) is compatible with National Security Agency (NSA) required certified software. Provide engineering support services for reviewing the THORNTON Cryptographic Modernization specification and reevaluating the DMR Ultra High Frequency (UHF) Satellite Communications (SATCOM) Transmission Security (TRANSEC) Crypto to ensure capability integration with new and legacy CEA. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decrease from FY 2018 to FY 2019 is due to the completion of MUOS development. FY 2019 RDTE is to commence the next development stage for DMR, Cryptographic Modernization Software Development.					
Accomplishments/Planned Programs Subtotals	2.295	4.310	3.272	0.000	3.272

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• OPN/3010: *DMR OPN*	9.671	23.695	45.450	-	45.450	66.478	71.213	63.190	65.112	Continuing	Continuing

Remarks

D. Acquisition Strategy

General Dynamics Mission Systems (GDMS), formerly General Dynamics C4 Systems (GDC4S), owns the technical data rights to the DMR. Due to this fact, they are the only contractor with the unique capabilities and technical know-how to perform the required design work to complete the IW upgrade, the MUOS interoperability efforts, and Cryptographic Modernization development.

E. Performance Metrics

Military Standard (MIL-STD) conformance to meet Joint Integration Test Command (JITC) Certification for IW/UHF SATCOM waveform and the MUOS waveform.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604280N / *JT Tact Radio Sys (JTRS)*	Project (Number/Name) 3078 / *Digital Modular Radio*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
IW/MUOS Development	C/CPIF	GDMS : Scottsdate, AZ	20.432	0.800	May 2017	1.760	Oct 2017	0.000		-		0.000	0.000	22.992	-
HF ALE Development	C/CPIF	GDMS : Scottsdale, AZ	7.646	0.000		0.702	Oct 2017	0.000		-		0.000	0.000	8.348	-
IW/MUOS Development	WR	SSC PAC : San Diego, CA	0.000	0.600	Nov 2016	0.000		0.000		-		0.000	0.000	0.600	-
HF ALE Development	WR	SSC PAC : San Diego, CA	0.000	0.242	Nov 2016	0.163	Oct 2017	0.000		-		0.000	0.000	0.405	-
Cryptographic Modernization Development	C/CPIF	GDMS : Scottsdale, AZ	0.000	0.000		0.000		2.072	Oct 2018	-		2.072	Continuing	Continuing	Continuing
		Subtotal	28.078	1.642		2.625		2.072		-		2.072	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Engineering Support	Various	SSC PAC : San Diego, CA	6.255	0.306	Nov 2016	1.086	Nov 2017	0.600	Dec 2018	-		0.600	Continuing	Continuing	Continuing
		Subtotal	6.255	0.306		1.086		0.600		-		0.600	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Testing	Various	SSC PAC : San Diego, CA	1.976	0.220	Nov 2016	0.199	Feb 2018	0.000		-		0.000	0.000	2.395	-
JITC Testing	WR	JITC : Ft. Huachuca, AZ	0.250	0.080	May 2017	0.200	Nov 2017	0.000		-		0.000	0.000	0.530	-
Interoperability Testing	WR	SSC PAC : San Diego, CA	0.000	0.000		0.000		0.200	Dec 2018	-		0.200	Continuing	Continuing	Continuing
Test and Evaluation	Various	TBD : TBD	0.000	0.000		0.000		0.200	Dec 2018	-		0.200	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604280N / *JT Tact Radio Sys (JTRS)*	Project (Number/Name) 3078 / *Digital Modular Radio*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			2.226	0.300		0.399		0.400		-		0.400	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPFF	BAH : San Diego, CA	2.319	0.047	Nov 2016	0.200	Feb 2018	0.200	Nov 2018	-		0.200	Continuing	Continuing	Continuing
Subtotal			2.319	0.047		0.200		0.200		-		0.200	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	38.878	2.295		4.310		3.272		-		3.272	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT Tact Radio Sys (JTRS)*	**Project (Number/Name)** 3078 / *Digital Modular Radio*

DMR

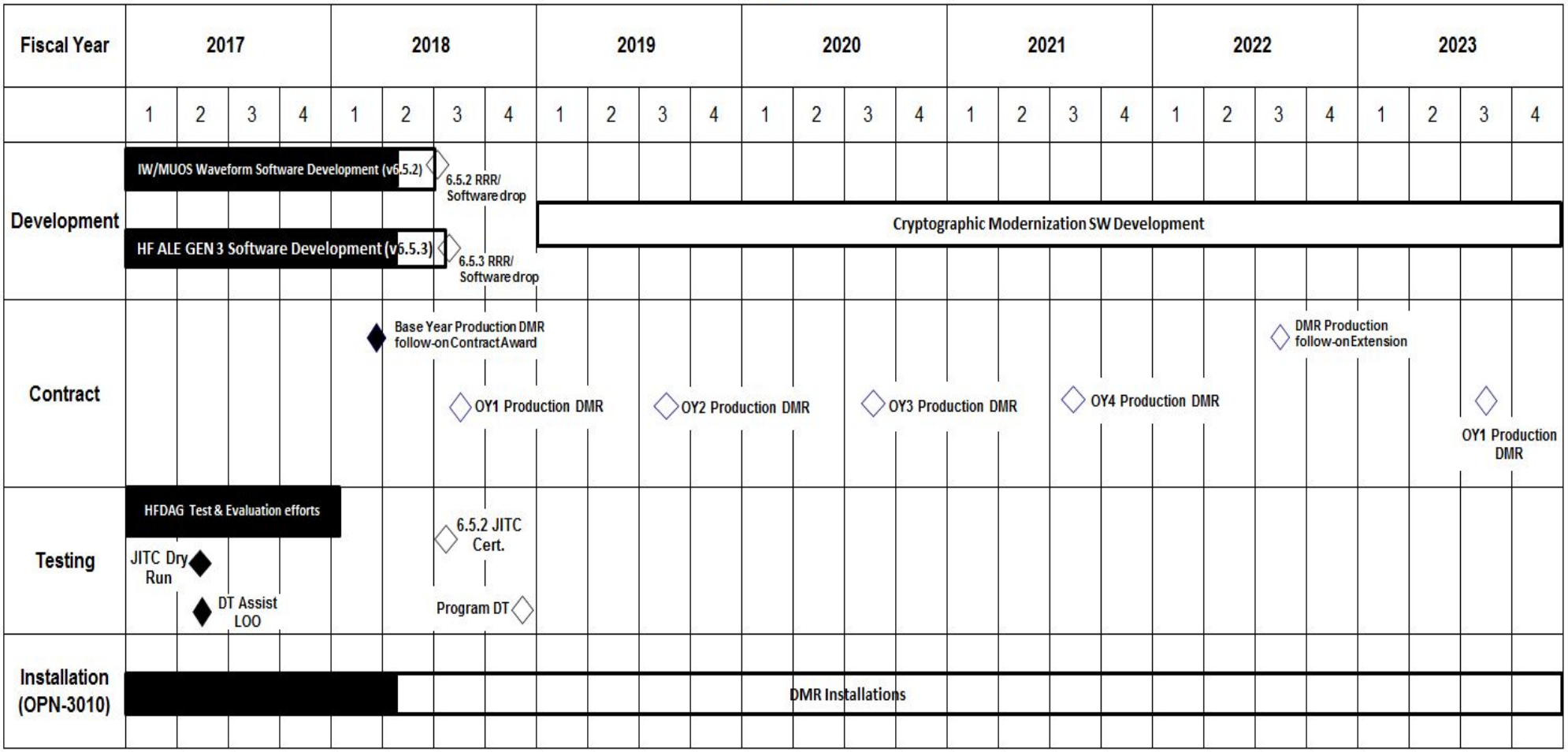

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT Tact Radio Sys (JTRS)*	**Project (Number/Name)** 3078 / *Digital Modular Radio*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3078				
IW Development	1	2017	2	2018
MUOS Waveform Development	1	2017	2	2018
HFDAG Test and Evaluation	1	2017	1	2018
MUOS Release Requirements Review Software Drop (v6.5.2)	3	2018	3	2018
HF ALE GEN 3 s/w Development	1	2017	3	2018
HF ALE GEN 3 Release Requirements Review Software Drop (v6.5.3)	3	2018	3	2018
Production Deliveries	1	2017	4	2023
Development Testing (DT)	4	2018	4	2018
IW JITC Dry-Run	2	2017	2	2017
Letter of Observation (LOO)	2	2017	2	2017
IW JITC Certification	3	2018	3	2018
Cryptographic Modernization SW Development	1	2019	4	2023