Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0303109N *I Satellite Communications (Space)*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	0.000	0.000	0.000	34.344	-	34.344	20.250	27.164	7.000	6.000	Continuing	Continuing
0728: *EHF SATCOM Terminals*	0.000	0.000	0.000	34.344	-	34.344	20.250	27.164	7.000	6.000	Continuing	Continuing
Program MDAP/MAIS Code: **Project MDAP/MAIS Code(s):** 290												

Note

Navy Multiband Terminal (NMT) Program (Proj 0728) has been realigned from PE 1203109N to PE 0303109N starting in FY20.
Mobile Advanced Extremely High Frequency (AEHF) Terminal (MAT) Project has been realigned from OPN LI 3107 SUBMARINE BROADCAST SUPPORT to PE 0303109N starting in FY20.

A. Mission Description and Budget Item Justification

The Navy Multiband Terminal (NMT) Program is the required Navy component to the Advanced Extremely High Frequency (AEHF) program for enhancing protected and survivable satellite communications to Naval forces. The NMT system provides an increase in single service capability from 1.5 Megabits per second (Mbps) to 8 Mbps, increases the number of coverage areas and retains Anti-Jam/Low Probability of Intercept (AJ/LPI) protection characteristics. It is compatible with legacy Navy Low Data Rate/Medium Data Rate (LDR/MDR) terminals and will sustain the Military Satellite Communications (MILSATCOM) architecture by providing connectivity across the spectrum of mission areas, to include land, air and naval warfare, special operations, strategic nuclear operations, strategic defense, theater missile defense, and space operations and intelligence in support of Resilient Command and Control (RC2) initiatives. The NMT system replenishes and improves on Navy terminal capabilities of the Military Strategic, Tactical & Relay System (MILSTAR), Defense Satellite Communications System (DSCS), Wideband Global Satellite (WGS) and Global Broadcast Service (GBS). The new system equips the warfighters with the assured, jam resistant, secure communications as described in the joint AEHF satellite communications system and WGS Operational Requirements Documents (ORD).

The Mobile AEHF Terminal (MAT) is the Navy's solution to provide key communications using the AEHF satellite constellation to support the Take Charge and Move Out (TACAMO) Ground Communication mobile mission, while also meeting mobility, size and weight requirements. The NMT provides multiband Satellite Communications (SATCOM) capability for ship, submarine, and protected MILSATCOM for shore sites.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy					Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*			R-1 Program Element (Number/Name) PE 0303109N *I Satellite Communications (Space)*		
B. Program Change Summary ($ in Millions)	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	34.344	-	34.344
Total Adjustments	0.000	0.000	34.344	-	34.344
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	0.000	0.000	34.344	-	34.344

Change Summary Explanation

The FY20 funding request was reduced by $1.731M (Proj 0728) to account for the availability of prior year balances.

The NMT (PROJECT 0728) FY20 increase awards the contract funding Navy specific development of the Wideband Anti-Jam Modem Systems (WAMS) to include the Direct Sequence Spread Spectrum (DSSS) Waveform and Network Operations Without Shore (NOWS). The FY20 NMT increase is $4.465M.

The FY20 $12M increase is for NMT MAT Project due to complexity of requirements to develop a new terminal versus a replacement solution.

Schedule:
EHF SATCOM Terminals (Project 0728) - No change

Technical:
EHF SATCOM Terminals (Project 0728): No change

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0303109N / *Satellite Communications (Space)*				Project (Number/Name) 0728 / *EHF SATCOM Terminals*			
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
0728: *EHF SATCOM Terminals*	0.000	0.000	0.000	34.344	-	34.344	20.250	27.164	7.000	6.000	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
Project MDAP/MAIS Code: 290												

Note

Navy Multiband Terminal (NMT) Program (Proj 0728) has been realigned from PE 1203109N to PE 0303109N starting in FY20.
Mobile Advanced Extremely High Frequency (AEHF) Terminal (MAT) Project has been realigned from PE 0101402N to PE 0303109N starting in FY20.

A. Mission Description and Budget Item Justification

The Navy Multiband Terminal (NMT) Program is the required Navy component to the Advanced Extremely High Frequency (AEHF) Program for enhancing protected and survivable satellite communications to Naval forces. Although development of the NMT terminal is complete, software and hardware upgrade development is ongoing to provide enhanced capabilities to the fleet. The NMT system provides an increase in single service capability from 1.5 Megabits per second (Mbps) to 8 Mbps, increases the number of coverage areas, and retains Anti-Jam/Low Probability of Intercept (AJ/LPI) protection characteristics. It is compatible with legacy Navy Low Data Rate/Medium Data Rate (LDR/MDR) terminals and will sustain the Military Satellite Communications (MILSATCOM) architecture by providing connectivity across the spectrum of mission areas, to include land, air and naval warfare, special operations, strategic defense, theater missile defense, and space operations and intelligence. The NMT system replenishes and improves on Navy Military Strategic, Tactical & Relay System (MILSTAR), Defense Satellite Communications System (DSCS), Wideband Global Satellite (WGS), and Global Broadcast Service (GBS) terminal capabilities. The new system equips the warfighters with assured, jam resistant, secure communications as described in both the joint AEHF Satellite Communications System and the WGS Operational Requirement Documents (ORD). Mission requirements specific to Navy operations, including threat levels and scenarios, are contained in the ORD. The NMT provides multiband Satellite Communications (SATCOM) capability for ship, submarine, and protected MILSATCOM for shore sites.

The Wideband Anti-Jam Modem System (WAMS) is a Navy technology upgrade that enhances communication capability of shipboard and submarine NMTs by providing wideband Anti-Jam (AJ) Satellite Communication throughput over Wideband Global SATCOM (WGS). WAMS is a major contributor in supporting the National Defense Strategy by investing in resilience to provide assured communications capabilities. WAMS enables space segment Anti Jam (AJ) diversity (EHF/AEHF and WGS), thus enabling NMT ships and submarines equipped with the modem to operate in wideband links closer to threat jammers. The United States USAF (USAF) Protected Tactical Enterprise Service (PTES) program will provide the ground hub component of the WAMS communication system. This PTES joint hub will serve as a DoD enterprise service ground solution for the use of the Protected Tactical Waveform (PTW) of SATCOM communications and introduces a Network Operations Without Shore (NOWS) capability. The NOWS capability will use the Direct Sequence Spread Spectrum (DSSS) waveform that provides uninterrupted communication in case of loss of shore hub connectivity. PTW is a Frequency Hopped Spread Spectrum (FHSS) waveform that provides high data rates in a benign environment and anti-jam protection to meet contested data rate requirements. High data rate anti-jam capability is enabled via the Protected Tactical Waveform (PTW) and low data rate anti-jam capability is provided via the Direct Sequence Spread Spectrum (DSSS) waveform. These two waveforms are designed to operate over the Wideband Global SATCOM system as well as other transponded satellites, and are also forward compatible with the on-board processing capabilities of the future Protected Tactical Satellites (PTS). WAMS enables the use of WGS X and Ka-band resources to assure access to mission critical communications to provide Resilient Command and

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0303109N / *Satellite Communications (Space)*	**Project (Number/Name)** 0728 / *EHF SATCOM Terminals*

Control (RC2) capabilities in contested/degraded environments, formerly known as Anti-Access/Area Denial (A2AD). The use of WAMS PTW on WGS will augment AEHF Extended Data Rate (XDR) services to provide the information throughput capacity necessary to support critical Command and Control capability.

Development efforts, including Adaptive Coding, Time of Day, and the Wideband Anti-Jam Modem System (WAMS) augment the baseline NMT system to pace the evolving threats to the warfighter. The Time of Day (TOD) capability promotes communications reliability and resiliency; when the channel is degraded due to inclement weather or adversarial action. TOD enables the system to automatically transition to a more robust, lower code rate resulting in ability to maintain satellite link thereby allowing the fleet to preserve communications.

The Mobile Advanced Extremely High Frequency (AEHF) Terminal (MAT) is the Navy's solution to provide key communications using the AEHF satellite constellation to support the Take Charge and Move Out (TACAMO) Ground Communication mobile mission, while also meeting mobility, size and weight requirements. The FY20 request will provide for planning and design efforts to include requirements definition and refinement, cost estimates, Integrated Master Schedule (IMS) development and maintenance, analysis of alternatives, and acquisition approach development for the potential follow-on effort. The project requires technical and trade studies including technical feasibility studies, security studies, link budget study, High altitude Electro Magnetic Pulse (HEMP) study, existing terminal studies, Baseband studies, future compatibility studies, and logistics commonality studies.

The FY20 request will provide for the award of a full and open competitive contract for the design and development Wideband Anti Jam Modem System (WAMS) to include the Navy unique requirements and to design and implement the changes required to the technical baseline to support the integration of WAMS with the NMT. The FY20 request will also provide for MAT planning, design efforts, cost estimates, Integrated Master Schedule (IMS) development and maintenance, analysis of alternatives, and acquisition approach development for the potential follow-on effort.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: NMT Resilient C2 Development	0.000	0.000	22.194	0.000	22.194
Articles:	-	-	-	-	-
Description: Software and hardware upgrade development is ongoing to provide Resilient Command and Control (RC2) capabilities to pace the evolving threats to the warfighter in contested/degraded environments. The Wideband Anti-Jam Modem System (WAMS) will provide an anti-jamming capability that will counter various adversary threats. Adaptive Coding (AC) will autonomously maximize throughput in degraded or benign conditions over the Advanced Extremely High Frequency (AEHF) satellites, providing significantly more throughput than is available today in the baseline NMT. The Time of Day (TOD) capability promotes communications reliability and resiliency; when the channel is degraded due to inclimate weather or adversarial action. TOD enables the system to automatically transition to a more robust, lower code rate resulting in ability to maintain satellite link thereby allowing the fleet to preserve communications. Technology Insertion, studies and implementation is necessary for military satellite communications systems development to support emerging technologies.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0303109N / *Satellite Communications (Space)*	**Project (Number/Name)** 0728 / *EHF SATCOM Terminals*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY 2019 Plans: FY19 Plans for NMT funded under PE 1203109N, Project 0728.					
FY 2020 Base Plans: Award a full and open competitive contract for the design and development of the Navy Wideband Anti Jam Modem System (WAMS) configuration. The contract will include Navy unique requirements such as antenna handover that provides the means to shift communications from one antenna to another to avoid shipboard super structure blockage. This will also include the Direct Sequence Spread Spectrum (DSSS) waveform that provides uninterrupted communication in case of loss of shore hub connectivity as well as interface to the Automatic Digital Network System (ADNS), and shipboard and submarine environmental qualification testing. The vendor will design and implement the changes required to the technical baseline to support the integration of WAMS with the NMT. The vendor will conduct a System Requirements Review (SRR), System Design Review (SDR) and a Preliminary Design Review (PDR) of the WAMS to work with both the Protected Tactical Waveform (PTW) and the Direct Sequence Spread Spectrum (DSSS) waveform to enable anti-jam communications and Network Operations Without Shore (NOWS). This will include development of the Embedded Crypto Unit (ECU) that provides protection for both waveforms. The ECU development as part of the contract will require National Security Agency (NSA) coordination and certification. NSA certification will require full engineering support to evaluate the security posture of the vendor's implementation of the ECU into the Wideband Anti Jam Modem System (WAMS). MIT Lincoln Labs will support the requirement to meet the gold standard for WAMS development to be interoperable with the Protected Tactical Enterprise Service (PTES) Hub. Continue ADNS development of the dynamic network interface that enables data rate to change based on modem link condition and will be included in the Automatic Digital Network System (ADNS) Service Pack 5 software build. Start to develop all required training documentation and required Shipmain documentation to install the Engineering Design Model (EDM) modems on identified surface, subsurface and shore facilities to support a Multiservice Operational Test & Evaluation (MOT&E) event in FY22.					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0303109N / *Satellite Communications (Space)*	**Project (Number/Name)** 0728 / *EHF SATCOM Terminals*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Increase of $4.465M from FY19 to FY20 is to support WAMS development efforts for the Direct Sequence Spread Spectrum (DSSS) waveform and the Networked Operations without Shore (NOWS) Waveform.					
Title: Mobile Advanced Extremely High Frequency (AEHF) Terminal (MAT)	0.000	0.000	12.000	0.000	12.000
Articles:	-	-	-	-	-

Description: The Mobile Advanced Extremely High Frequency (AEHF) Terminal (MAT) is the Navy's solution to provide key communications using the AEHF satellite constellation to support the Take Charge and Move Out (TACAMO) Ground Communication mobile mission, while also meeting mobility, size and weight requirements. The MAT project will be the Navy's solution to provide key communications using the AEHF satellite constellation, while also meeting mobility, size and weight requirements.

FY 2019 Plans:
FY19 Plans for Mobile Advanced Extremely High Frequency (AEHF) Terminal (MAT) was funded under PE 0101402N, Project 1083.

FY 2020 Base Plans:
Continue technical and trade studies for MAT to include technical feasibility studies, security studies, and link budget study. Additional studies include: High altitude Electro Magnetic Pulse (HEMP) study, existing terminal studies, Baseband studies, future compatibility studies, and logistics commonality studies. Technical feasibility study to evaluate available technical alternatives. The project will study existing terminals to evaluate the efficacy of using Government Off-The-Shelf (GOTS) equipment. The baseband study will ensure proper definition of interfaces and interrelations with other systems (e.g., Mission Planning Element (MPE)). Future compatibility study will be conducted to accommodate potential future systems (e.g., Evolved Strategic Satellite (ESS)) and to inform system technical specifications. Develop technical and pre-award acquisition documentation for the MAT effort to include RFP development and coordination as well as technical specifications. Documentation development includes the MAT Specification, Cyber strategy to support the Clinger Cohen Act and Information Support Plan (ISP). Initiate certification and coordination process through NSA.

FY 2020 OCO Plans:
N/A

FY 2019 to FY 2020 Increase/Decrease Statement:
FY19 to FY20 increase represents a PE realignment from 1203109N to 0303109N beginning in FY20. In FY19 MAT project funding in the amount of $5M was provided under PE 0101402N Project 1083. FY20 MAT funding

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0303109N / *Satellite Communications (Space)*	**Project (Number/Name)** 0728 / *EHF SATCOM Terminals*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
reflects a full year of studies and design beyond the initial planning and commencement of studies in FY19. The complexity of requirements has increased and MAT will require significant development and integration activities.					
Title: Technology Insertion	0.000	0.000	0.150	0.000	0.150
Articles:	-	-	-	-	-
Description: Overall program efforts include technology insertion implementation and associated testing required to support satellite communications. ***FY 2019 Plans:*** N/A ***FY 2020 Base Plans:*** To maintain alignment with the Navy's Resilient Command and Control (RC2) strategy and approach, Commercial Broadband Satellite Program (CBSP) will transition from exercising an initial RC2 modem capability to utilizing the Wideband Anti-Jam Modem System (WAMS), which provides protected wideband Satellite Communication (SATCOM) capability to the Fleet. Funds are required to test and integrate the WAMS into the CBSP architecture. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of $0.150M from FY19 to FY20 is to support enhancements required for RC2 and WAMS capabilities required to pace the evolving threats to the warfighter in contested/degraded environments.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	34.344	0.000	34.344

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• OPN/3216: *NAVY MULTIBAND TERMINAL (NMT)*	62.113	109.385	88.021	-	88.021	70.187	24.249	16.585	20.281	73.062	1,551.433
• RDTEN/1203109N/0728: *EHF SATCOM Terminals*	21.830	17.729	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	39.559

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0303109N / *Satellite Communications (Space)*	**Project (Number/Name)** 0728 / *EHF SATCOM Terminals*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost

Remarks

Funding for Prior Year through FY19 NMT OPN in PE 1203109N.

The Other Appropriation represents remaining procurement and installation of NMT production units for Afloat and Shore requirements to reach Full Operational Capability. Funding also includes the procurement and installation of Assured Command and Control (AC2) modems as well as the installation of Advanced Time Division Multiple Access (TDMA) Interface Processors (ATIPs), X/KA Back-Fits, and Ashore Antennas.

D. Acquisition Strategy

The Navy Multiband Terminal (NMT) Follow-On Full Deployment (FOFD) contract will continue NMT production for Afloat platforms and Shore locations, in support of the Chief of Naval Operations and the Department of the Navy (DON), and will allow the NMT Program to complete Full Operational Capability (FOC) . The competitive contract awarded to Comtech supports the development of Advanced Time Division Multiple Access (TDMA) Interface Processor (ATIP) and Assured Command and Control (AC2) modem enhancements such as Adaptive Coding. A new competitive contract will be awarded to support development and procurement of the Wideband Anti-Jam Modem System (WAMS).

The MAT initial acquisition strategy was based on a replacement solution for the current Single Channel Anti-Jam Man Portable (SCAMP) terminal, that would leverage the existing capabilities, designs, hardware, software, Mission Planning and testing from the Air Force's Family of Advanced Beyond Line-Of-Sight Terminal (FAB-T) Command Post Terminal (CPT) program, rather than developing a new terminal. From initial conception to today, the complexity of requirements has increased. It is now evident that MAT will require significant development and integration activities in order to make the acquisition successful. The RDT&E is needed as result of the complexity and increased requirements to develop a solution. Additionally, the funding is being realigned to PMW/A 170 as that program office has the cadre of acquisition and AEHF engineering expertise already on staff so is better situated to manage the MAT effort.

E. Performance Metrics

The RDT&E goal for the NMT program is to create a military satellite communications system that consolidates capabilities of current and future satellite systems into a single terminal, and develops terminal communications capabilities that will counter all current and projected threats to satellite operations enabling communications in all environments.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0303109N / *Satellite Communications (Space)*	**Project (Number/Name)** 0728 / *EHF SATCOM Terminals*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Development Engineering	C/CPFF	NUWC : Newport, RI	0.000	0.000		0.000		3.067	Jan 2020	-		3.067	Continuing	Continuing	Continuing
Software Development Engineering	WR	SSC PAC : San Diego, CA	0.000	0.000		0.000		0.515	Jan 2020	-		0.515	Continuing	Continuing	Continuing
WAMS Design Development	C/CPIF	TBD : TBD	0.000	0.000		0.000		9.720	Feb 2020	-		9.720	Continuing	Continuing	Continuing
MAT Studies and Design Development	MIPR	MIT/LL : Lexington, MA	0.000	0.000		0.000		6.700	Feb 2020	-		6.700	0.000	6.700	-
		Subtotal	0.000	0.000		0.000		20.002		-		20.002	Continuing	Continuing	N/A

Remarks

FY20 increase will award a new contract to fund the development of the Wideband Anti-Jam Modem System (WAMS) to include the Direct Sequence Spread Spectrum (DSSS) waveform and Network Operations Without Shore (NOWS) capability in support of critical Resilient Command and Control (RC2) capability. The FY20 increase also provides for Mobile Advanced Extremely High Frequency (AEHF) Terminal (MAT) for studies and design development.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Integration/ Government Oversight	WR	NUWC : Newport, RI	0.000	0.000		0.000		1.394	Nov 2019	-		1.394	Continuing	Continuing	Continuing
Software Integration Support	WR	SSC PAC : San Diego, CA	0.000	0.000		0.000		0.745	Nov 2019	-		0.745	Continuing	Continuing	Continuing
Software Engineering Support	C/CPFF	SYSTECH : San Diego, CA	0.000	0.000		0.000		2.163	Nov 2019	-		2.163	Continuing	Continuing	Continuing
WAMS Studies and Design	FFRDC	MIT/LL : Lexington, MA	0.000	0.000		0.000		0.500	Jan 2020	-		0.500	Continuing	Continuing	Continuing
WAMS Cybersecurity Engineering	WR	NSA : Fort Meade, MD	0.000	0.000		0.000		0.275	Jan 2020	-		0.275	Continuing	Continuing	Continuing
MAT Studies and Design	WR	NUWC : Newport, RI	0.000	0.000		0.000		1.600	Feb 2020	-		1.600	0.000	1.600	-
MAT Cybersecurity Engineering Support	C/BA	SYSTECH : San Diego, CA	0.000	0.000		0.000		0.800	Oct 2019	-		0.800	0.000	0.800	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MAT Cybersecurity Engineering	FFRDC	NSA : Fort Meade, CA	0.000	0.000		0.000		0.600	Dec 2019	-		0.600	0.000	0.600	-
MAT Engineering Support	C/CPFF	NUWC : Newport, RI	0.000	0.000		0.000		1.500	Dec 2019	-		1.500	0.000	1.500	-
		Subtotal	0.000	0.000		0.000		9.577		-		9.577	Continuing	Continuing	N/A

Remarks

The FY20 increase provides for Mobile Advanced Extremely High Frequency (AEHF) Terminal (MAT) for studies and design support.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technology Insertion	WR	COTF : Norfolk, VA	0.000	0.000		0.000		0.150	Jan 2020	-		0.150	0.000	0.150	-
WAMS Development Test and Evaluation	WR	SSC PAC : San Diego, CA	0.000	0.000		0.000		2.265	Nov 2019	-		2.265	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		0.000		2.415		-		2.415	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contract Management	C/CPFF	BAH : San Diego, CA	0.000	0.000		0.000		0.200	Nov 2019	-		0.200	Continuing	Continuing	Continuing
Program Management	C/CPFF	BAH : San Diego, CA	0.000	0.000		0.000		1.300	Nov 2019	-		1.300	Continuing	Continuing	Continuing
Travel	Various	SPAWAR : Various	0.000	0.000		0.000		0.050	Nov 2019	-		0.050	Continuing	Continuing	Continuing
MAT Contracts Management	C/CPFF	BAH : San Diego, CA	0.000	0.000		0.000		0.800	Nov 2019	-		0.800	0.000	0.800	-
		Subtotal	0.000	0.000		0.000		2.350		-		2.350	Continuing	Continuing	N/A

Remarks

The FY20 increase provides for Mobile Advanced Extremely High Frequency (AEHF) Terminal (MAT) management services.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
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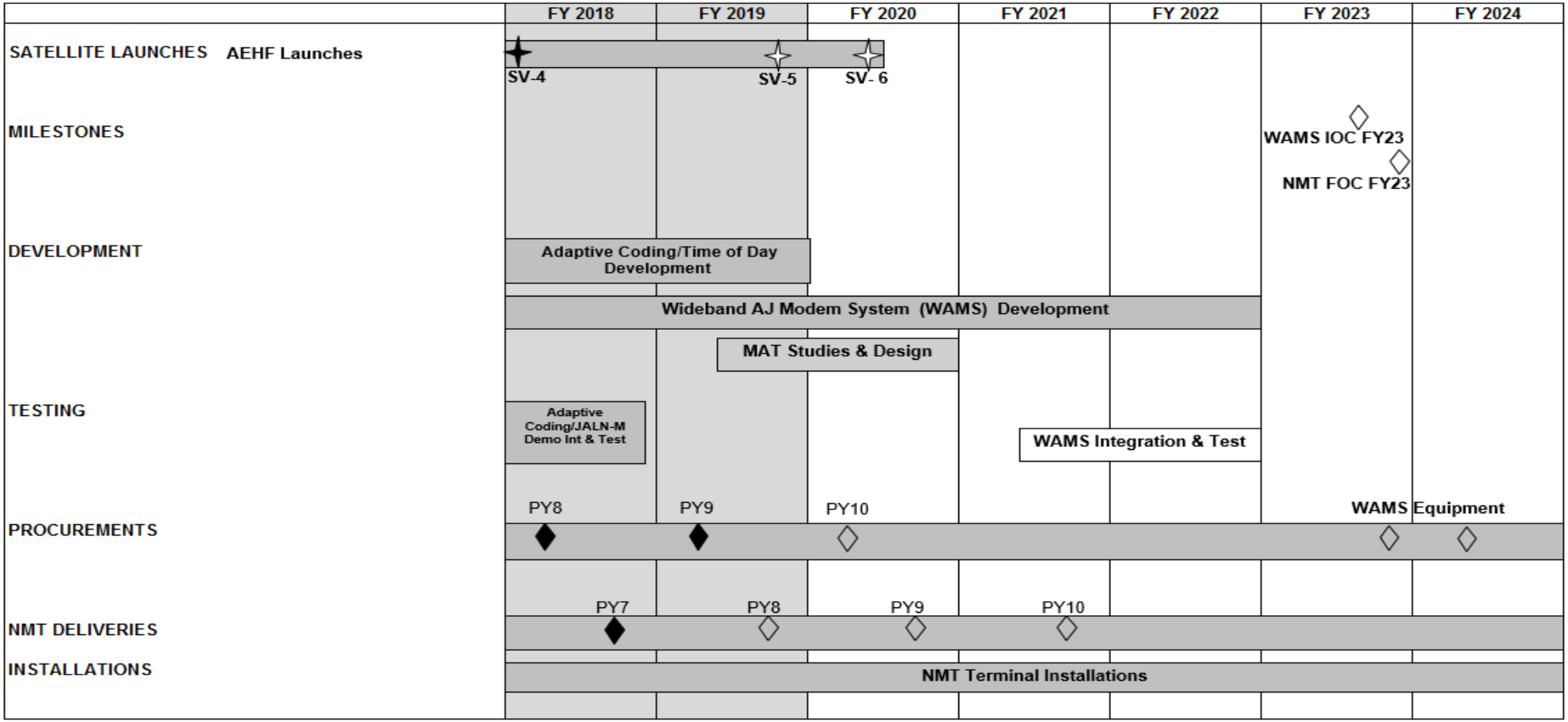
	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.000		34.344		-		34.344	Continuing	Continuing	N/A

Remarks

FY19 and Prior NMT cost data is provided under PE 1203109N, Project 0728.

FY19 MAT cost data is provided under PE 0101402N, Project 1083.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0303109N / *Satellite Communications (Space)*	**Project (Number/Name)** 0728 / *EHF SATCOM Terminals*



Notes:
FY18-19 NMT funding is provided under PE 1203109N Project 0728.
FY19 MAT funding was provided under PE 0101402N, Project 1083.

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0303109N / *Satellite Communications (Space)*	**Project (Number/Name)** 0728 / *EHF SATCOM Terminals*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0728				
AEHF Launch SV-6	2	2020	2	2020
NMT Procurement Year (PY10)	2	2020	2	2020
NMT FRP PY9 Delivery	3	2020	3	2020
NMT FRP PY10 Delivery	3	2021	3	2021
WAM Integration & Testing	2	2021	4	2022
WAMS IOC	3	2023	3	2023
NMT FOC	4	2023	4	2023
FY23 WAMS Procurement	4	2023	4	2023
FY24 WAMS Procurement	2	2024	2	2024