Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army											Date: May 2017	

Appropriation/Budget Activity
2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*

R-1 Program Element (Number/Name)
PE 0605031A *I Joint Tactical Network (JTN)*

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	20.790	16.014	44.150	-	44.150	41.175	27.353	25.051	25.350	Continuing	Continuing
EF5: *Joint Tactical Network (JTN)*	-	20.790	10.038	14.210	-	14.210	12.723	4.521	3.604	3.368	Continuing	Continuing
EX6: *Waveforms*	-	0.000	5.976	29.940	-	29.940	28.452	22.832	21.447	21.982	Continuing	Continuing

Note

In FY 2013, Joint Tactical Networks (JTN) was funded in the Navy Program Element (PE) 0604280N (Joint Tactical Radio System (JTRS)), Project No.3076 (formally known as JTRS Network Enterprise Domain (JNED)). JNED was renamed JTN and the Joint Executive Program Office (JPEO) JTRS transitioned to the JTNC in FY 2013, in accordance with the Acquisition Decision Memorandum (ADM) dated 11 July 2012. FY 2013 and FY 2014 JTNC funding was provided by the JTN Program via PE 0604280N and PE 0605030A, respectively.

As per the JTNC ADM dated 20 January 2014, JTN and JTNC became separate entities and PE 0605031A (Project Code EF5) was created for JTN. The 2014 ADM also directed that the waveform development and sustainment responsibilities transition to the Services in 4QFY15. PdM Waveforms (SRW, WNW) transitioned to PM TR; PdM Joint Enterprise Network Manager (JENM) transitioned to PEO C3T PM Warfighter Information Network-Tactical (WIN-T) PdM Tactical Cyber and Network Operations (TCNO); and Mobile User Objective System (MUOS) and Link16 transitioned to the Navy. For FY 2015 and out, the Army PE 0605031 contains only the JTN (Waveforms & JENM) RDT&E funding. As part of the joint program budget strategy for JENM, each Military Department (MILDEP) budgets for approximately one-third of the total program RDT&E funds for joint efforts. Joint funding is held at the Navy PE 0605030N and Air Force PE 0605030F. Prior to the year of execution, the funding is consolidated in the Army PE (0605031A) for execution.

A. Mission Description and Budget Item Justification

Join Tactical Networks (JTN) efforts are executed by PdM Waveforms and JENM .They are responsible for the portable, interoperable, mobile ad hoc networking waveforms and network enterprise services to enhance tactical warfighting capabilities. PdM Waveforms and JENM applications are: (1) Interoperable - among all Services, capable of operating in a variety of hardware items, for both Program of Record and commercial Non-Developmental Item (NDI) radios; (2) Secure - meet all DoD and US Government information assurance requirements; (3) Operationally relevant - quickly and effectively meet evolving network mission requirements of Combatant Commanders and the Services; (4) Affordable - drive down procurement and support costs via a robust, competitive Non-Developmental Item (NDI) market which adheres to open government standards.

In accordance with the Joint Tactical Networking Center (JTNC) Acquisition Decision Memorandum (ADM) and Charter dated 20 January, 2014, the JTN active efforts include the Soldier Radio Waveform (SRW), the Wideband Networking Waveform (WNW) and JENM. Due to the PdM Waveforms extensive knowledge and expertise, PdM Waveforms will also enhance, update, and sustain the following Legacy Waveforms on a reimbursable basis: the High Frequency (HF) waveform, the merged HAVE QUICK II (HQII) and Very High Frequency (VHF)/Ultra High Frequency (UHF) Line of Sight (VULOS) waveforms, the Joint Tactical Radio System (JTRS) Bowman waveform (JBW), the Single Channel Ground and Airborne Radio System (SINCGARS) waveform and the UHF Satellite Communications (SATCOM) waveform.

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605031A *I Joint Tactical Network (JTN)*

FY2018 Base RDTE dollars in the amount of $44.150 million supports the continued development of the Waveforms and JENM, testing support and the program management office.

B. Program Change Summary ($ in Millions)

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	18.055	16.014	24.258	-	24.258
Current President's Budget	20.790	16.014	44.150	-	44.150
Total Adjustments	2.735	0.000	19.892	-	19.892
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.715	-			
• Other Adjustments 1	0.000	0.000	10.021	-	10.021
• Other Adjustments 2	0.000	0.000	9.871	-	9.871
• Other Adjustments 3	3.450	0.000	0.000	-	0.000

Change Summary Explanation

$3.450 million of FY 2016 RDT&E funds were added to PdM Tactical Cyber and Network Operations (TCNO) - JENM Software Real-Time Frequency Management development requirement.

$10.021 million of FY 2018 RDT&E funds were identified to support PdM TCNO - JENM development requirements identified.

$9.867 million of FY 2018 RDT&E funds were identified to support PdM Waveforms Soldier Radio Waveform (SRW) Cyber Electro-Magnetic Activities (CEMA) and enterprise Over The Air Management (eOTAM) development requirements identified.

In accordance with the signed JTNC ADM and Charter dated 20 January 2014, Program Element (PE) 0605031A was established to execute JTN requirements in PB2015. FY 2015 was the first year funds were aligned to that PE. The Army has aligned their Service share of JENM and Waveform funding fully within the JTN PE for PB 2016. The Navy and Air Force funding for the JENM joint requirements remains in Navy PE 0605030N (shared) and Air Force PE 0605030F (shared). As part of the joint program budget strategy, each Military Department (MILDEP) budgets for approximately one-third of the total program RDT&E funds for joint efforts. Prior to the year of execution, the funding is consolidated in the Army PE for execution.

| Exhibit R-2A, RDT&E Project Justification: FY 2018 Army | | | | | | | | | | Date: May 2017 | |

| Appropriation/Budget Activity
2040 I 5 | | | | R-1 Program Element (Number/Name)
PE 0605031A I *Joint Tactical Network (JTN)* | | | | | | Project (Number/Name)
EF5 I *Joint Tactical Network (JTN)* | |

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EF5: *Joint Tactical Network (JTN)*	-	20.790	10.038	14.210	-	14.210	12.723	4.521	3.604	3.368	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

For FY 2018 and out, the continuing JTN efforts are funded in Army PE 0605031A (JTN), Navy PE 0605031N (shared), Air Force PE 0605031F (shared) and USMC (Marine Corps Communications Systems – MCPC: 112107). As part of the JENM joint program budget strategy, the Air Force and Army budget for approximately one-third each of the total program funds for JENM efforts. The Navy and USMC funding combined equal the other third of the JENM program funding. Prior to the year of execution, Navy and Air Force funding is consolidated in the Army PE (0605031A) and software sustainment funds are realigned from RDT&E to O&M,A PE (4326750A) to support the joint program acquisition strategy. USMC funding will be provided on an annual basis via Military Interdepartmental Purchase Request (MIPR). USMC funding projections are as follows: FY18 - $1.407M; FY19 - $1.118M; FY20 - $1.121M; FY21 - $1.139M and FY22 - $1.064M.

A. Mission Description and Budget Item Justification

The Joint Enterprise Network Manager (JENM) software provides the ability to plan, monitor, configure and control the Army's Software Defined Radio (SDR) communication networks. JENM configures numerous SDR radios such as the Manpack, MNVR and Rifleman, enabling them to utilize the Mobile Ad Hoc Networking (MANET) waveforms such as the Soldier Radio Waveform (SRW), Wideband Networking Waveform (WNW), Mobile User Objective System (MUOS), Satellite Communications (SATCOM) Demand Assigned Multiple Access (DAMA), Integrated Waveform (IW), and Single Channel Ground and Airborne Radio System (SINCGARS) waveforms. Furthermore, JENM provides the Commander the ability to quickly reconfigure critical networks using its' Over the Air Management (OTAM) functionality. JENM enhances the S6's ability to conduct Course of Action (COA) Analysis and the Military Decision Making Process (MDMP) providing commanders critical information regarding their ability to effectively communicate.

In accordance with the JTNC ADM and Charter dated 20 January 2014, the JTN active efforts include the SRW, the WNW and the JENM.

FY 2016, Army PE 0605031.EF5 contains only the JTN (Waveforms & JENM) RDT&E funding. Starting in FY17, PdM Waveforms is executing from Project Code EX6 and JENM is executing from Project Code EF5.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: SRW Development	2.066	-	-
Description: SRW will operate on tactical radio sets to provide a networked battlefield communications capability for users engaged in land combat operations and will support voice, data, and video communications on the immediate battlefield. These forces include vehicles, rotary wing, dismounted soldiers, munitions, sensors, and unmanned air vehicles (UAV). Functional software applications will use SRW radio enabled sets over Internet Protocol (IP) capable networks and sub-networks. SRW will be interoperable with higher throughput, IP based network waveforms, such as Wideband Networking Waveform (WNW). As			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		**Date:** May 2017
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605031A / *Joint Tactical Network (JTN)*	**Project (Number/Name)** EF5 / *Joint Tactical Network (JTN)*

B. Accomplishments/Planned Programs ($ in Millions)	**FY 2016**	**FY 2017**	**FY 2018**
applicable, these IP-based networking waveforms will enable information exchanges through the Global Information Grid (GIG) to the soldier and provide entirely new capabilities for battlefield communications and information sharing. SRW is currently ported on 21 different radio platforms with 9 different vendors. FY15 effort: JTN Enterprise Over-the-Air Management (OTAM) design provides Non-Developmental Integration (NDI) vendors a portable Operating Environment (OE)-centric OTAM approach extensible to SRW, WNW, and future networking waveforms. The Enterprise OTAM is platform and waveform agnostic and provides remote Unit Task Reorganization and radio management capabilities. *FY 2016 Accomplishments:* Continue to develop, evolve and enhance SRW to provide improved performance. Maintain test facility to conduct SRW test and evaluation. Release of SRW v1.2.2 will provide Emissions Control (EMCON) with Push to Talk (PTT) capability, and network performance. Begin SRW v2.0 efforts.			
Title: WNW Development *Description:* WNW is a high data rate Mobile Adhoc NETworking (MANET) waveform application that provides the mid tier tactical Internet backbone and connects tactical forces across the battle sphere. WNW will provide high throughput, dynamically adaptable connectivity for the exchange of IP based voice, data, and video traffic. WNW will feature two signals-in-space (SiS), which are the Orthogonal Frequency Division Multiplexing (OFDM) and Anti-Jam (AJ). WNW will support network nodes on mobile, airborne, and maritime platforms. WNW includes networking services, security, High Assurance IP Equipment (HAIPE) capabilities, red black switching, and internal routing of other WNW signals. WNW is currently ported on 7 different radio platforms with 5 different vendors. *FY 2016 Accomplishments:* Orient on an agile software approach to support the System of Systems Risk Reduction of the WNW dependent system at NIE 16.2 and a positive Milestone C decision for MNVR; deliver security updates and an optimized parametric package for Army Aviation WNW subnets, higher order modulation, and Anti-Jam subnets (WNW 4.2.1).	5.440	-	-
Title: JENM Program Office Support *Description:* Program Management Office support in the development of the JENM system. *FY 2017 Plans:* Funding will provide for JENM program office support to develop the JENM system as well as Dynamic Network Connectivity, a STARNET objective. *FY 2018 Plans:*	-	1.551	1.534

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605031A / *Joint Tactical Network (JTN)*	Project (Number/Name) EF5 / *Joint Tactical Network (JTN)*

B. Accomplishments/Planned Programs ($ in Millions)	**FY 2016**	**FY 2017**	**FY 2018**
Program Office funding will support JENM design, engineering, integration and test of mid and lower tier planning and management application for the Software Defined Radio (SDR) network. To align with the emerging Integrated Network Operations (INO) vision, JENM will lower and mid-tier Network Management with that of WIN-T to enable Soldiers the ability to manage the entire, consolidated, tactical network. JENM will also work to extend our Over-The-Air-Management (OTAM) capabilities to the mounted environment through our participation with Dynamic Network Connectivity development. Program Office Support funding will also support US Navy Digital Modular Radio (DMR) enhancements, ARC 210/231 development, USMC and USAF 117G MUOS deployment, full-rate production HMS Radios, AMF airborne radio, and the integration of USMC terrestrial based waveform planning and management capability.			
Title: JENM Development *Description:* JENM provides consolidated communications planning, network configuration, network activation, position reporting, fault management, security management, and network health and status reporting needed to establish and maintain a mobile wireless network comprised of JTN network waveforms. JENM can interface with other external network managers, mission planning systems, network planning systems, key management systems, and spectrum planning systems. JENM is considered a mission essential system. JENM is also considered a critical element within the J-TNT configuration management tool kit. *FY 2016 Accomplishments:* Conducted JENM Functional Qualification Tested (FQT) of JENM v3.3. Will be released in 1QFY17 to support MUOS MOT&E, Mid-Tier Networking Evaluation, JENM supported radio platform Operational Test (OT) and Network Integration Evaluation (NIE) 16.2. *FY 2017 Plans:* JENM will develop software products for Capability Set Fielding Team and support systems engineering for Navy Digital Modular Radio (DMR) for the MUOS system to include the Airborne Radio Communication (ARC) 210, and the Army/Navy Portable Radio Communications (PRC) 117G. JENM will initiate development of Dynamic Network Connectivity as part of the STARNET objective. JENM continues to provide software support to PdM HMS for Manpack and Rifleman Radio's full and open competition. *FY 2018 Plans:* JENM will support systems design, engineering, and integration of mid and lower tier radio planning and management application for the SDR network. JENM will provide support to the Unit Task Reorganization (UTR) systems integration effort to enable the S-6 to quickly transform the tactical network based upon the Commander's intent and associated mission analysis. JENM will support US Navy Digital Modular Radio (DMR) enhancements, ARC 210/231 development, full-rate production HMS Radios, Aviation Small Tactical Terminal (STT), and Small Airborne Networking Radio (SANR) and the integration of USMC terrestrial based waveform planning and management capability. JENM will continue to support modifications to the SRW, WNW, SINCGARS, SATCOM, and Integrated Waveforms. JENM will also incorporate enhanced over the air management (OTAM)	7.722	8.487	9.946

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 I 5	R-1 Program Element (Number/Name) PE 0605031A I *Joint Tactical Network (JTN)*	Project (Number/Name) EF5 I *Joint Tactical Network (JTN)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
capabilities for U.S. Army mid and lower tier waveforms along with continued integration of JENM capability within the WIN-T Network Management System (NMS) including automating critical interface for planning and configuring crypto solutions.			
Title: Legacy Radio Waveforms/Program Office Support *Description:* Legacy Radio Waveforms/Program Office Support: Includes the continued development, incremental upgrades, and software efficiencies of legacy software and other related activities to support the legacy waveform integration into hardware solutions in the field. *FY 2016 Accomplishments:* Locked control for PdM JENM and PdM Waveforms Program office and Legacy Radio Waveforms support. Shared costs.	5.562	-	-
Title: Test and Evaluation *FY 2018 Plans:* JENM will provide direct support to the FY-18 Developmental and Operational Test (DT/OT) of the PdM HMS Full and Open Competition (FOC) for the next generation Manpack and Rifleman/Leader radios. During this planned Network Integration Exercise (NIE) 18.2 event JENM will also undergo an Operational Test assessment to ensure it continues to meet the needs of today's Soldiers.	-	-	2.730
Accomplishments/Planned Programs Subtotals	20.790	10.038	14.210

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• 0605031N: *0605031N; JTN, RDTE,N*	-	-	3.284	-	3.284	1.291	1.296	1.318	1.229	Continuing	Continuing
• 0605031F: *0605031F; JTNC, RDTE,F*	-	6.427	4.691	-	4.691	3.725	3.735	3.798	3.874	Continuing	Continuing
• 4326750A: *4326750A: JTN, O&M,A*	8.993	-	-	-	-	-	-	-	-	Continuing	Continuing

Remarks

In FY 2015 and beyond PE 0605031A contains only the JTN (PdM Waveforms and PdM TCNO (JENM)) RDTE funding.

In accordance with the Acquisition Decision Memorandum (ADM) dated 11 July 2012, the Joint Tactical Radio System (JTRS) Program of Records (PORs) transitioned to Military Department (MILDEP) managed programs. As per the ADM dated 20 January 2014, JTN and JTNC became separate entities. FY 2015 and out, Army PE 0605031 contains only the JTN RDT&E funding. For FY2018 and out, the continuing JTN efforts are funded in Army PE 0605031A (JTN), Navy PE 0605031N (shared), Air Force PE 0605031F (shared) and USMC (Marine Corps Communications Systems – MCPC: 112107). As part of the joint program budget strategy, the Air Force

Exhibit R-2A, **RDT&E Project Justification:** FY 2018 Army		**Date:** May 2017
Appropriation/Budget Activity 2040 *I* 5	**R-1 Program Element (Number/Name)** PE 0605031A *I Joint Tactical Network (JTN)*	**Project (Number/Name)** EF5 *I Joint Tactical Network (JTN)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost

and Army budget for approximately one-third each of the total program funds for JENM efforts. The Navy and USMC funding combined equal the other third of the JENM program funding. Prior to the year of execution, Navy and Air Force funding is consolidated in the Army PE (0605031A) and software sustainment funds are realigned from RDT&E to O&M,A PE (4326750A) to support the joint program acquisition strategy. USMC funding will be provided on an annual basis via Military Interdepartmental Purchase Request (MIPR). USMC funding projections are as follows: FY18 - $1.407M; FY19 - $1.118M; FY20 - $1.121M; FY21 - $1.139M and FY22 - $1.064M.

In FY 2017 and out Waveform funding will be on the Army PE 0605031A, Project Code EX6. JENM funding will remain under Army PE 0605031A Project Code EF5.

D. Acquisition Strategy

Joint Tactical Network Center (JTNC) Acquisition Decision Memorandum (ADM) (July 2012) (JENM Supporting Role). Per the December 2014 Joint Tactical Network (JTN) Select Acquisition Report (SAR), JTN was 90% expended and changed to inactive. Defense Acquisition Management Information Retrieval (DAMIR) reflected the inactive status on 3 June 2015 JTN APB (13 October 2015) (JENM Supporting Role).

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army											Date: May 2017		
Appropriation/Budget Activity 2040 / 5						**R-1 Program Element (Number/Name)** PE 0605031A / *Joint Tactical Network (JTN)*				**Project (Number/Name)** EF5 / *Joint Tactical Network (JTN)*			

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JENM Program Management Support	C/CPFF	G2 Software Systems : San Diego, CA	0.000	-		0.909	Nov 2016	-		-		-	0.000	0.909	0.000
JENM Program Management Support	C/CPIF	Pending Contract Award : Aberdeen, MD	0.000	-		0.448	Nov 2016	-		-		-	0.000	0.448	0.000
JENM Program Management Support	Allot	USAASC : Aberdeen, MD	0.000	-		0.238	Oct 2016	0.898	Oct 2017	-		0.898	Continuing	Continuing	Continuing
JENM Program Management Support	MIPR	SSC PACIFIC : San Diego, CA	0.000	-		0.347	Oct 2016	-		-		-	0.000	0.347	0.000
Program Management Support	C/CPFF	Booz Allen Hamilton : San Diego, CA	0.336	0.337	Oct 2015	-		0.635		-		0.635	0.000	1.308	0.673
Program Management	C/CPFF	G2 Software Systems : San Diego, CA	0.840	0.843	Oct 2015	-		-		-		-	0.000	1.683	1.683
		Subtotal	1.176	1.180		1.942		1.533		-		1.533	-	-	-

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JENM NMRIL Development	C/CPFF	G2 Software Systems : San Diego, CA	0.000	-		0.992	Nov 2016	-		-		-	0.000	0.992	0.000
JENM NMRIL Development	C/CPFF	Pending Contract Award : Aberdeen, MD	0.000	-		0.875	Nov 2016	-		-		-	0.000	0.875	0.000
JENM NMRIL Development	MIPR	SSC PACIFIC : San Diego, CA	0.000	-		1.741	Oct 2016	9.736	Oct 2017	-		9.736	Continuing	Continuing	Continuing
Post Formal Qualification Testing-JENM	C/CPIF	Boeing : Huntington Beach, CA	1.876	4.263		-		-		-		-	0.000	6.139	4.991
Post Formal Qualification Testing-WNW	C/CPIF	General Dynamics : Scottsdale, AZ	1.217	1.540	Oct 2015	-		-		-		-	0.000	2.757	2.976

Exhibit R-3, **RDT&E Project Cost Analysis:** FY 2018 Army										**Date:** May 2017			
Appropriation/Budget Activity 2040 / 5					**R-1 Program Element (Number/Name)** PE 0605031A / *Joint Tactical Network (JTN)*					**Project (Number/Name)** EF5 / *Joint Tactical Network (JTN)*			

Product Development ($ in Millions)				**FY 2016**		**FY 2017**		**FY 2018** **Base**		**FY 2018** **OCO**		**FY 2018** **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**
Post Formal Qualification Testing-SRW	C/CPIF	Harris : Rochester, NY	1.225	1.329	Oct 2015	-	-	-	-	-	-	-	0.000	2.554	2.554
Software Communications Architecture (SCA) Compliance	MIPR	NSA : Fort Meade, MD	0.476	0.477	Oct 2015	-	-	-	-	-	-	-	0.000	0.953	0.953
Post FQT/Software Support	MIPR	SSC PAC : San Diego, CA	3.670	3.808	Oct 2015	-	-	-	-	-	-	-	0.000	7.478	7.604
Post FQT/Software Support	MIPR	CERDEC : APG, MD	0.305	0.306		-	-	-	-	-	-	-	0.000	0.611	0.611
Post FQT/Software Support	MIPR	SSC LANT : Charleston, SC	2.610	2.619	Oct 2015	-	-	-	-	-	-	-	0.000	5.229	5.229
Post Formal Qualification Testing-MUOS	C/CPIF	Lockheed Martin Corp. : Sunnyvale, CA	0.660	-	-	-	-	-	-	-	-	-	0.000	0.660	0.660
Post Formal Qualification Testing-Link 16	C/CPIF	BAE : Wayne, NJ	0.332	-	-	-	-	-	-	-	-	-	0.000	0.332	0.332
		Subtotal	12.371	14.342		3.608		9.736		-		9.736	-	-	-

Remarks

 FY 2016 PE 0605031A represents the total JTN RDTE budget. FY 2017 and beyond reflect JENM budget only.

Support ($ in Millions)				**FY 2016**		**FY 2017**		**FY 2018** **Base**		**FY 2018** **OCO**		**FY 2018** **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**
JENM v3 Software Support	C/CPFF	G2 Software Systems : San Diego, CA	0.000	-		0.442	Nov 2016	-		-		-	0.000	0.442	0.000
JENM v3 Software Support	C/CPFF	Pending Contract Award : Aberdeen, MD	0.000	-		0.607	Nov 2016	-		-		-	Continuing	Continuing	Continuing
JENM v3 Software Support	MIPR	SSC PACIFIC : San Diego, CA	0.000	-		0.694	Oct 2016	-		-		-	Continuing	Continuing	Continuing

Exhibit R-3, **RDT&E Project Cost Analysis:** FY 2018 Army													**Date:** May 2017

Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605031A / *Joint Tactical Network (JTN)*	**Project (Number/Name)** EF5 / *Joint Tactical Network (JTN)*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Development/Engineering/ Technical Support	C/CPFF	Various : various	0.861	0.994	Oct 2015	-	-	-	-	-	-	-	0.000	1.855	1.985
Subtotal			0.861	0.994		1.743		-		-		-	-	-	-

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JENM v3 System Engineering and Test	MIPR	SSC PACIFIC : San Diego, CA	0.000	-		1.104	Oct 2016	1.193	Oct 2017	-		1.193	Continuing	Continuing	Continuing
JENM v3 System Engineering and Test	MIPR	NM RIL : San Diego, CA	0.000	-		1.641	Nov 2016	1.748	Nov 2017	-		1.748	0.000	3.389	0.000
JTN Test and Evaluation Support	C/CPFF	Booz Allen Hamilton : San Diego, CA	0.702	1.160	Oct 2015	-	-	-	-	-	-	-	0.000	1.862	1.406
JTN Test and Evaluation	FFRDC	MITRE : San Diego, CA	1.600	2.061	Oct 2015	-	-	-	-	-	-	-	0.000	3.661	3.205
JTN Test and Evaluation Support	C/CPFF	G2 Software Systems : San Diego, CA	0.595	1.053	Oct 2015	-	-	-	-	-	-	-	0.000	1.648	1.192
Subtotal			2.897	4.274		2.745		2.941		-		2.941	-	-	-

	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	17.305	20.790		10.038		14.210		-		14.210	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army		**Date:** May 2017
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605031A / *Joint Tactical Network (JTN)*	**Project (Number/Name)** EF5 / *Joint Tactical Network (JTN)*

Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Wideband Networking Waveform (WNW)

WNW Software Enhancement and Version Drops

Soldier Radio Waveform (SRW)

SRW Software Enhancement and Version Drops

FY2018 JENM Software Development and Release

FY2018 JENM Software Development and Release

FY2020 JENM Software Development and Release

FY2020 JENM Software Development and Release

FY2022 JENM Software Development and Release

FY2022 JENM Software Development and Release

Exhibit R-4A, **RDT&E Schedule Details:** FY 2018 Army		**Date:** May 2017
Appropriation/Budget Activity 2040 *I* 5	**R-1 Program Element (Number/Name)** PE 0605031A *I Joint Tactical Network (JTN)*	**Project (Number/Name)** EF5 *I Joint Tactical Network (JTN)*

Schedule Details

Events	Start		End	
	Quarter	**Year**	**Quarter**	**Year**
Wideband Networking Waveform (WNW)	1	2015	4	2016
Soldier Radio Waveform (SRW)	1	2015	4	2016
FY2018 JENM Software Development and Release	2	2017	2	2018
FY2020 JENM Software Development and Release	2	2018	1	2020
FY2022 JENM Software Development and Release	1	2020	1	2022

Note

In FY17 and out Waveform funding will now be on the Army PE 0605031A, Project Code EX6. Starting in FY17, Waveforms Software Enhancements and Versions Drops will reflect on the Project Code EX6 Exhibit R4 and R4A.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017	
Appropriation/Budget Activity 2040 / 5				**R-1 Program Element (Number/Name)** PE 0605031A / *Joint Tactical Network (JTN)*						**Project (Number/Name)** EX6 / *Waveforms*	
COST ($ in Millions)	**Prior Years**	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
EX6: *Waveforms*	-	0.000	5.976	29.940	-	29.940	28.452	22.832	21.447	21.982	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Prior to FY17, PdM Waveforms was funded under JTN Army Program Element (APE) 0605031A (Project Code EF5). Starting in FY17, PdM Waveforms will be executing from Project Code EX6.

For FY17 and prior, PdM Waveforms utilized OMA funding to support annual engineering releases. Beginning in FY18, PdM Waveforms' refocused strategy eliminates annual engineering releases and replaces them with five year version upgrades to incorporate fixes and emerging threats to the warfighter. This strategy will eliminate the need for OMA funding.

A. Mission Description and Budget Item Justification

PdM Waveforms delivers, maintains, and upgrades portable, interoperable, mobile ad hoc networking waveforms and network enterprise services to enhance tactical warfighting capabilities. PdM Waveforms provides the Lower Tactical Internet with a suite of waveforms and network services that are: (1) Interoperable - used by all Services; (2) Capable of operating on a variety of hardware platforms, both Program of Record and non-developmental commercial radios; (3) Secure - meet all Department of Defense and US Government information assurance requirements; (4) Operationally relevant - quickly and effectively meet evolving network mission requirements of Combatant Commanders and the Services; and (5) Affordable - drive down procurement and support costs via a robust, competitive market which adheres to open government standards.

Project code EX6 funds the continued development of PdM Waveforms. FY2015-FY2016 requirements were executed from JTN APE 0605031A (Project Code EF5).

FY18 Base RDTE dollars in the amount of $29.940 million supports the continued development of the waveforms, testing support, and the program management office.

B. Accomplishments/Planned Programs ($ in Millions)	**FY 2016**	**FY 2017**	**FY 2018**
Title: Program Management Office Support	-	0.793	3.975
Description: Provides Program Management Office (PMO) support for Waveforms enhancements.			
FY 2017 Plans: Continues the program management support for PdM Waveforms.			
FY 2018 Plans: Continue program management support for PdM Waveforms.			
Title: Wideband Networking Waveform (WNW) Development	-	2.537	12.709

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		**Date:** May 2017
Appropriation/Budget Activity 2040 *I* 5	**R-1 Program Element (Number/Name)** PE 0605031A *I Joint Tactical Network (JTN)*	**Project (Number/Name)** EX6 *I Waveforms*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Description: WNW is a high data rate Mobile Adhoc Networking (MANET) waveform application that provides the Army's mid-tier tactical Internet backbone (transit network) and connects tactical forces during Unified Land Operations, particularly in Denied, Degraded, Disrupted, Space Operational Environment (D3SOE). WNW provides high throughput, dynamically adaptable connectivity for the secure exchange of IP based voice, data, and video traffic. WNW has two signals-in-space (SiS), which are the Orthogonal Frequency Division Multiplexing (OFDM) and Anti-Jam (AJ), each with multiple bandwidths. WNW supports network nodes on mobile, airborne, and maritime platforms. WNW includes Type 1 Encryption, networking services, High Assurance IP Equipment (HAIPE) capabilities, red/black switching, and internal routing of other WNW signals. WNW is currently ported on 7 radio platforms with 5 different vendors. *FY 2017 Plans:* Integrate HAIPE 4.2 interoperable core and designated extensions in collaboration with Joint Enterprise Net Manager (JENM) and Warfighter Information Network-Tactical (WIN-T) high efficiency routing deployments and enhanced electronic protection requirements assessments. Develop capability for expanded scale and high mobility subnets, continued electronic protection enhancements as well as Disruption Tolerant and Virtualized Networking functionality for WNW. Develop, test, and deploy a security enhanced, non-proprietary development environment. Evolve an expanded test bed for validation of performance and interoperability of waveform applications and radio platform services to support to Mid-tier Networking Vehicular Radio (MNVR) and Small Airborne Networking Radio (SANR) milestones. Support WNW evaluation as part of the MNVR Analysis of Alternatives (AoA). *FY 2018 Plans:* Continue development of the WNW 5.0 capability as described above and perform unit lead testing of interim engineering releases. Continue to expand the test bed for validation of performance and interoperability of waveform applications and radio platform services to support Mid-tier Networking Vehicular Radio (MNVR) and Small Airborne Networking Radio (SANR) milestones.			
Title: Soldier Radio Waveform (SRW) *Description:* Soldier Radio Waveform (SRW) will operate on tactical radio sets to provide a networked battlefield communications capability for users engaged in land combat operations and will support voice, data, and video communications on the immediate battlefield. These forces include vehicles, rotary wing aircraft, dismounted Soldiers, and unmanned aerial vehicles (UAV). Functional software applications will use SRW radio enabled sets over Internet Protocol (IP) capable networks and sub-networks. SRW will be interoperable with higher throughput, IP based network waveforms, such as Wideband Networking Waveform (WNW). As applicable, these IP-based networking waveforms will enable information exchanges through the Global Information Grid (GIG) to the Soldier and provide entirely new capabilities for battlefield communications and information sharing. SRW is currently ported on 21 different radio platforms with 9 different vendors.	-	2.646	13.256

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605031A / *Joint Tactical Network (JTN)*	**Project (Number/Name)** EX6 / *Waveforms*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
FY 2017 Plans: Continue to develop, evolve and enhance SRW to provide improved performance. Maintain test facility to conduct SRW test and evaluation. Release of v2.0 will provide Enhanced Electronic Protection (EEP), network performance and scalability improvements, and address SRW Narrowband requirements. ***FY 2018 Plans:*** Continue to develop, evolve and enhance SRW to provide improved performance. Maintain test facility to conduct SRW test and evaluation. Continue development of SRW version 2.0. a. Provide improved cyber robustness for SRW, including a mode that is robust to modern EW devices, synchronizes with blue force Defense Electronic Attack (DEA) devices, and operates in a congested RF environment to support the SRW CEMA effort. b. Develop an eOTAM radio service to provide updates over the air for operational parameters and maintenance functions across the radio network.			
Accomplishments/Planned Programs Subtotals	-	5.976	29.940

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• 4326750A: *4326750A: JTN, O&M, A*	8.993	10.278	-	-	-	-	-	-	-	0	19.271

Remarks

In FY2014, the JTN (PdM Waveforms) was funded in the APE 0605030A. This was a shared line with JTNC. In FY2016 and beyond APE 0605030A will be JTNC only.

In FY2015 and FY2016 APE 0605031A (Project Code EF5) contains only the JTN (PdM Waveforms and PdM JENM) RDTE funding. Starting in FY2017, PdM Waveforms will be executing from Project Code EX6.

Prior to the year of execution, software sustainment funds are realigned from RDTE to OMA APE 4326750A to support the PdM Waveforms program acquisition strategy.

D. Acquisition Strategy

PdM Waveforms is responsible for common core activities including developing and updating legacy and networking waveforms that operate on multiple radios sets and in all operational environments that support network-centric operational warfare. Waveform developments (upgrading, developing, and maintaining) will generally be procured through full and open contract competitions.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		**Date:** May 2017
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605031A / *Joint Tactical Network (JTN)*	**Project (Number/Name)** EX6 / *Waveforms*
E. Performance Metrics N/A		

Exhibit R-3, **RDT&E Project Cost Analysis:** FY 2018 Army		**Date:** May 2017
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605031A / *Joint Tactical Network (JTN)*	**Project (Number/Name)** EX6 / *Waveforms*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	MIPR	CERDEC : APG, MD	0.000	-		0.232		0.678		-		0.678	Continuing	Continuing	Continuing
Program Management Support	C/CPFF	Various/TBD : Aberdeen, MD	0.000	-		-		0.489		-		0.489	Continuing	Continuing	Continuing
Program Management Support	MIPR	MITRE : Aberdeen, MD	0.000	-		0.561		2.808		-		2.808	Continuing	Continuing	Continuing
Subtotal			0.000	-		0.793		3.975		-		3.975	-	-	-

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Development-SRW	C/CPFF	Harris : Rochester, NY	0.000	-		0.997		3.176		-		3.176	Continuing	Continuing	Continuing
Software Development-SRW	C/CPFF	Various/TBD : APG, MD	0.000	-		0.920		3.175		-		3.175	Continuing	Continuing	Continuing
Software Development - WNW	MIPR	SSC Atlantic : Charleston, SC	0.000	-		0.567		2.486		-		2.486	Continuing	Continuing	Continuing
Software Development - WNW	C/CPFF	Various/TBD : APG, MD	0.000	-		-		3.603		-		3.603	Continuing	Continuing	0.000
Subtotal			0.000	-		2.484		12.440		-		12.440	-	-	-

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Support - SRW	MIPR	CERDEC : APG, MD	0.000	-		0.194		2.314		-		2.314	Continuing	Continuing	Continuing
Software Support - SRW	C/CPFF	Harris : Rochester, NY	0.000	-		0.421		3.861		-		3.861	Continuing	Continuing	Continuing
Software Support - WNW	MIPR	SSC Atlantic : Charleston, SC	0.000	-		0.729		1.947		-		1.947	Continuing	Continuing	Continuing

Exhibit R-3, **RDT&E Project Cost Analysis:** FY 2018 Army											**Date:** May 2017		
Appropriation/Budget Activity 2040 **/** 5						**R-1 Program Element (Number/Name)** PE 0605031A **/** *Joint Tactical Network (JTN)*					**Project (Number/Name)** EX6 **/** *Waveforms*		

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Software Support - WNW	C/CPFF	Various/TBD : APG, MD	0.000	-		0.862		2.932		-		2.932	Continuing	Continuing	Continuing
		Subtotal	0.000	-		2.206		11.054		-		11.054	-	-	-

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation Support (SRW RIL)	MIPR	CERDEC : APG, MD	0.000	-		0.146		0.730		-		0.730	Continuing	Continuing	Continuing
Test and Evaluation Support (WNW RIL)	MIPR	SSC Atlantic : Charleston, SC	0.000	-		0.347		1.741		-		1.741	Continuing	Continuing	Continuing
		Subtotal	0.000	-		0.493		2.471		-		2.471	-	-	-

	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	-	5.976	29.940	-	29.940	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605031A / Joint Tactical Network (JTN)	Project (Number/Name) EX6 / Waveforms

Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

(1) Wideband Networking Waveform 4.2.1 — ▲1 WNW 4.2.1

(2) Wideband Networking Waveform 4.2.2 — ▲2 WNW 4.2.2

(3) Wideband Networking Waveform 5.0 — ▲3 WNW 5.0

(4) Soldier Radio Waveform 1.2.2 — ▲4 SRW 1.2.2

(5) Soldier Radio Waveform 2.0 — ▲5 SRW 2.0

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605031A / *Joint Tactical Network (JTN)*	**Project (Number/Name)** EX6 / *Waveforms*

Schedule Details

Events	Start		End	
	Quarter	**Year**	**Quarter**	**Year**
Wideband Networking Waveform 4.2.1	2	2016	2	2016
Wideband Networking Waveform 4.2.2	1	2017	1	2017
Wideband Networking Waveform 5.0	1	2020	1	2020
Soldier Radio Waveform 1.2.2	3	2016	3	2016
Soldier Radio Waveform 2.0	2	2020	2	2020