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 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0604120A *I Assured Positioning, Navigation and Timing (PNT)*							
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	-	26.967	83.279	164.967	-	164.967	138.323	80.491	25.811	1.673	Continuing	Continuing
ED5: *Assured Positioning, Navigation and Timing (PNT)*	-	7.416	11.116	23.991	-	23.991	20.000	28.000	12.010	0.000	0.000	102.533
EH8: *DISMOUNTED*	-	0.000	3.200	14.423	-	14.423	10.507	2.263	0.000	0.000	0.000	30.393
EH9: *PSEUDOLITES*	-	19.551	57.411	79.230	-	79.230	44.768	8.407	0.000	0.000	0.000	209.367
EJ2: *MOUNTED*	-	0.000	11.552	35.300	-	35.300	44.273	11.828	5.655	0.000	0.000	108.608
EJ3: *ANTI-JAM ANTENNA*	-	0.000	0.000	12.023	-	12.023	18.775	29.993	8.146	1.673	Continuing	Continuing

Note

PE 0604120A: Assured Positioning, Navigation and Timing will transition from Budget Activity-4 to Budget Activity-5 in Fiscal Year 2020.

A. Mission Description and Budget Item Justification

Assured Positioning, Navigation and Timing (PNT) will provide the Army's ground maneuver forces access to trusted PNT information under conditions where space-based PNT Global Positioning System (GPS) may be limited or denied. Joint Requirements Oversight Council Memo (JROCM) 049-10, dated 05 Apr 2010, approved the Positioning, Navigation and Timing Assurance Initial Capabilities Document and designated the Army as the Lead Component for Assured PNT. The Material Development Decision (MDD) was approved on 30 Jul 2013. The Assured PNT draft Capabilities Development Document was validated by the Army Requirements Oversight Council (AROC) on 28 Jul 2014.

PNT is a critical enabler of many Army systems. The current GPS capability is a fixed frequency system vulnerable to current and emerging threats and field conditions, which means Warfighter assured access and integrity to PNT is not guaranteed. This situation degrades mission performance to an unacceptable level. Therefore, current Army systems cannot operate at the required PNT Assurance Levels with GPS alone.

Assured PNT is a system of systems consisting of one project (ED5) Assured PNT and four separate and interdependent PNT products; (EH8) Dismounted A-PNT System, (EH9) Pseudolite, (EJ2) Mounted A-PNT System, and (EJ3) Anti-Jam Antenna System (AJAS). These interdependent PNT products assure access to and integrity of PNT information. Each system provides a degree of standalone capability, but only when deployed together can Assured PNT be achieved in all environments and across all formations and warfighting functions. Program Manager (PM) PNT manages these four products (Dismounted A-PNT System, Pseudolite, Mounted A-PNT System, and AJAS) constructed to develop, test, field, and sustain the A-PNT materiel solution. The final contracting strategy is under development.

Assured PNT consists of:
(ED5) - The Assured PNT funding line originally represented the entire program prior to breaking into four funding lines. The FY17-FY22 funding now includes PNT System of Systems Architecture (SOSA) Testing and Resiliency and Software Assurance Modification (RSAM) to legacy GPS systems.

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 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604120A *I Assured Positioning, Navigation and Timing (PNT)*

(EH8) - The Dismounted Assured Positioning, Navigation and Timing (PNT) System is a Size, Weight, Power, and Cost (SWAP-C) optimized military Global Positioning System (GPS) and non-GPS sensor suite that acquires and distributes trusted PNT data to soldier-borne systems.

(EH9) - The Pseudolite system provides area protection and PNT Assurance in GPS denied environments by providing terrestrial radio navigation (GPS-like) service in electronically or physically challenged environments using a higher power signal.

(EJ2) - The Mounted Assured PNT System fuses military GPS with physics based sensors and timing technology to acquire and distribute secure trusted PNT data to tactical client systems on vehicular and watercraft platforms.

(EJ3) - The Anti-Jam Antenna Systems (AJAS) provides GPS signal point protection and PNT Assurance in challenged environments through anti-jam technologies. AJAS enables tactical capabilities through assured signal acquisition in challenged environments.

FY 2018 Base funds in the total amount of $164.967 million are provided to continue the development of the Assured PNT program. The ED5 funding line accounts for $23.991 million for PNT System of Systems Architecture (SOSA) Testing, Resiliency and Software Assurance Modification (RSAM) and enhancements of Army PNT capabilities. The EH8 funding line accounts for $14.423 million to support risk reduction efforts for the Dismounted A-PNT System. The EH9 funding line accounts for $79.230 million for the continuation of the Technology Maturation and Risk Reduction phase for Pseudolite. The EJ2 funding line accounts for $35.300 million to support risk reduction efforts for the Mounted Assured PNT System. The EJ3 funding line accounts for $12.023 million to support risk reduction efforts for the AJAS.

B. Program Change Summary ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	30.058	83.279	108.847	-	108.847
Current President's Budget	26.967	83.279	164.967	-	164.967
Total Adjustments	-3.091	0.000	56.120	-	56.120
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.191	-			
• Adjustments to Budget Years	0.000	0.000	56.120	-	56.120
• Other Adjustments 1	-1.900	0.000	0.000	-	0.000

Change Summary Explanation

FY 2016 reduction of $1.900 million reflects realignment of funding to higher priority requirement for Anti-Personnel Landmine Alternatives.

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 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604120A *I Assured Positioning, Navigation and Timing (PNT)*

FY 2018 Base funds increased by $56.120 million in order to support the continuation of the Pseudolites Technology Maturation and Risk Reduction (TMRR) phase. In addition, the funding supports the risk reduction efforts for all four Assured PNT products (Dismounted A-PNT System, Pseudolite, Mounted A-PNT System and Anti-Jam Antenna).

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	Project (Number/Name) ED5 / *Assured Positioning, Navigation and Timing (PNT)*	

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
ED5: *Assured Positioning, Navigation and Timing (PNT)*	-	7.416	11.116	23.991	-	23.991	20.000	28.000	12.010	0.000	0.000	102.533
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

PE 0604120A: ED5 - Assured Positioning, Navigation and Timing is transitioning from Budget Activity-4 to Budget Activity-5 in Fiscal Year 2019.

A. Mission Description and Budget Item Justification

Assured PNT will provide the Army's ground maneuver forces access to trusted PNT information under conditions where space-based PNT Global Positioning System (GPS) may be limited or denied. Joint Requirements Oversight Council Memo (JROCM) 049-10, dated 5 Apr 2010, approved the Positioning, Navigation and Timing Assurance Initial Capabilities Document and designated the Army as the Lead Component for Assured PNT. The Material Development Decision (MDD) was approved on 30 Jul 2013. The Assured PNT draft Capabilities Development Document was validated by Army Requirements Oversight Council (AROC) on 28 Jul 2014.

FY 2018 Base funds in the amount of $23.991 million are to support PNT System of Systems Architecture (SOSA) Testing and Resiliency and Software Assurance Modification (RSAM). The U.S. Army is required to operate in an ever evolving GPS contested environment. The PNT SOSA Testing will allow for Army systems to test developed RSAM software and enable actions to be taken to ensure full operation of Army Forces through RSAM field patches, Military-Code (M-Code) implementation, and Assured PNT.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Military GPS User Equipment for Precision Munitions, PNT System of System Testing and Resiliency and Software Assurance Modification	7.416	11.116	23.991
Description: Acceleration of MGUE (Military GPS User Equipment) Increment 2 for Precision Guided Munitions (AM2P). In addition, the effort supports testing of PNT SOSA of Army PNT capabilities and RSAM.			
FY 2016 Accomplishments: FY 2016 Base funds further assessed the technology maturity and Joint Common GPS Specification and Interface Control Document. These efforts include bench top component level testing of GPS receiver prototypes, integration of the GPS receivers into a Precision Guided Munition platform and live fire guide-to-hit (Technology Readiness Level 6) demonstration of the GPS receivers.			
FY 2017 Plans: FY 2017 Base funds will provide for Army Global Positioning System (GPS)/Positioning, Navigation and Timing (PNT) test assets. These systems and assets will be utilized for System of Systems Architecture (SOSA) testing. The testing data will validate			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	**Project (Number/Name)** ED5 / *Assured Positioning, Navigation and Timing (PNT)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Resiliency and Software Assurance Modification (RSAM) and aid senior leadership in determining the most equitable path forward on PNT modernization. ***FY 2018 Plans:*** FY18 Base funds will support testing of PNT SOSA of Army PNT capabilities. This testing will inform the RSAM and Assured PNT requirements, and will validate RSAM implementation. RSAM implementation will include modifications to Army Legacy receivers GPS systems.			
Accomplishments/Planned Programs Subtotals	7.416	11.116	23.991

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

FY16: The acquisition strategy includes the acceleration of Military GPS User Equipment (MGUE) Increment 2 for Precision Guided Munitions (AM2P). This will provide a technology maturity assessment of MGUE Increment 1 technology and increase supply chain competition for subsequent use by Joint Precision Guided Munitions (PGM) to avoid potential significant performance and operation risks. The Joint Common GPS Specification and Interface Control Document will be validated through live fire Technology Readiness Level 6 (TRL6) demonstration. The M-Code GPS enables essential PGM-based lethality capabilities in potential "M-Code Only" GPS combat scenarios and maintains combat overmatch enabled by Joint GPS-based PGMs.

FY17 and beyond: The planned acquisition strategy for PNT SOSA testing and RSAM implementation is to award sole source contracts to the original equipment manufacturers, utilize existing engineering support contracts, and leverage the Communications Electronics Research Development Engineering Center (CERDEC) to develop and evaluate solutions to enhance the resiliency of GPS-dependent systems operating in evolving contested environments.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	**Project (Number/Name)** ED5 / *Assured Positioning, Navigation and Timing (PNT)*	

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
Project Management Support	Allot	PM PNT : Various	0.485	-		0.517	Oct 2017	0.693	Oct 2017	-		0.693	Continuing	Continuing	0.000
		Subtotal	0.485	-		0.517		0.693		-		0.693	-	-	0.000

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
AM2P – DOTC GPS Receiver Prototypes	C/FFP	Rockwell Collins : Cedar Rapids, IA	0.630	-		-		-		-		-	0.000	0.630	0.000
AM2P – DOTC GPS Receiver Prototypes	C/CPFF	L-3 IEC : Anaheim, CA	0.600	-		-		-		-		-	0.000	0.600	0.000
AM2P – DOTC GPS Receiver Prototypes	C/CPFF	EOIR Technologies : Fredericksburg, VA	3.982	-		-		-		-		-	0.000	3.982	0.000
AM2P – DOTC GPS Receiver Prototypes	C/CPFF	SAVIT : Rockaway, NJ	0.286	-		-		-		-		-	0.000	0.286	0.000
AM2P – GPS/PGM Integration	MIPR	various : various	0.000	2.989	Jan 2016	-		-		-		-	0.000	2.989	0.000
Develop Pseudolite Competitive Prototype Contractor 1	C/CPIF	Datapath - Rockwell Collins : Cedar Rapids, IA	3.615	-		-		-		-		-	0.000	3.615	0.000
Develop Pseudolite Competitive Prototype Contractor 2	C/CPIF	L-3 Communications : Anaheim, CA	3.237	-		-		-		-		-	0.000	3.237	0.000
RSAM - Develop RSAM Receiver 1 Modifications	SS/CPFF	Rockwell Collins : Cedar Rapids, IA	0.000	-		-		3.035	Feb 2018	-		3.035	Continuing	Continuing	0.000
RSAM - Develop RSAM Receiver 2 Modifications	SS/CPFF	GCC Technologies : Oakland, MD	0.000	-		-		5.892	Jan 2018	-		5.892	Continuing	Continuing	0.000
RSAM - Develop RSAM Integration Modifications	Various	Various : Various	0.000	-		-		1.890	Dec 2017	-		1.890	Continuing	Continuing	0.000
		Subtotal	12.350	2.989		-		10.817		-		10.817	-	-	0.000

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	Project (Number/Name) ED5 / *Assured Positioning, Navigation and Timing (PNT)*	

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
Engineering and Technical Contracting Services	C/FFP	Various : Various	0.920	-		-		4.262	Dec 2017	-		4.262	Continuing	Continuing	0.000
Engineering and Technical Government Services	MIPR	C4ISR : Various	1.290	-		-		1.296	Nov 2017	-		1.296	Continuing	Continuing	0.000
AM2P – Government Eng	MIPR	ARDEC : Picatinny, NJ	1.876	2.120	Jan 2016	-		-		-		-	0.000	3.996	0.000
AM2P- Joint PGM SME	MIPR	Various : Various	2.026	1.415	Jan 2016	-		-		-		-	0.000	3.441	0.000
		Subtotal	6.112	3.535		-		5.558		-		5.558	-	-	0.000

Test and Evaluation ($ 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
AM2P – Bench Top Component Level Test	MIPR	Various : Various	0.000	0.112	Mar 2016	-		-		-		-	0.000	0.112	0.000
AM2P – Flight Tests	MIPR	Various : Yuma Proving Ground, AZ	0.000	0.780	Jun 2016	-		-		-		-	0.000	0.780	0.000
SOSA Testing/RSAM - Government Eng Support	MIPR	Various : Various	0.000	-		3.038	Nov 2016	3.660	Nov 2017	-		3.660	Continuing	Continuing	0.000
SOSA Testing/RSAM - Contractor Eng Support	Various	Various : Various	0.000	-		3.800	Dec 2016	1.998	Dec 2017	-		1.998	Continuing	Continuing	0.000
SOSA Testing/RSAM - Receiver acquisition	Various	Various : Various	0.000	-		1.211	Dec 2016	-		-		-	0.000	1.211	0.000
SOSA Testing/RSAM - Test PNT system modifications	Various	Various : Various	0.000	-		2.550	Dec 2016	-		-		-	0.000	2.550	0.000
SOSA Testing/RSAM Test Equipment	Various	Various : Various	0.000	-		-		1.265	Dec 2017	-		1.265	Continuing	Continuing	0.000
		Subtotal	0.000	0.892		10.599		6.923		-		6.923	-	-	0.000

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	Project (Number/Name) ED5 / *Assured Positioning, Navigation and Timing (PNT)*	

	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	18.947	7.416		11.116		23.991		-		23.991	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	**Project (Number/Name)** ED5 / *Assured Positioning, Navigation and Timing (PNT)*

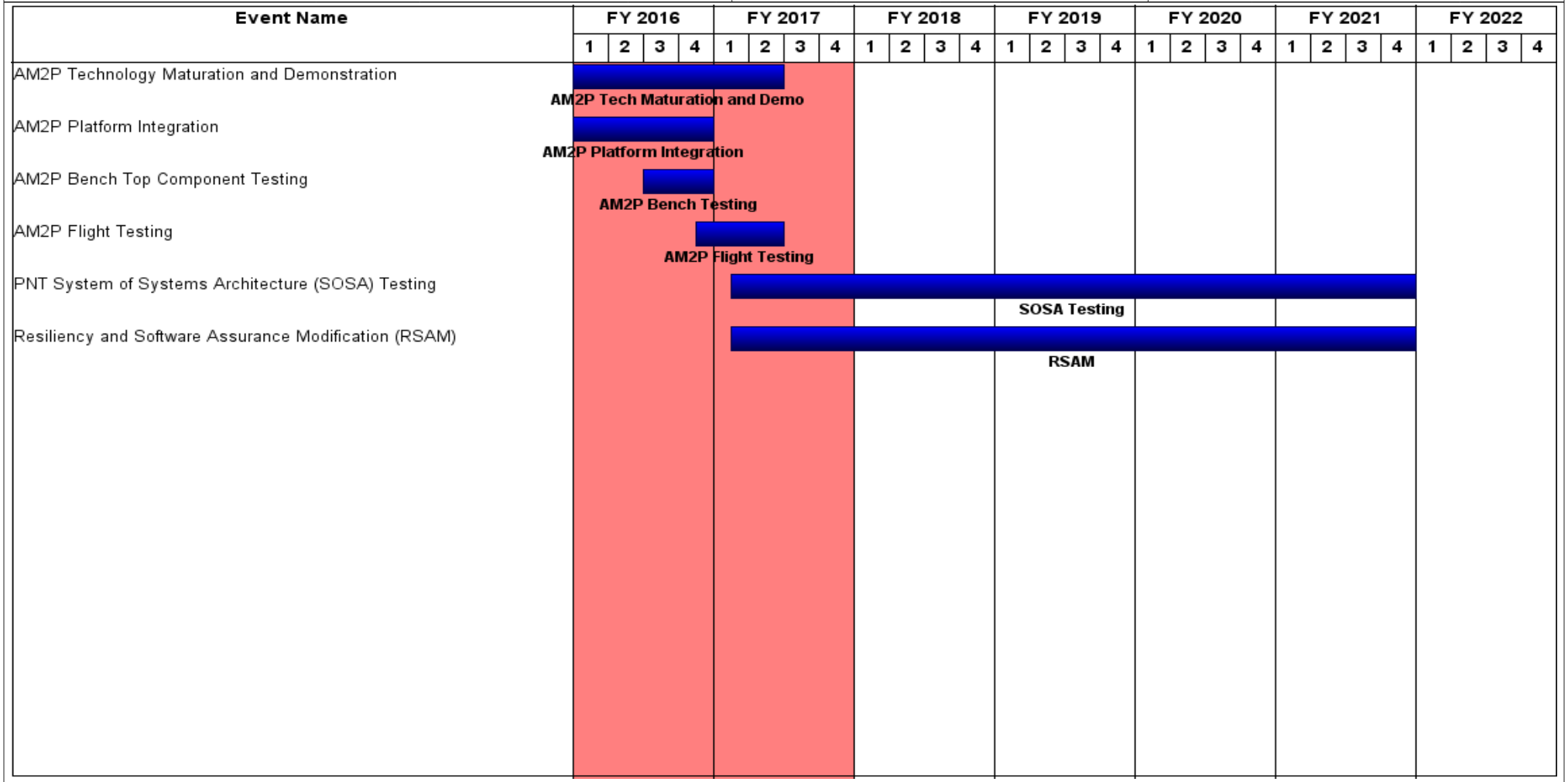

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	**Project (Number/Name)** ED5 / *Assured Positioning, Navigation and Timing (PNT)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
AM2P Technology Maturation and Demonstration	1	2015	2	2017
AM2P Platform Integration	1	2016	4	2016
AM2P Bench Top Component Testing	3	2016	4	2016
AM2P Flight Testing	4	2016	2	2017
PNT System of Systems Architecture (SOSA) Testing	1	2017	4	2021
Resiliency and Software Assurance Modification (RSAM)	1	2017	4	2021

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	Project (Number/Name) EH8 / *DISMOUNTED*	

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
EH8: *DISMOUNTED*	-	0.000	3.200	14.423	-	14.423	10.507	2.263	0.000	0.000	0.000	30.393
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

PE 0604120A: EH8 - Dismounted Assured Positioning, Navigation and Timing (PNT) System will transition from Budget Activity-4 to Budget Activity-5 in Fiscal Year 2020.

A. Mission Description and Budget Item Justification

The Dismounted Assured PNT System acquires, protects, and distributes secure PNT on dismounted platforms. Dismounted A-PNT System is a stand-alone system and will be used in conjunction with the PEO Soldier Nett Warrior System. Dismounted A-PNT System is planned to be modular, scalable form-factor that paces the threats and includes development and integration of GPS and non-GPS sensors. Dismounted A-PNT System includes receiver software capable of acquiring Pseudolite signals resulting in additional protection for military GPS in denied environments and includes a migration path to Military-Code (M-Code) and other future technologies.

FY 2018 Base funds in the amount of $14.423 million are provided to support risk reduction/prototyping efforts required to mature critical technologies and development of the Acquisition Requirements Package and other documentation to support the Developmental Request for Proposal Release Decision Point milestone.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Dismounted A-PNT System	-	3.200	14.423
Description: Risk Reduction efforts to reduce technology risk and to determine the appropriate set of technologies to be integrated into the full system. ***FY 2017 Plans:*** FY 2017 Base funds will support risk reduction efforts for the Dismounted A-PNT System. ***FY 2018 Plans:*** FY2018 Base funds will support risk reduction/prototyping efforts required to mature critical technologies and development of the Acquisition Requirements Package and other documentation to support the Developmental Request for Proposal Release Decision Point milestone.			
Accomplishments/Planned Programs Subtotals	-	3.200	14.423

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	**Project (Number/Name)** EH8 / *DISMOUNTED*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

Assured Positioning, Navigation and Timing (PNT) is a system comprised of four products; Dismounted A-PNT System, Pseudolite, Mounted A-PNT System, and Anti-Jam Antenna System (AJAS), to assure access to and integrity of PNT information. Each product provides a degree of standalone capability, but only when deployed together can Assured PNT be achieved in all environments and across all formations and warfighting functions. Program Manager (PM) PNT manages these four products (Dismounted A-PNT System, Pseudolite, Mounted A-PNT System, and AJAS) constructed to develop, test, field, and sustain the A-PNT materiel solution. The final contracting strategy is under development.

The Dismounted A-PNT System acquisition strategy will begin at Milestone B. After successful Milestone B and award of the Engineering Manufacturing Development contract, development, integration and testing of the Dismounted A-PNT System solution will begin.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	Project (Number/Name) EH8 / *DISMOUNTED*	

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
Project Management Support - Government	Allot	PM PNT : APG, MD	0.000	-		0.425	Oct 2016	0.558	Oct 2017	-		0.558	Continuing	Continuing	0.000
Project Management Support - Contractor	C/CPFF	Various : Various	0.000	-		-		0.186	Nov 2017	-		0.186	Continuing	Continuing	0.000
FFRDC	SS/CR	MITRE : Various	0.000	-		0.290		-		-		-	0.000	0.290	0.000
		Subtotal	0.000	-		0.715		0.744		-		0.744	-	-	0.000

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
Development of a Dismounted M-Code capable prototype	MIPR	PEO Command Control Communications-Tactical : APG, MD	0.000	-		-		5.200	Dec 2017	-		5.200	Continuing	Continuing	0.000
Development of a small SWAP-C multi sensor navigation prototype	MIPR	CERDEC Command Power and Integration Directorate : APG, MD	0.000	-		-		4.694	Dec 2017	-		4.694	Continuing	Continuing	0.000
Development of sensor fusion algorithm	MIPR	CERDEC Command Power and Integration Directorate : APG, MD	0.000	-		-		0.789	Dec 2017	-		0.789	Continuing	Continuing	0.000
Engineering and Technical Product Support	MIPR	C4ISR : Various	0.000	-		-		0.412	Nov 2017	-		0.412	Continuing	Continuing	0.000
		Subtotal	0.000	-		-		11.095		-		11.095	-	-	0.000

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	Project (Number/Name) EH8 / *DISMOUNTED*	

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
Engineering and Technical Services - Government	Various	C4ISR : Various	0.000	-		1.099	Nov 2016	0.904	Nov 2017	-		0.904	Continuing	Continuing	0.000
Engineering and Technical Services - Contractor	C/CPFF	Various : Various	0.000	-		1.386	Dec 2016	1.444	Dec 2017	-		1.444	Continuing	Continuing	0.000
		Subtotal	0.000	-		2.485		2.348		-		2.348	-	-	0.000

Test and Evaluation ($ 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
Test Support - Contractor	C/Various	Various : Various	0.000	-		-		0.236	Dec 2017	-		0.236	Continuing	Continuing	0.000
		Subtotal	0.000	-		-		0.236		-		0.236	-	-	0.000

	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	-		3.200		14.423		-		14.423	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	**Project (Number/Name)** EH8 / *DISMOUNTED*

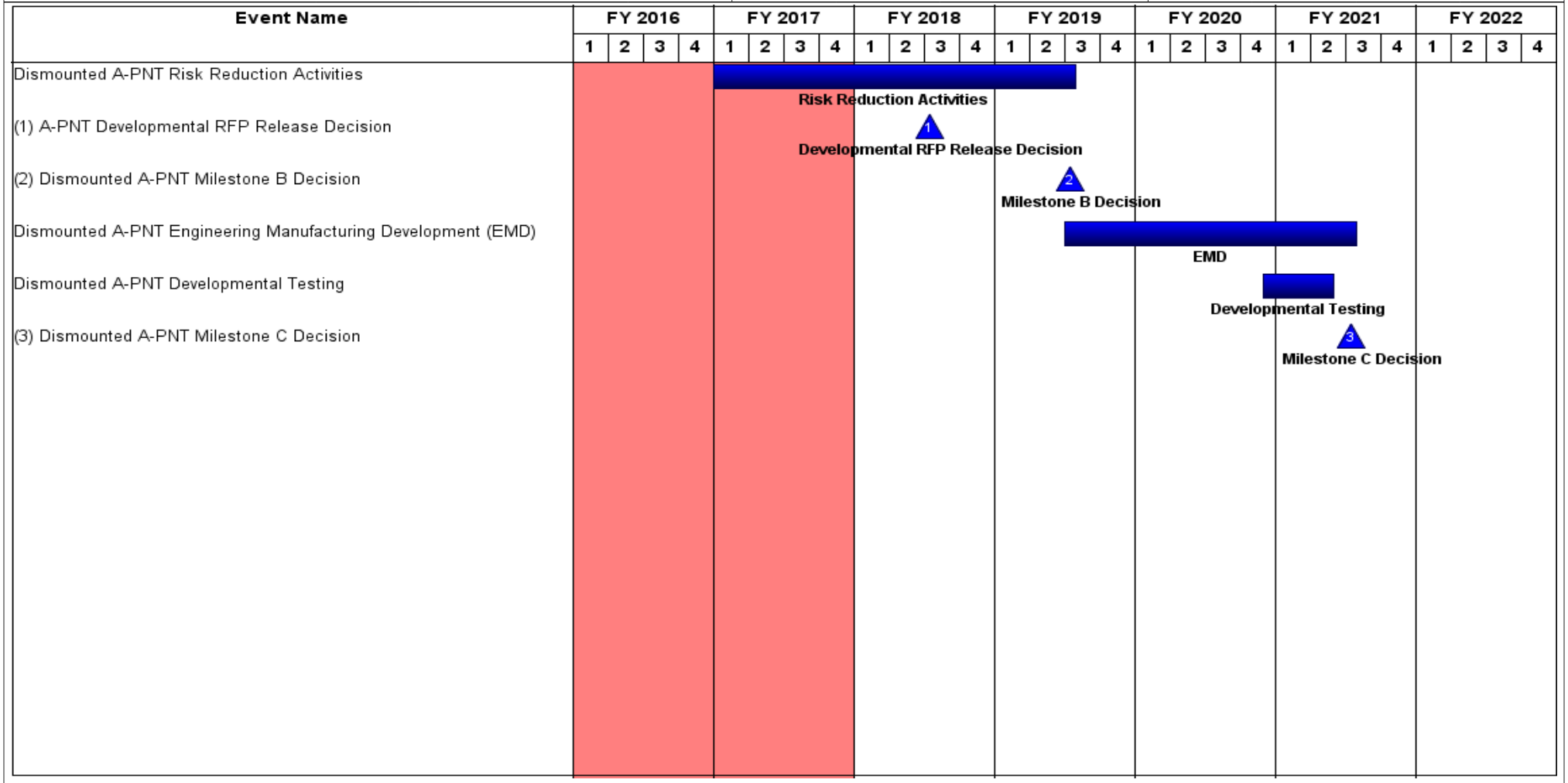

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	**Project (Number/Name)** EH8 / *DISMOUNTED*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Dismounted A-PNT Risk Reduction Activities	1	2017	3	2019
A-PNT Developmental RFP Release Decision	3	2018	3	2018
Dismounted A-PNT Milestone B Decision	3	2019	3	2019
Dismounted A-PNT Engineering Manufacturing Development (EMD)	3	2019	3	2021
Dismounted A-PNT Developmental Testing	4	2020	2	2021
Dismounted A-PNT Milestone C Decision	3	2021	3	2021

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	Project (Number/Name) EH9 / *PSEUDOLITES*	

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
EH9: *PSEUDOLITES*	-	19.551	57.411	79.230	-	79.230	44.768	8.407	0.000	0.000	0.000	209.367
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

PE 0604120A: EH9 - Pseudolite will transition from Budget Activity-4 to Budget Activity-5 in Fiscal Year 2020.

A. Mission Description and Budget Item Justification

Highly accurate Positioning, Navigation and Timing (PNT) data is a key enabler and a cross cutting capability for Army forces to execute their mission. The Army requires ground maneuver forces access to trusted PNT information under conditions where space-based PNT may be limited or denied to maintain its Global Positioning System (GPS) military advantage on the battlefield. The current GPS capability is a fixed frequency system which is vulnerable to current and emerging threats and field conditions.

Pseudolite (satellite-like transmitters) assure GPS access and integrity by providing PNT via terrestrial and airborne-based radio navigation GPS transmitters in electronically or physically challenged environments using a higher power signal. Area protection is provided through the deployment of Pseudolite transmitters supporting a Brigade Combat Team area of operations. Pseudolite supports continued operations of PNT-enabled systems such as Blue Force Tracker, Communications Networks and Precision Guided Munitions. Pseudolite consists of three segments:

1. Pseudolite Transmitter segment provides terrestrial and airborne radio navigation (GPS-like) service in electronically or physically challenged environments using a high power signal.
2. Command and Control (C2) segment to control the Pseudolite transmitters on the battlefield.
3. Receiver segment, which will develop software upgrades to current and future military GPS receivers to receive and process the Pseudolite signals.

FY 2018 Base funds in the amount of $79.230 million are provided for the continuation of the Technology Maturation and Risk Reduction Phase, which includes additional testing and security certification efforts, and development of the Acquisition Requirements Package and other documentation to support the Developmental Request for Proposal Release Decision Point milestone.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Pseudolite	19.551	57.411	79.230
Description: Pseudolite Technology Maturation and Risk Reduction to reduce technology risk and to determine the appropriate set of technologies to be integrated into the full system.			
FY 2016 Accomplishments: FY16 Base funds continued the Technology Maturation and Risk Reduction phase of the Pseudolite system. These efforts include Pseudolite Transmitter prototyping, with two (2) contractors; development of prototype software for legacy GPS receiver(s), and			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	**Project (Number/Name)** EH9 / *PSEUDOLITES*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
leveraging research and development efforts to support Command and Control (C2) prototype development. Additionally, funds were used for Assured PNT system architecture development to include: design trades and requirements trades analysis; mature and validate requirements; and performance of Cost Benefit Analysis. ***FY 2017 Plans:*** FY17 Base funds will continue the Technology Maturation and Risk Reduction prototyping and testing effort for the Pseudolite transmitter. Develop prototype software code for the remote C2 of Pseudolites over a tactical network. Continue the software upgrades to legacy receivers (e.g. DAGR) and develop software for Precision Guided Munitions to communicate with the Pseudolite transmitter. Efforts will focus on laboratory and field testing of Pseudolite prototypes; integration efforts with Pseudolite host platforms; finalization of design and requirements trades analysis; and finalization of a Cost Benefit Analysis. ***FY 2018 Plans:*** FY18 Base funds will continue the Technology Maturation and Risk Reduction prototyping and testing effort for the Pseudolite transmitter. In addition, efforts will continue the development of prototype software code for the remote C2 of Pseudolites over a tactical network. Other efforts include: software upgrades to legacy receivers and completion of software development for Precision Guided Munitions to communicate with the Pseudolite transmitter; Security Certification requirements and initial activities toward achievement; implementation of modifications and upgrades to prototypes based on testing results; integration development efforts with Pseudolite Ground and Air host platforms; support to Milestone B activities and documentation preparation/approval; and development of the Acquisition Requirements Package and other documentation to support the Developmental Request for Proposal Release Decision Point milestone.			
Accomplishments/Planned Programs Subtotals	19.551	57.411	79.230

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Assured Positioning, Navigation and Timing (PNT) is a system comprised of four products; Dismounted A-PNT System, Pseudolite, Mounted A-PNT System, and Anti-Jam Antenna System (AJAS), to assure access to and integrity of PNT information. Each product provides a degree of standalone capability, but only when deployed together can Assured PNT be achieved in all environments and across all formations and warfighting functions. Program Manager (PM) PNT manages these four products (Dismounted A-PNT System, Pseudolite, Mounted A-PNT System, and AJAS) constructed to develop, test, field, and sustain the A-PNT materiel solution. The final contracting strategy is under development.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	**Project (Number/Name)** EH9 / *PSEUDOLITES*

The Pseudolite Technology Maturation and Risk Reduction (TMRR) acquisition strategy was approved by the Milestone Decision Authority and Milestone A was successfully completed in May 2015. The Pseudolite product is currently in the TMRR Phase of the acquisition life-cycle.

The TMRR Acquisition Strategy for Pseudolites includes: 1) Technology maturation of the Transmitter segment through the use of two prototyping, cost-plus fixed fee (CPFF) contracts; 2) Command and Control (C2) segment will leverage the development by other DoD agencies to the greatest extent possible; 3) Receiver segment will make the use of multiple contracts through existing vehicles for Pseudolite Receiver software prototype development.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	Project (Number/Name) EH9 / *PSEUDOLITES*	

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
Project Management Support - Government	Allot	PM PNT : APG, MD	0.000	0.800	Dec 2015	0.670	Oct 2016	4.713	Oct 2017	-		4.713	Continuing	Continuing	0.000
Project Management Support - Contractor	C/CPFF	Various : Various	0.000	0.228	Jan 2016	0.191	Dec 2016	1.571	Dec 2017	-		1.571	Continuing	Continuing	0.000
FFRDC	SS/CR	MITRE : Various	0.000	0.700	Jan 2016	0.586	Dec 2016	1.200	Dec 2017	-		1.200	Continuing	Continuing	0.000
		Subtotal	0.000	1.728		1.447		7.484		-		7.484	-	-	0.000

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
Pseudolite Prototype - Transmitter Contractor 1	C/CPFF	Datapath - Rockwell Collins : Cedar Rapids IA	0.000	5.663	Feb 2016	6.285	Dec 2016	5.806	Dec 2017	-		5.806	Continuing	Continuing	0.000
Pseudolite Prototype - Transmitter Contractor 2	C/CPFF	L-3 Communications : Anaheim, CA	0.000	5.663	Feb 2016	6.285	Dec 2016	6.398	Dec 2017	-		6.398	Continuing	Continuing	0.000
Engineering and Technical Product Support	MIPR	C4ISR : Various	0.000	-		-		3.560	Nov 2017	-		3.560	Continuing	Continuing	0.000
Pseudolite GPS Receiver Upgrade (DAGR & PGK)	SS/CPFF	Rockwell Collins & L-3 Communications : Cedar Rapids, IA & Anaheim, CA	0.000	0.393	Mar 2016	4.784	Dec 2016	11.407	Dec 2017	-		11.407	Continuing	Continuing	0.000
Pseudolite GPS Receiver Upgrade (GB-GRAM & Excalibur)	SS/CPFF	Rockwell Collins & L-3 Communications : Cedar Rapids, IA & Anaheim, CA	0.000	-		-		9.532	Dec 2017	-		9.532	Continuing	Continuing	0.000
Pseudolite Command & Control	C/Various	PEO Ammo & PM EW : Various	0.000	-		3.200	Dec 2016	10.177	Nov 2017	-		10.177	Continuing	Continuing	0.000

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	Project (Number/Name) EH9 / *PSEUDOLITES*	

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
OEM Platform Integration Development for Air Platform	SS/CPFF	PEO Aviation : Various	0.000	-		14.543	Dec 2016	11.952	Dec 2017	-		11.952	Continuing	Continuing	0.000
OEM Platform Integration Development for Ground Platform 1, Platform 2, and Platform 3	SS/CPFF	Various : Various	0.000	-		11.654	Dec 2016	1.000	Dec 2017	-		1.000	Continuing	Continuing	0.000
PM Platform Integration Development	MIPR	Various : Various	0.000	-		2.000	Dec 2016	0.616	Dec 2017	-		0.616	Continuing	Continuing	0.000
		Subtotal	0.000	11.719		48.751		60.448		-		60.448	-	-	0.000

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
Engineering and Technical Services - Government	Various	C4ISR : Various	0.000	2.653	Jan 2016	2.222	Nov 2016	5.591	Nov 2017	-		5.591	Continuing	Continuing	0.000
Engineering and Technical Services - Contractor	C/CPFF	Various : Various	0.000	3.451	Jan 2016	2.891	Dec 2016	5.307	Dec 2017	-		5.307	Continuing	Continuing	0.000
		Subtotal	0.000	6.104		5.113		10.898		-		10.898	-	-	0.000

Test and Evaluation ($ 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
Pseudolite Prototype Lab and Field Testing	MIPR	Various : Various	0.000	-		2.100	Dec 2016	0.400	Nov 2017	-		0.400	Continuing	Continuing	0.000
		Subtotal	0.000	-		2.100		0.400		-		0.400	-	-	0.000

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	Project (Number/Name) EH9 / *PSEUDOLITES*	

	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	19.551		57.411		79.230		-		79.230	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	**Project (Number/Name)** EH9 / *PSEUDOLITES*

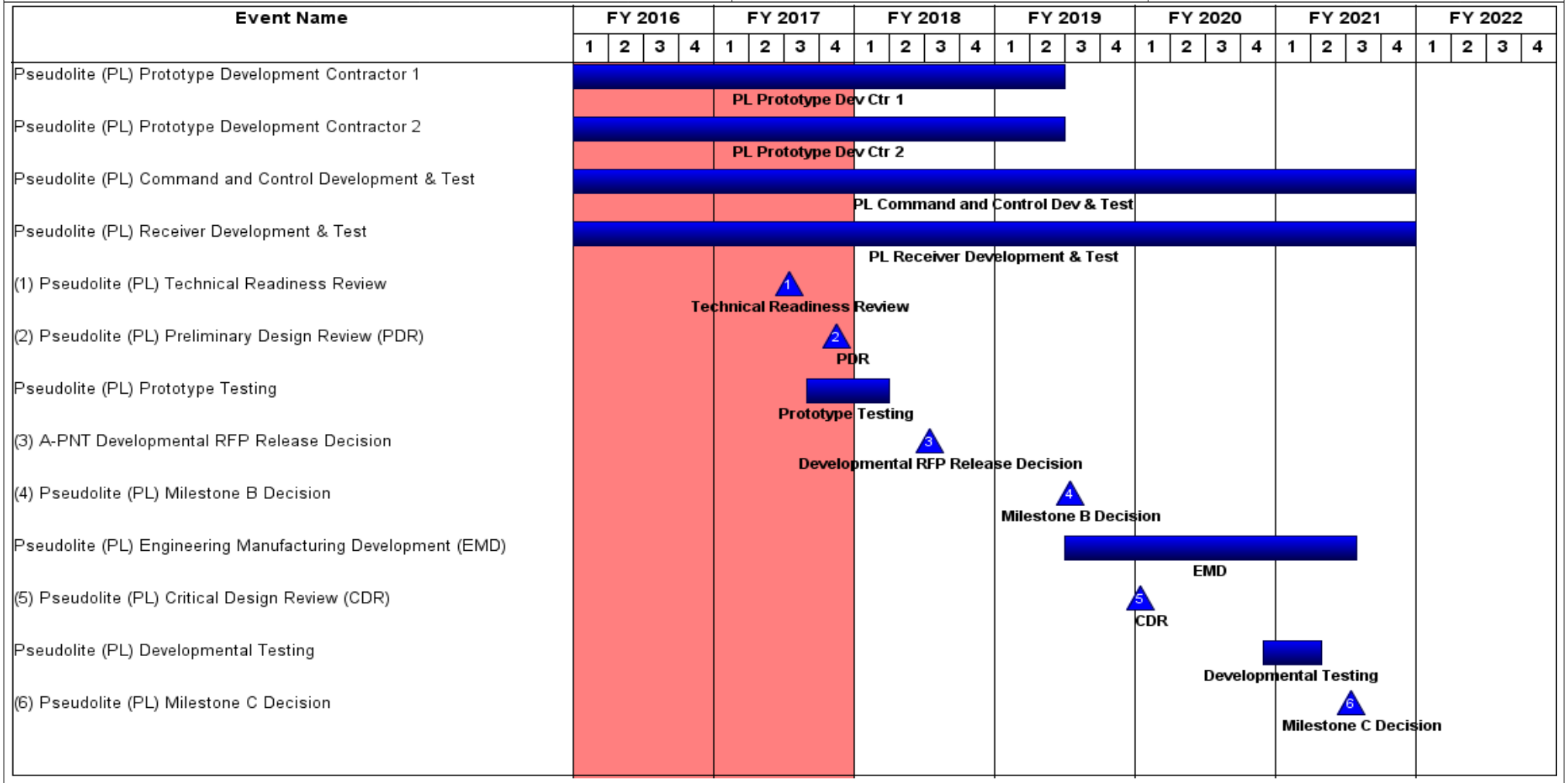

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	**Project (Number/Name)** EH9 / *PSEUDOLITES*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Pseudolite (PL) Prototype Development Contractor 1	3	2015	2	2019
Pseudolite (PL) Prototype Development Contractor 2	3	2015	2	2019
Pseudolite (PL) Command and Control Development & Test	3	2015	4	2021
Pseudolite (PL) Receiver Development & Test	3	2015	4	2021
Pseudolite (PL) Technical Readiness Review	3	2017	3	2017
Pseudolite (PL) Preliminary Design Review (PDR)	4	2017	4	2017
Pseudolite (PL) Prototype Testing	3	2017	1	2018
A-PNT Developmental RFP Release Decision	3	2018	3	2018
Pseudolite (PL) Milestone B Decision	3	2019	3	2019
Pseudolite (PL) Engineering Manufacturing Development (EMD)	3	2019	3	2021
Pseudolite (PL) Critical Design Review (CDR)	1	2020	1	2020
Pseudolite (PL) Developmental Testing	4	2020	2	2021
Pseudolite (PL) Milestone C Decision	3	2021	3	2021

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	Project (Number/Name) EJ2 / *MOUNTED*	

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
EJ2: *MOUNTED*	-	0.000	11.552	35.300	-	35.300	44.273	11.828	5.655	0.000	0.000	108.608
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

PE 0604120A: EJ2 - Mounted Assured Positioning, Navigation and Timing (PNT) System will transition from Budget Activity-4 to Budget Activity-5 in Fiscal Year 2020.

A. Mission Description and Budget Item Justification

The Mounted Assured Positioning, Navigation and Timing (PNT) System provides PNT data and is a key enabler and a cross cutting capability for Army ground maneuver forces to execute their mission. Army ground maneuver Forces require access to trusted PNT information under conditions where space-based PNT may be limited or denied to maintain its Global Positioning System (GPS) military advantage on the battlefield. The current GPS capability is a fixed frequency system which is vulnerable to current and emerging threats and field condition.

Mounted A-PNT is a scalable form-factor that distributes PNT data to multiple devices (client systems) on mounted platforms. The system fuses military GPS with physics-based sensors and timing technology to provide trusted PNT data, which allows the Soldier to operate in GPS degraded or denied environments. Mounted A-PNT System includes receiver software capable of acquiring Pseudolite signals resulting in additional protection for military GPS in denied environments and paces the threat by including a migration path to Military Code (M-Code) and other future technologies.

FY 2018 Base funds in the amount of $35.300 million are provided to support Milestone B regulatory/statutory activities to include documentation preparation/approval, critical risk reduction through focused prototyping with industry and Federally Funded Research & Development Center partners, standup of the Systems Integration Lab to begin early integration with over 40 client systems, and development of the Acquisition Requirements Package and other documentation to support the Developmental Request for Proposal Release Decision Point milestone.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Mounted A-PNT System	-	11.552	35.300
Description: Risk Reduction efforts to reduce technology risk and to determine the appropriate set of technologies to be integrated into the system.			
FY 2017 Plans: FY 2017 Base funds will transition the Communications Electronics Research Development and Engineering Center (CERDEC) Technology Maturation Initiative (TMI) efforts to the Mounted A-PNT System. These efforts will directly support critical risk reduction activities needed to meet the exit criteria to transition to the Engineering Manufacturing Development phase. Efforts will			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	**Project (Number/Name)** EJ2 / *MOUNTED*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
focus on sensor fusion and PNT distribution architecture. It will also include finalization of design and requirement trades analysis and integration efforts on host platforms; finalization of Cost Benefit Analysis. ***FY 2018 Plans:*** FY2018 Base funds will support regulatory/statutory activities required for a Milestone B decision in FY19 to include documentation preparation/approval, critical technology risk reduction through focused prototyping with industry and Federally Funded Research & Development Center partners, standup of the Systems Integration Lab to begin early integration with over 40 client systems, and development of the Acquisition Requirements Package and other documentation to support the Developmental Request for Proposal Release Decision Point milestone.			
Accomplishments/Planned Programs Subtotals	-	11.552	35.300

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Assured Positioning, Navigation and Timing (PNT) is a system comprised of four products; Dismounted A-PNT System, Pseudolite, Mounted A-PNT System, and Anti-Jam Antenna System (AJAS), to assure access to and integrity of PNT information. Each product provides a degree of standalone capability, but only when deployed together can Assured PNT be achieved in all environments and across all formations and warfighting functions. Program Manager (PM) PNT manages these four products (Dismounted A-PNT System, Pseudolite, Mounted A-PNT System, and AJAS) constructed to develop, test, field, and sustain the A-PNT materiel solution. The final contracting strategy is under development.

The Mounted A-PNT System acquisition strategy will begin at Milestone B. After successful Milestone B and award of the Engineering Manufacturing Development contract, development, integration and testing of the Mounted A-PNT System solution will begin.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	Project (Number/Name) EJ2 / *MOUNTED*	

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
Project Management Support - Government	Allot	PM PNT : APG, MD	0.000	-		0.386	Oct 2016	0.813	Oct 2017	-		0.813	Continuing	Continuing	0.000
Project Management Support - Contractor	C/CPFF	Various : Various	0.000	-		0.110	Dec 2016	0.271	Dec 2017	-		0.271	Continuing	Continuing	0.000
FFRDC	SS/CR	MITRE : Various	0.000	-		0.339	Dec 2016	1.200	Dec 2017	-		1.200	Continuing	Continuing	0.000
		Subtotal	0.000	-		0.835		2.284		-		2.284	-	-	0.000

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
Prototype Development Contractor 1	C/CPFF	Rockwell Collins : Cedar Rapids, IA	0.000	-		3.885	Dec 2016	2.983	Dec 2017	-		2.983	Continuing	Continuing	0.000
Prototype Development Contractor 2	C/CPFF	Northrup Grumman : San Diego, CA	0.000	-		3.885	Dec 2016	2.583	Dec 2017	-		2.583	Continuing	Continuing	0.000
Engineering and Technical Product Support	MIPR	C4ISR : Various	0.000	-		-		2.300	Nov 2017	-		2.300	Continuing	Continuing	0.000
Early Platform Integration and Evaluation	MIPR	Various : Various	0.000	-		-		6.603	Dec 2017	-		6.603	Continuing	Continuing	0.000
Development of the Systems Engineering and Integration Lab	MIPR	CERDEC Command Power and Integration Directorate : APG, MD	0.000	-		-		8.092	Dec 2017	-		8.092	Continuing	Continuing	0.000
M-Code Small-Chip Development and Prototype to meet Army Requirements	MIPR	Air Force : Various	0.000	-		-		5.500	Jan 2018	-		5.500	Continuing	Continuing	0.000
		Subtotal	0.000	-		7.770		28.061		-		28.061	-	-	0.000

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	Project (Number/Name) EJ2 / *MOUNTED*	

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
Engineering and Technical Services - Government	Various	C4ISR : various	0.000	-		1.281	Nov 2017	1.239	Nov 2017	-		1.239	Continuing	Continuing	0.000
Engineering and Technical Services - Contractor	C/CPFF	Various : Various	0.000	-		1.666	Dec 2017	3.243	Dec 2017	-		3.243	Continuing	Continuing	0.000
		Subtotal	0.000	-		2.947		4.482		-		4.482	-	-	0.000

Test and Evaluation ($ 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
Test Support - Contractor	C/CPFF	Various : Various	0.000	-		-		0.473	Dec 2017	-		0.473	Continuing	Continuing	0.000
		Subtotal	0.000	-		-		0.473		-		0.473	-	-	0.000

	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	-		11.552		35.300		-		35.300	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	**Project (Number/Name)** EJ2 / *MOUNTED*

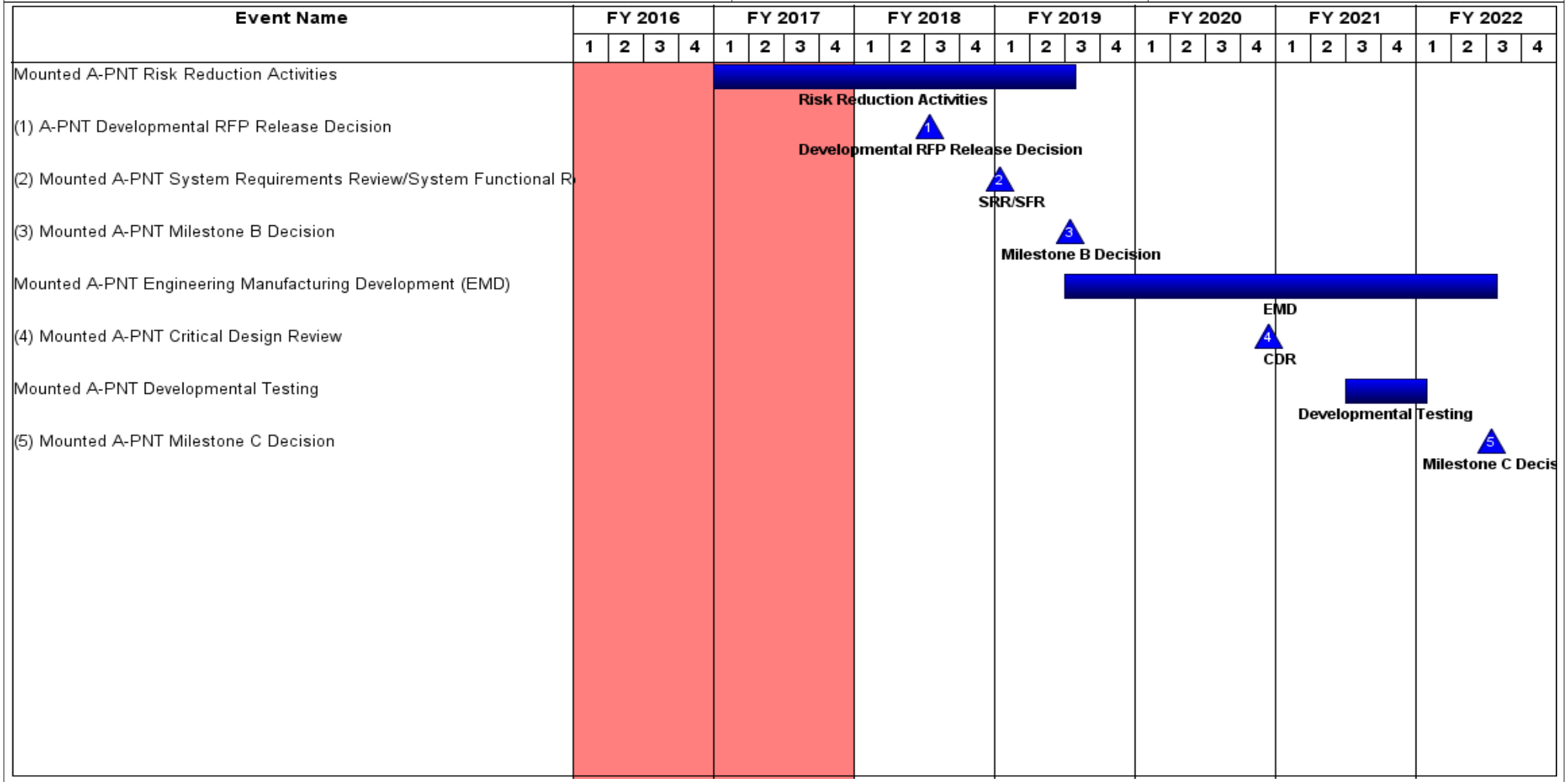

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	**Project (Number/Name)** EJ2 / *MOUNTED*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Mounted A-PNT Risk Reduction Activities	1	2017	3	2019
A-PNT Developmental RFP Release Decision	3	2018	3	2018
Mounted A-PNT System Requirements Review/System Functional Review	1	2019	1	2019
Mounted A-PNT Milestone B Decision	3	2019	3	2019
Mounted A-PNT Engineering Manufacturing Development (EMD)	3	2019	3	2022
Mounted A-PNT Critical Design Review	4	2020	4	2020
Mounted A-PNT Developmental Testing	3	2021	1	2022
Mounted A-PNT Milestone C Decision	3	2022	3	2022

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	Project (Number/Name) EJ3 / *ANTI-JAM ANTENNA*	

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
EJ3: *ANTI-JAM ANTENNA*	-	0.000	0.000	12.023	-	12.023	18.775	29.993	8.146	1.673	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

PE 0604120A: EJ3 - Anti-Jam Antenna System will transition from Budget Activity-4 to Budget Activity-5 in Fiscal Year 2020.

A. Mission Description and Budget Item Justification

The Anti-Jam Antenna System (AJAS) provides point protection by steering electronic nulls at interference sources or beams at valid signal sources. This enables continuous GPS signal acquisition and tracking in a navigation warfare (jamming) environment. The AJAS is deployed as a scalable component accessory to the Mounted Assured Positioning, Navigation and Timing (PNT) System.

FY 2018 Base funds in the amount of $12.023 million are provided to support Milestone B documentation preparation/approval, risk reduction activities to include: development of a Systems Integration Lab used for evaluation of system interoperability, platform integration, and evaluation of commercial AJAS using modeling and simulation; development/modification of commercial AJAS; Anechoic Chamber testing; live-sky testing and the development of the Acquisition Requirements Package to support the Request for Proposal Release Decision Point milestone.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Anti-Jam Antenna System	-	-	12.023
Description: Risk reduction activities associated with the AJAS to reduce technology risk and to determine the appropriate set of technologies to be integrated into the full system. ***FY 2018 Plans:*** FY2018 Base funds will provide support to Milestone B documentation preparation/approval, risk reduction activities to include: development of a Systems Integration Lab used for evaluation of system interoperability, platform integration, and evaluation of commercial AJAS using modeling and simulation; development/modification of commercial AJAS; Anechoic Chamber testing; live-sky testing and the development of the Acquisition Requirements Package to support the Developmental Request for Proposal Release Decision Point milestone.			
Accomplishments/Planned Programs Subtotals	-	-	12.023

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
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C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

Assured Positioning, Navigation and Timing (PNT) is a system comprised of four products; Dismounted A-PNT System, Pseudolite, Mounted A-PNT System, and Anti-Jam Antenna System (AJAS), to assure access to and integrity of PNT information. Each product provides a degree of standalone capability, but only when deployed together can Assured PNT be achieved in all environments and across all formations and warfighting functions. Program Manager (PM) PNT manages these four products (Dismounted A-PNT System, Pseudolite, Mounted A-PNT System, and AJAS) constructed to develop, test, field, and sustain the A-PNT materiel solution. The final contracting strategy is under development.

The AJAS acquisition strategy will begin at Milestone B. After successful Milestone B and award of the Engineering Manufacturing Development contract, development, integration and testing of the AJAS solution will begin.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	Project (Number/Name) EJ3 / *ANTI-JAM ANTENNA*	

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
Project Management Support - Government	Allot	PM PNT : APG, MD	0.000	-		-		0.400	Nov 2017	-		0.400	Continuing	Continuing	0.000
Project Management Support - Contractor	C/CPFF	Various : Various	0.000	-		-		0.112	Dec 2017	-		0.112	Continuing	Continuing	0.000
FFRDC	SS/CR	MITRE : Various	0.000	-		-		0.600	Dec 2017	-		0.600	Continuing	Continuing	0.000
		Subtotal	0.000	-		-		1.112		-		1.112	-	-	0.000

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
Development of the Systems Engineering and Integration Lab	MIPR	CERDEC Command Power and Integration Lab : APG, MD	0.000	-		-		2.235	Dec 2017	-		2.235	Continuing	Continuing	0.000
Anti-Jam Antenna Hardware Simulation and Evaluation	MIPR	CERDEC - Command and Integration Directorate : APG, MD	0.000	-		-		3.717	Apr 2018	-		3.717	Continuing	Continuing	0.000
Early Platform Integration and Evaluation	MIPR	Various : Various	0.000	-		-		0.975	Dec 2017	-		0.975	Continuing	Continuing	0.000
Engineering and Technical Product Suport	MIPR	C4ISR : Various	0.000	-		-		0.412	Nov 2017	-		0.412	Continuing	Continuing	0.000
		Subtotal	0.000	-		-		7.339		-		7.339	-	-	0.000

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
Engineering and Technical Services - Government	Various	C4ISR : Various	0.000	-		-		1.286	Nov 2017	-		1.286	Continuing	Continuing	0.000

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army			Date: May 2017
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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
Engineering and Technical Services - Contractor	C/CPFF	Various : Various	0.000	-		-		0.429	Dec 2017	-		0.429	Continuing	Continuing	0.000
		Subtotal	0.000	-		-		1.715		-		1.715	-	-	0.000

Test and Evaluation ($ 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
Anti-Jam Antenna Live Sky Demo and Anechoic Chamber Test	MIPR	CERDEC - Command Power and Integration Directorate : APG, MD	0.000	-		-		1.857	Dec 2017	-		1.857	Continuing	Continuing	0.000
		Subtotal	0.000	-		-		1.857		-		1.857	-	-	0.000

	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	-		0.000		12.023		-		12.023	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	**Project (Number/Name)** EJ3 / *ANTI-JAM ANTENNA*

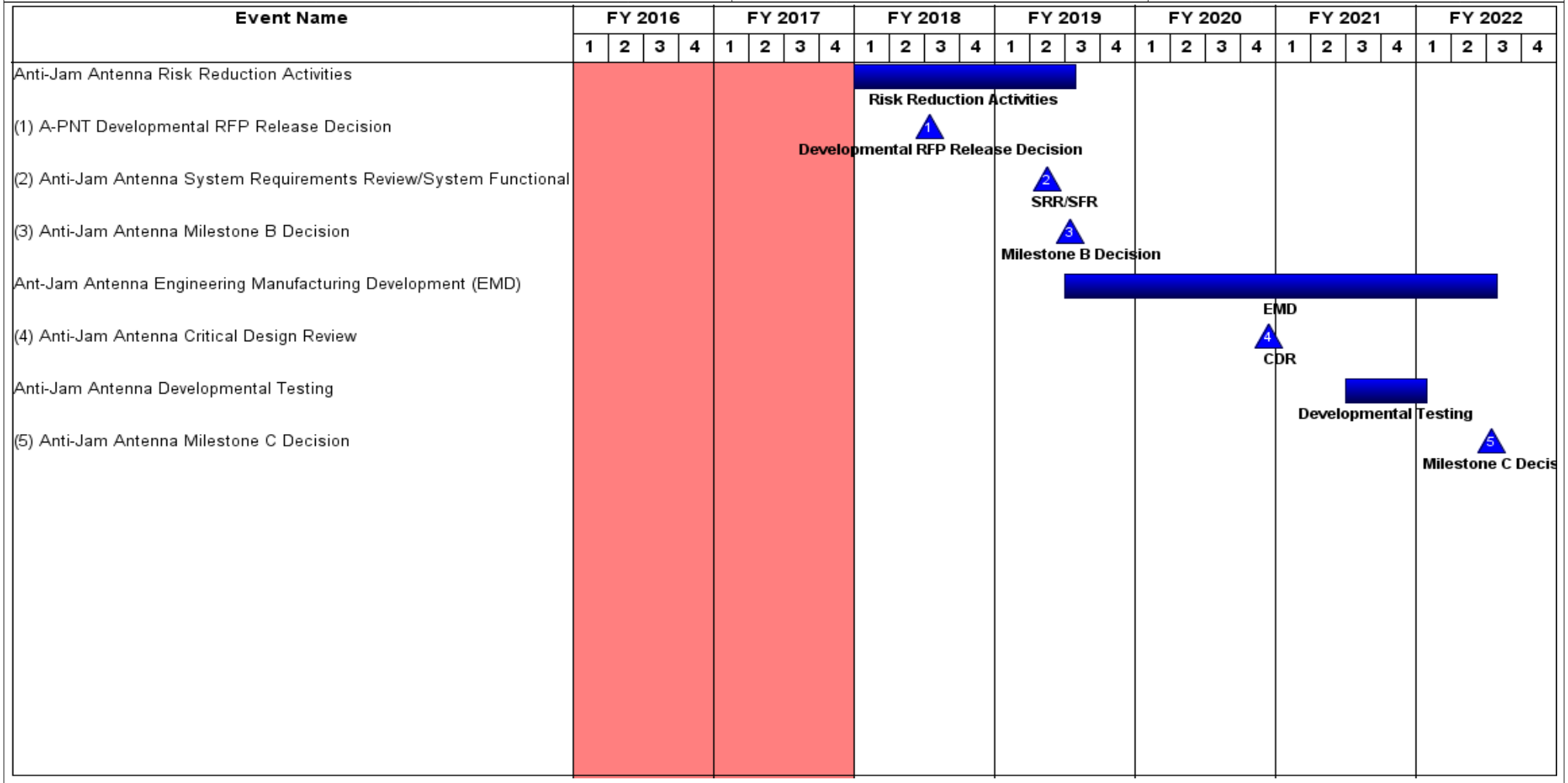

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*	**Project (Number/Name)** EJ3 / *ANTI-JAM ANTENNA*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Anti-Jam Antenna Risk Reduction Activities	1	2018	3	2019
A-PNT Developmental RFP Release Decision	3	2018	3	2018
Anti-Jam Antenna System Requirements Review/System Functional Review	2	2019	2	2019
Anti-Jam Antenna Milestone B Decision	3	2019	3	2019
Ant-Jam Antenna Engineering Manufacturing Development (EMD)	3	2019	3	2022
Anti-Jam Antenna Critical Design Review	4	2020	4	2020
Anti-Jam Antenna Developmental Testing	3	2021	1	2022
Anti-Jam Antenna Milestone C Decision	3	2022	3	2022