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**Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army** **Date:** March 2023

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / <i>Assured Positioning, Navigation and Timing (PNT)</i>
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	80.858	57.620	40.930	-	40.930	48.356	31.249	15.817	18.177	Continuing	Continuing
BV4: <i>Area Protection and Alt Nav Technology Development</i>	-	15.799	31.553	13.183	-	13.183	11.565	10.266	-	-	0.000	82.366
ED5: <i>Assured Positioning, Navigation and Timing (PNT)</i>	-	19.856	-	3.013	-	3.013	4.022	5.033	5.037	4.033	0.000	40.994
EH8: <i>DISMOUNTED</i>	-	11.805	10.418	10.896	-	10.896	10.279	8.378	3.931	7.219	Continuing	Continuing
EJ2: <i>MOUNTED</i>	-	33.398	15.649	13.838	-	13.838	22.490	7.572	6.849	6.925	Continuing	Continuing

**A. Mission Description and Budget Item Justification**

This funding line is directly aligned to the Army Assured Positioning, Navigation and Timing modernization priority.

The Assured Positioning, Navigation and Timing (APNT) provides Army ground maneuver forces access to assured PNT under conditions where Global Positioning Systems (GPS) may be limited or denied (jammed and spoofed) as per the National Defense Authorization Act guidance. APNT products are ruggedized tactical systems that enable Army forces the ability to shoot, move, communicate, thereby allowing forces to maneuver from operational and strategic distances to close with, destroy, and exploit the enemy with sufficient combat power, tempo, and momentum. APNT addresses two critical capability gaps: Access and Integrity. Access is the ability to retrieve accurate PNT information in a contested Electronic Warfare/Cyber environment. Integrity is the ability to trust the PNT information. PNT is a critical enabler of many Army Maneuver, Fires, and Command and Control systems that are dependent on accurate Position and Timing, and a foundational Multi-Domain Battle capability to support: calibrated force posture (position and maneuver across strategic distances); multi-domain formations (operate in contested spaces against near-peer adversaries); convergence (continuous integration of capabilities in all domains).

The APNT Program in FY 2024 consists of four Projects; (BV4) Area Protection and Alternative Navigation (ALTNAV) Technology Development, (ED5) Assured Positioning Navigation Timing, (EH8) Dismounted APNT System (DAPS), and (EJ2) Mounted APNT System (MAPS).

Approved Requirements: The Army Requirements Oversight Council (AROC) approved the Alternative Navigation (ALTNAV) Abbreviated Capabilities Development Document (A-CDD) in October 2022. The Joint Requirements Oversight Council (JROC) approved the Dismounted APNT System (DAPS) Capabilities Development Document (CDD) on 28 January 2022. The Army Requirements Oversight Council (AROC) approved the Mounted APNT System (MAPS) CDD on 12 September 2020. MAPS and DAPS are implementing Congressional and OSD guidance to develop and field Military Code (M-Code) Global Positioning System (GPS) Ground user Equipment. The AROC approved the Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Modular Open Suite of Standards (CMOSS) Mounted Form Factor (CMFF) Abbreviated Capabilities Development Document (A-CDD) on 04 January 2021. In support of House Report 116-442, 2020, the program will prototype modular cards and software according to the Modular Open System Approach (MOSA) standards, for future modernization and new weapons systems. On 31 January, 19 March, and 10 August 2019, the MAPS, DAPS, ALTNAV Directed Requirements were approved, respectively. Joint

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2024 Army	<b>Date:</b> March 2023
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / <i>Assured Positioning, Navigation and Timing (PNT)</i>
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Requirements Oversight Council Memo (JROCM) 049-10, dated 05 April 2010, approved the PNT Assurance Initial Capabilities Document and designated the Army as the Lead Component for Assured PNT.

(BV4) - The Area Protection and Alternative Navigation project line currently funds the Alternative Navigation (ALTNAV) Enterprise. The ALTNAV Enterprise is a global navigation solution providing warfighters with an alternative source of positioning and timing information. In accordance with National Defense Authorization Act (NDAA) Guidance (2021 NDAA: Section 1611), ALTNAV Enterprise is a complementary capability to Global Positioning System and may be used as contingency in the PNT PACE (Primary, Alternative, Contingency, Emergency) Plan that facilitates continued operations as GPS is degraded or denied. ALTNAV Enterprise consists of: (1) Space Segment, (2) Ground Control Segment, (3) User Equipment and Software.

(ED5) - Assured Positioning Navigation Timing project develops a Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Modular Open Suite of Standards (CMOSS) APNT Card and modernization activities that will enable the transition of incremental and disruptive technologies to fieldable PNT solutions to pace or overmatch current and evolving threats and in accordance with 2020 NDAA: Section 840 - Implementation guidance for use of a modular open system approach.

(EH8) - The DAPS meets congressional (10 USC 2281) and Department of Defense guidance to provide resilient and survivable M-Code Global Positioning System (GPS) capable Ground User Equipment (MGUE) receivers. The DAPS will provide Soldiers Assured PNT (APNT) information utilizing various sources of PNT data to address multiple threats and ensure mission success where Global Positioning System (GPS) may be limited or denied. DAPS will deliver APNT in an optimized form factor that supports mission profiles in denied environments.

(EJ2) - The MAPS meets congressional (10 USC 2281) and Department of Defense guidance to provide resilient and survivable M-Code GPS capable MGUE receivers. The MAPS will deliver systems that provide the Army's combat forces access to assured PNT information under conditions where space-based GPS may be limited or denied to enable Army forces the ability to move, shoot, communicate, and provide situational awareness.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
Previous President's Budget	83.952	43.797	25.256	-	25.256
Current President's Budget	80.858	57.620	40.930	-	40.930
Total Adjustments	-3.094	13.823	15.674	-	15.674
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	14.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-3.094	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	15.674	-	15.674
• FFRDC Transfer	-	-0.177	-	-	-

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2024 Army **Date:** March 2023

**Appropriation/Budget Activity**  
 2040: *Research, Development, Test & Evaluation, Army / BA 4: Advanced Component Development & Prototypes (ACD&P)*

**R-1 Program Element (Number/Name)**  
 PE 0604120A / *Assured Positioning, Navigation and Timing (PNT)*

**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** BV4: *Area Protection and Alt Nav Technology Development*

Congressional Add: *Alt Nav*

Congressional Add Subtotals for Project: BV4

Congressional Add Totals for all Projects

	<b>FY 2022</b>	<b>FY 2023</b>
	-	14.000
	-	14.000
	-	14.000

**Change Summary Explanation**

Fiscal Year (FY) 2023 \$14.000 Million Congressional add is to continue the development and testing of the Alternative Navigation (ALTNAV) Enterprise global navigation capability (project 0604120A BV4) in accordance with National Defense Authorization Act (NDAA) Guidance (2021 NDAA: Section 1611).

FY 2024 budget increased for the Assured Positioning, and Navigation and Timing to continue ALTNAV development efforts.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Army										<b>Date:</b> March 2023		
<b>Appropriation/Budget Activity</b> 2040 / 4					<b>R-1 Program Element (Number/Name)</b> PE 0604120A / <i>Assured Positioning, Navigation and Timing (PNT)</i>				<b>Project (Number/Name)</b> BV4 / <i>Area Protection and Alt Nav Technology Development</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
BV4: <i>Area Protection and Alt Nav Technology Development</i>	-	15.799	31.553	13.183	-	13.183	11.565	10.266	-	-	0.000	82.366
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

In FY22 and FY23, Program Element (PE) 0604120A project BV4 funds multiple efforts. These include: Alternative Navigation (ALTNAV), Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Modular Open Suite of Standards (CMOSS) and government-owned PNT software architecture.

In FY24, Program Element (PE) 0604120A project BV4 funds only ALTNAV Enterprise. All other efforts listed above transition to PE 0604120A Assured Positioning, Navigation and Timing project ED5.

**A. Mission Description and Budget Item Justification**

Alternative Navigation (ALTNAV) Enterprise is a global navigation solution providing warfighters with an alternative source of positioning and timing information. ALTNAV Enterprise is a complementary capability to Global Positioning System and may be used as contingency in the PNT PACE (Primary, Alternative, Contingency, Emergency) Plan that facilitates continued operations as GPS is degraded or denied in accordance with National Defense Authorization Act (NDAA) Guidance (2021 NDAA: Section 1611). ALTNAV Enterprise consists of: (1) Space Segment, (2) Ground Control Segment, (3) User Equipment and Software.

The Area Protection and Alt Nav Technology Development project supports the ALTNAV capability and complementary PNT technologies. ALTNAV provides radio frequency (RF) and source diversity that enables Army users access to accurate and assured position and time information in GPS denied environments. ALTNAV Abbreviated Capabilities Development Document (A-CDD) was Army Requirements Oversight Council (AROC) Approved, October 2022.

Fiscal Year (FY) 2024 Base funds in the amount of \$13.183 Million supports ALTNAV Enterprise and Performance Verification Testing.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<b>Title:</b> Area Protection & Alt Nav Technology Development	15.799	16.912	13.183
<b>Description:</b> FY22 and FY23 funding supports Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Modular Open Suite of Standards (CMOSS), PNT software frameworks and Alternative Navigation (ALTNAV) PNT capabilities.			
FY24 funds only ALTNAV.			
<b>FY 2023 Plans:</b>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Army		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / <i>Assured Positioning, Navigation and Timing (PNT)</i>	<b>Project (Number/Name)</b> BV4 / <i>Area Protection and Alt Nav Technology Development</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<p>Fiscal Year (FY) 2023 Base funds in the amount of \$16.912 million supports Alternative Navigation (ALTNAV) Enterprise Ground Control Segment Development and Testing; Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Modular Open Suite of Standards (CMOSS) PNT card prototyping, and development, engineering demonstrations and testing.</p> <p><b>FY 2024 Plans:</b> Fiscal Year (FY) 2024 Base funds in the amount of \$13.183 million completes Alternative Navigation (ALTNAV) Ground Control Segment Development and Performance Verification Testing.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> Funding decreased due to the transition of the Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Modular Open Suite of Standards (CMOSS) to PE 0604120A project ED5.</p>			
<p><b>Title:</b> Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)</p> <p><b>Description:</b> Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)</p> <p><b>FY 2023 Plans:</b> Funding transferred in accordance with Title 15 USC 638</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC 638.</p>	-	0.641	-
<b>Accomplishments/Planned Programs Subtotals</b>	15.799	17.553	13.183

	<b>FY 2022</b>	<b>FY 2023</b>
<b>Congressional Add:</b> Alt Nav	-	14.000
<p><b>FY 2023 Plans:</b> Fiscal Year (FY) 2023 Congressional Add in the amount of \$14.000 million supports acceleration of the Alternative Navigation (ALTNAV) Enterprise Ground Control Segment Development and Testing.</p>		
<b>Congressional Adds Subtotals</b>	-	14.000

<b>C. Other Program Funding Summary (\$ in Millions)</b>			<b>FY 2024</b>	<b>FY 2024</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>Cost To</b>	<b>Total Cost</b>
<b>Line Item</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Base</b>	<b>OCO</b>	<b>Total</b>					<b>Complete</b>	
• K49020: <i>Dismounted Hub</i>	30.143	26.769	41.533	-	41.533	64.632	61.097	69.163	65.945	Continuing	Continuing
• K49030: <i>Mounted Hub A-PNT</i>	80.658	138.005	153.517	-	153.517	126.081	130.333	130.377	130.489	Continuing	Continuing

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**Exhibit R-2A, RDT&E Project Justification:** PB 2024 Army **Date:** March 2023

<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / <i>Assured Positioning, Navigation and Timing (PNT)</i>	<b>Project (Number/Name)</b> BV4 / <i>Area Protection and Alt Nav Technology Development</i>
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**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2022	FY 2023	FY 2024	FY 2024	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	Cost To	Total Cost
			Base	OCO	Total					Complete	
• K49041: <i>ALTERNATE NAVIGATION (ALT NAV)</i>	-	-	4.962	-	4.962	24.152	26.193	5.042	-	0.000	60.349
• OMA - 432126000: <i>DCS Long Haul Communications</i>	12.962	12.000	2.872	-	2.872	2.955	3.173	3.236	3.301	0.000	40.499

**Remarks**

Linked to:  
 K49020 / Dismounted Hub is an OPA subset of Line Item Number 9897K49000 / Assured Positioning, Navigation and Timing  
 K49030 / Mounted Hub A-PNT is an OPA subset of Line Item Number 9897K49000 / Assured Positioning, Navigation and Timing  
 K49041 / Alternative Navigation (ALTNAV) is an OPA subset of Line Item Number 9897K49000 / Assured Positioning, Navigation and Timing  
 DCS Long Haul Communications funds commercial satellite airtime for ALTNAV

**D. Acquisition Strategy**

The Alternative Navigation (ALTNAV) Ground Control Segment Capability will be implemented by utilizing a mix of competitive Other Transaction Authority (OTA)'s and Federal Acquisition Regulation contracts. This will provide incremental capability to use and inform future Mounted Assured Positioning, Navigation, and Timing System (MAPS) and Dismounted Assured Positioning, Navigation, and Timing System (DAPS) requirements.

Requirement documents include:

- ALTNAV Abbreviated Capabilities Development Document (A-CDD), Army Requirements Oversight Council (AROC) Approved, October 2022.
- DAPS Capabilities Development Document (CDD), Joint Requirements Oversight Council (JROC) Approved, 28 January 2022.
- MAPS Capabilities Development Document (CDD), Army Requirements Oversight Council (AROC) Approved, 12 September 2020.
- Alternative Navigation (ALTNAV) DR, 10 August 2019.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Army												Date: March 2023				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 4				PE 0604120A / Assured Positioning, Navigation and Timing (PNT)				BV4 / Area Protection and Alt Nav Technology Development								
<b>Management Services (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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	
Project Management Support	Various	Various : Various	0.835	0.787	Nov 2021	1.247	Dec 2022	0.659	Dec 2023	-		0.659	0.000	3.528	Continuing	
FY 2023 SBIR / STTR Transfer	TBD	Various : Various	-	-		0.641	Mar 2023	-		-		-	0.000	0.641	-	
<b>Subtotal</b>			0.835	0.787		1.888		0.659		-		0.659	0.000	4.169	N/A	
<b>Product Development (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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	
ALTNV Enterprise Ground Control Segment Development	Various	Various : Various	1.291	2.216	Dec 2021	15.969	Oct 2023	6.022	Nov 2023	-		6.022	0.000	25.498	Continuing	
Modular Open System Approach (pntOS & CMOSS)	Various	Various : Various	9.309	9.307	Nov 2021	7.183	Nov 2022	-		-		-	0.000	25.799	-	
<b>Subtotal</b>			10.600	11.523		23.152		6.022		-		6.022	0.000	51.297	N/A	
<b>Support (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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	
Engineering and Technical Services - Government	IA	C5ISR : Various	0.238	0.294	Nov 2021	0.307	Nov 2022	0.322	Nov 2023	-		0.322	0.000	1.161	Continuing	
Engineering and Technical Services - Contractor	Various	DCS Corporation / MITRE / QED Corporation : APG, MD	4.844	1.429	Nov 2021	2.351	Feb 2023	2.398	Dec 2023	-		2.398	0.000	11.022	Continuing	
<b>Subtotal</b>			5.082	1.723		2.658		2.720		-		2.720	0.000	12.183	N/A	



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2024 Army</b>		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / <i>Assured Positioning, Navigation and Timing (PNT)</i>	<b>Project (Number/Name)</b> BV4 / <i>Area Protection and Alt Nav Technology Development</i>

Event Name	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	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
ALTNAV Enterprise Ground Control Segment (GCS) Dev																												
ALTNAV Enterprise Ground Control Development																												
ALTNAV Performance Verification Testing																												
Cyber Vulnerability Testing																												
ALTNAV Enterprise Capability Decision																												
ALTNAV Enterprise Installation & Fielding																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2024 Army</b>		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / <i>Assured Positioning, Navigation and Timing (PNT)</i>	<b>Project (Number/Name)</b> BV4 / <i>Area Protection and Alt Nav Technology Development</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
ALTNAV Enterprise Ground Control Segment (GCS) Dev	2	2019	2	2024
ALTNAV Performance Verification Testing	1	2024	2	2024
Cyber Vulnerability Testing	2	2024	2	2024
ALTNAV Enterprise Capability Decision	3	2024	3	2024
ALTNAV Enterprise Installation & Fielding	4	2024	2	2027

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Army										<b>Date:</b> March 2023		
<b>Appropriation/Budget Activity</b> 2040 / 4					<b>R-1 Program Element (Number/Name)</b> PE 0604120A / Assured Positioning, Navigation and Timing (PNT)				<b>Project (Number/Name)</b> ED5 / Assured Positioning, Navigation and Timing (PNT)			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
ED5: Assured Positioning, Navigation and Timing (PNT)	-	19.856	-	3.013	-	3.013	4.022	5.033	5.037	4.033	0.000	40.994
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Assured Positioning, Navigation and Timing (APNT) project funds the development of Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Modular Open Suite of Standards (CMOSS) APNT Card and development of hardware and software modernization technologies. This will enable the Science & Technology transitions of incremental and disruptive technologies to fieldable Positioning, Navigation and Timing (PNT) solutions to pace or overmatch current and evolving threats and in accordance with National Defense Authorization Act (NDAA) Guidance (2021 NDAA: Section 1611).

The CMOSS APNT Card provides the APNT solutions required by the CMOSS Mounted Form Factor (CMFF) Abbreviated Capability Development Document and distributes APNT data to payloads within the CMFF chassis and external systems as needed. It is designed to provide limited PNT in satellite denied or degraded environments ensuring mission accomplishments. The CMFF PNT card provides trusted PNT by utilizing multiple PNT sources and leveraging multiple open architectures. These technologies comply with the PNT Reference Architecture and Modular Open System Approach (MOSA) compliant hardware; CMOSS and software frameworks (PNT Operating System (pntOS)), to ensure a plug and play capability. The CMOSS APNT Card prototyping and software development will be conducted in accordance with modular open systems approach (Reference House Report 116-442, 2020). Hardware and software technologies will transition to Mounted Assured PNT System (MAPS) and Dismounted Assured PNT System (DAPS) programs of record.

Fiscal Year (FY) 2024 Base funds in the amount of \$3.013 million funds CMOSS PNT Modular Card Development.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<b>Title:</b> Resiliency and Software Assurance Measures (RSAM)	13.335	-	-
<b>Description:</b> Funding supports Resiliency and Software Assurance Measures (RSAM) software upgrades to legacy military GPS receivers			
<b>Title:</b> Assured PNT Enablers	6.521	-	-
<b>Description:</b> Development of Assured PNT enablers, network integration and certification of ALTNVAV ground infrastructure.			
<b>Title:</b> CMOSS - PNT Modular Card	-	-	3.013
<b>Description:</b> PNT Modular card based solutions prototyping			
<b>FY 2024 Plans:</b>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Army		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / <i>Assured Positioning, Navigation and Timing (PNT)</i>	<b>Project (Number/Name)</b> ED5 / <i>Assured Positioning, Navigation and Timing (PNT)</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
Fiscal Year (FY) 2024 Base funds in the amount of \$3.013 Million support Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Modular Open Suite of Standards (CMOSS) PNT Modular Card Development.			
<b><i>FY 2023 to FY 2024 Increase/Decrease Statement:</i></b> Funding increased from \$0.000 million in FY 2023 to \$3.013 million in FY 2024. This increase is due to transition of CMOSS PNT Modular Card Development from PE 0604120A project BV4.			
<b>Accomplishments/Planned Programs Subtotals</b>	19.856	-	3.013

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• AW6: <i>Modular GPS Independent Sensors Advanced Tech</i>	6.542	10.131	12.343	-	12.343	14.732	6.459	12.491	4.784	0.000	67.482
• AV8: <i>Navigation Warfare (NAVWAR) Advanced Technology</i>	1.856	1.949	6.029	-	6.029	3.980	6.024	-	3.465	0.000	23.303
• K49020: <i>Dismounted Hub</i>	30.143	26.769	41.533	-	41.533	64.632	61.097	69.163	65.945	Continuing	Continuing
• K49030: <i>Mounted Hub A-PNT</i>	80.658	138.005	153.517	-	153.517	126.081	130.333	130.377	130.489	Continuing	Continuing

**Remarks**  
0603463A AW6 Modular GPS Independent Sensors Advanced Tech and AV8 Navigation Warfare (NAVWAR) Advanced Technology will transition Science & Technology (S&T) work for modular open systems approach (MOSA) compliance to Assured Positioning, Navigation and Timing.

0604120A ED5 Assured Positioning, Navigation and Timing will transition PNT Modernization/complementary PNT capabilities to the Mounted Hub A-PNT and Dismounted Hub programs.

**D. Acquisition Strategy**  
PNT Modular Card will build, integrate and test PNT Cards by utilizing a mix of competitive Other Transaction Authority (OTA)'s and Federal Acquisition Regulation contracts in order to effectively prototype cards for integration into the CMOSS Mounted Form Factor system and for stand alone applications.

Requirement documents include:

- DAPS Capabilities Development Document (CDD), Joint Requirements Oversight Council (JROC) Approved, 28 January 2022.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Army		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / <i>Assured Positioning, Navigation and Timing (PNT)</i>	<b>Project (Number/Name)</b> ED5 / <i>Assured Positioning, Navigation and Timing (PNT)</i>
<ul style="list-style-type: none"><li>- Abbreviated Capabilities Development Document (A-CDD) for the Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Modular Open Suite of Standards (CMOSS) Mounted Form Factor, Army Requirements Oversight Council (AROC) approved on 4 January 2021.</li><li>- MAPS Capabilities Development Document (CDD), Army Requirements Oversight Council (AROC) approved on 12 September 2020.</li></ul>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Army												Date: March 2023			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 4				PE 0604120A / Assured Positioning, Navigation and Timing (PNT)				ED5 / Assured Positioning, Navigation and Timing (PNT)							
Management Services (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
Project Management Support	Various	Various : Various	3.614	2.229	Nov 2021	-		0.331	Nov 2023	-		0.331	0.000	6.174	Continuing
<b>Subtotal</b>			3.614	2.229		-		0.331		-		0.331	0.000	6.174	N/A
Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
RSAM - DAGR Software Development	SS/CPFF	Rockwell Collins : Cedar Rapids, IA	6.918	2.655	Oct 2021	-		-		-		-	0.000	9.573	-
RSAM - GB-GRAM Software Development	SS/CPFF	Rockwell Collins : Cedar Rapids, IA	7.638	4.644	Nov 2021	-		-		-		-	0.000	12.282	-
Assured PNT Enablers	Various	Various : Various	15.430	7.221	Nov 2021	-		-		-		-	0.000	22.651	-
CMOSS - PNT Modular Card	Various	Various : Various	-	-		-		1.821	Nov 2023	-		1.821	0.000	1.821	Continuing
<b>Subtotal</b>			29.986	14.520		-		1.821		-		1.821	0.000	46.327	N/A
Support (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
Engineering and Technical Government Services	MIPR	Various : Various	4.190	0.998	Nov 2021	-		-		-		-	0.000	5.188	Continuing
Engineering and Technical Contracting Services	C/FFP	DCS Corp : APG, MD	11.003	0.921	Oct 2021	-		0.861	Nov 2023	-		0.861	0.000	12.785	Continuing
<b>Subtotal</b>			15.193	1.919		-		0.861		-		0.861	0.000	17.973	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2024 Army</b>		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / Assured Positioning, Navigation and Timing (PNT)	<b>Project (Number/Name)</b> ED5 / Assured Positioning, Navigation and Timing (PNT)

Event Name	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	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
PNT Modular Card Development (Block 1)	Block 1 PNT Card Development																											
PNTAX Testing 1								▲ 1 PNTAX																				
PNT Modular Card Developmental Testing (Block 1)									Block 1 PNT Card Testing																			
PNTAX Testing 2												▲ 2 PNTAX																
PNT Modular Card Integration (Block 1)													Block 1 PNT Card Integration															
PNTAX Testing 3															▲ 3													
PNT Modular Card Development (Block 2)																	Block 2 PNT Card Development											
PNTAX Testing 4																			▲ 4									
PNT Modular Card Developmental Testing (Block 2)																					Block 1 PNT Card Testing							

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2024 Army		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / <i>Assured Positioning, Navigation and Timing (PNT)</i>	<b>Project (Number/Name)</b> ED5 / <i>Assured Positioning, Navigation and Timing (PNT)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
PNT Modular Card Development (Block 1)	1	2022	4	2023
PNTAX Testing 1	4	2023	4	2023
PNT Modular Card Developmental Testing (Block 1)	4	2023	2	2025
PNTAX Testing 2	4	2024	4	2024
PNT Modular Card Integration (Block 1)	1	2025	2	2026
PNTAX Testing 3	4	2025	4	2025
PNT Modular Card Development (Block 2)	4	2025	2	2027
PNTAX Testing 4	4	2026	4	2026
PNT Modular Card Developmental Testing (Block 2)	1	2027	3	2028

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**Exhibit R-2A, RDT&E Project Justification:** PB 2024 Army **Date:** March 2023

<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / <i>Assured Positioning, Navigation and Timing (PNT)</i>	<b>Project (Number/Name)</b> EH8 / <i>DISMOUNTED</i>
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
EH8: <i>DISMOUNTED</i>	-	11.805	10.418	10.896	-	10.896	10.279	8.378	3.931	7.219	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Dismounted Assured PNT (APNT) System (DAPS) meets congressional (10 USC 2281) and Department of Defense guidance to provide resilient, survivable, M-Code Global Positioning System (GPS) capable Ground User Equipment (MGUE) receivers and Alternative Navigation (ALTNV). The DAPS will provide Soldiers Assured PNT (APNT) information utilizing various sources of PNT data to address multiple threats and ensure mission success where Global Positioning System (GPS) may be limited or denied. DAPS will deliver APNT in an optimized form factor that supports dismounted mission profiles in denied environments.

- DAPS GEN I is delivering Assured PNT as Quick Reaction Capability (QRC) supporting United States Army Europe (USAREUR) and United States Army Pacific (USARPAC)
- DAPS GEN II is leveraging the QRC and lessons learned. Initial Operational Capability is planned for 4QFY24

Fiscal Year (FY) 2024 Base funds in the amount of \$10.896 million will support the completion of Initial Operational Test and Evaluation (IOT&E) for DAPS GEN II, and development and testing to integrate an Anti-Jam (AJ) Antenna capability with the DAPS for future configurations (vehicular, maritime and aviation).

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2022	FY 2023	FY 2024
<b>Title:</b> Dismounted APNT System (DAPS)	11.805	10.038	10.896
<b>Description:</b> This effort supports the DAPS hardware and software development, system engineering and client integration, development and operational testing, and program management efforts.			
<b>FY 2023 Plans:</b> Fiscal Year (FY) 2023 Base funds in the amount of \$10.038 million supports the completion of engineering development, production and manufacturing readiness for DAPS GEN II Program of Record. The Production Qualification Testing (PQT) and Initial Operational Test and Evaluation (IOT&E) will begin in preparation for Full Rate Production Decision 2Q FY2024. Also initiates development of an Anti-Jam (AJ) Antenna capability.			
<b>FY 2024 Plans:</b> Fiscal Year (FY) 2024 Base funds in the amount of \$10.896 million will support the completion of Initial Operational Test and Evaluation (IOT&E) for DAPS GEN II, and development and testing to integrate an Anti-Jam (AJ) Antenna capability with the DAPS for future configurations (vehicular, maritime and aviation).			
<b>FY 2023 to FY 2024 Increase/Decrease Statement:</b>			

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**Exhibit R-2A, RDT&E Project Justification:** PB 2024 Army **Date:** March 2023

<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / <i>Assured Positioning, Navigation and Timing (PNT)</i>	<b>Project (Number/Name)</b> EH8 / <i>DISMOUNTED</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2022	FY 2023	FY 2024
Funding change reflects planned lifecycle of the effort.			
<b>Title:</b> Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)	-	0.380	-
<b>Description:</b> Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)			
<b>FY 2023 Plans:</b> Funding transferred in accordance with Title 15 USC 638			
<b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC 638			
<b>Accomplishments/Planned Programs Subtotals</b>	11.805	10.418	10.896

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

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• K49020: <i>Dismounted Hub</i>	30.143	26.769	41.533	-	41.533	64.632	61.097	69.163	65.945	Continuing	Continuing
• ED5: <i>Assured Positioning, Navigation and Timing (PNT)</i>	19.856	-	3.013	-	3.013	4.022	5.033	5.037	4.033	0.000	40.994

**Remarks**  
 K49020 / Dismounted Hub is an OPA subset of Line Item Number 9897K49000 / Assured Positioning, Navigation and Timing.  
 0604120A ED5 Assured Positioning, Navigation and Timing will transition PNT Modernization/complementary PNT capabilities to the DAPS.

**D. Acquisition Strategy**  
 The Dismounted Assured PNT (APNT) System (DAPS) acquisition strategy consists of an iterative development security operations (DevSecOps) methodology for the development, testing, production and fielding of a material solution that implements Congressional guidance for M-Code capability (10 USC 2281), Modular Open Systems Approach (Reference House Report 116-442, 2020), and the DAPS Capability Development Document (CDD) (signed 28 January 2022) performance requirements. The DAPS strategy leverages competitive Other Transaction Authority (OTA) agreements and Small Business Innovative Research (SBIR) contracts to assess industry capabilities, develop prototypes, and mature technology upgrades. Developmental test and operational assessment results informed a best value decision in November 2021 for the selected material solution for final engineering development, production and manufacturing readiness, and Limited User Test (LUT). LUT results will inform a major capabilities acquisition program Milestone C decision in 2Q FY 2023. Following a successful Milestone C decision, a sole source, hybrid indefinite Delivery/Indefinite Quantity (ID/IQ) SBIR Phase III production contract will be awarded in April FY 2023. The DAPS program will conduct production qualification testing and an Initial Operational Test and Evaluation (IOT&E) in 1Q FY 2024 to support a Full Rate Production Decision in 2Q FY 2024.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Army		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / <i>Assured Positioning, Navigation and Timing (PNT)</i>	<b>Project (Number/Name)</b> EH8 / <i>DISMOUNTED</i>
<p>Much like its predecessor the Defense Advanced Global Positioning System Receiver (DAGR), the DAPS offers design flexibility that may be leveraged as a multi-role device. Future roles for DAPS may include vehicular, maritime and aviation PNT capability provider. The DAPS program will evaluate and execute an engineering change proposal for integration of an Anti-Jam (AJ) Antenna capability.</p> <p>DAPS requirement documents include:</p> <p>DAPS GEN I Quick Reaction Capability (QRC): DAPS Directed Requirement (19 Mar 2019), Alternative Navigation Directed Requirement (10 August 2019), APNT Requirements Trace and Concurrence for DAPS with ALTNAV Handheld Devices memorandum (16 April 2020) and DAPS Directed Requirement Addendum (18 May 2021).</p> <p>DAPS GEN II Program of Record (POR): The Joint Requirements Oversight Council (JROC) approved the Dismounted APNT System (DAPS) Capabilities Development Document (CDD) on 28 January 2022.</p>		

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Army** **Date:** March 2023

<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / Assured Positioning, Navigation and Timing (PNT)	<b>Project (Number/Name)</b> EH8 / DISMOUNTED
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<b>Management Services (\$ in Millions)</b>				<b>FY 2022</b>		<b>FY 2023</b>		<b>FY 2024 Base</b>		<b>FY 2024 OCO</b>		<b>FY 2024 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Project Management Support	Various	Various : Various	0.279	0.300	Dec 2021	0.195	Dec 2022	0.272	Dec 2023	-		0.272	Continuing	Continuing	Continuing
FY 2023 SBIR / STTR Transfer	TBD	Various : Various	-	-		0.380	Mar 2023	-		-		-	0.000	0.380	-
<b>Subtotal</b>			0.279	0.300		0.575		0.272		-		0.272	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				<b>FY 2022</b>		<b>FY 2023</b>		<b>FY 2024 Base</b>		<b>FY 2024 OCO</b>		<b>FY 2024 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
DAPS Prototyping & Engineering Development, Production & Manufacturing Readiness	MIPR	Various : Various	9.469	5.486	Nov 2021	1.405	Dec 2022	3.548	Dec 2023	-		3.548	Continuing	Continuing	Continuing
Engineering and Technical Product Development	MIPR	C5ISR : APG, MD	1.315	0.568	Dec 2021	1.333	Dec 2022	0.768	Dec 2023	-		0.768	Continuing	Continuing	Continuing
<b>Subtotal</b>			10.784	6.054		2.738		4.316		-		4.316	Continuing	Continuing	N/A

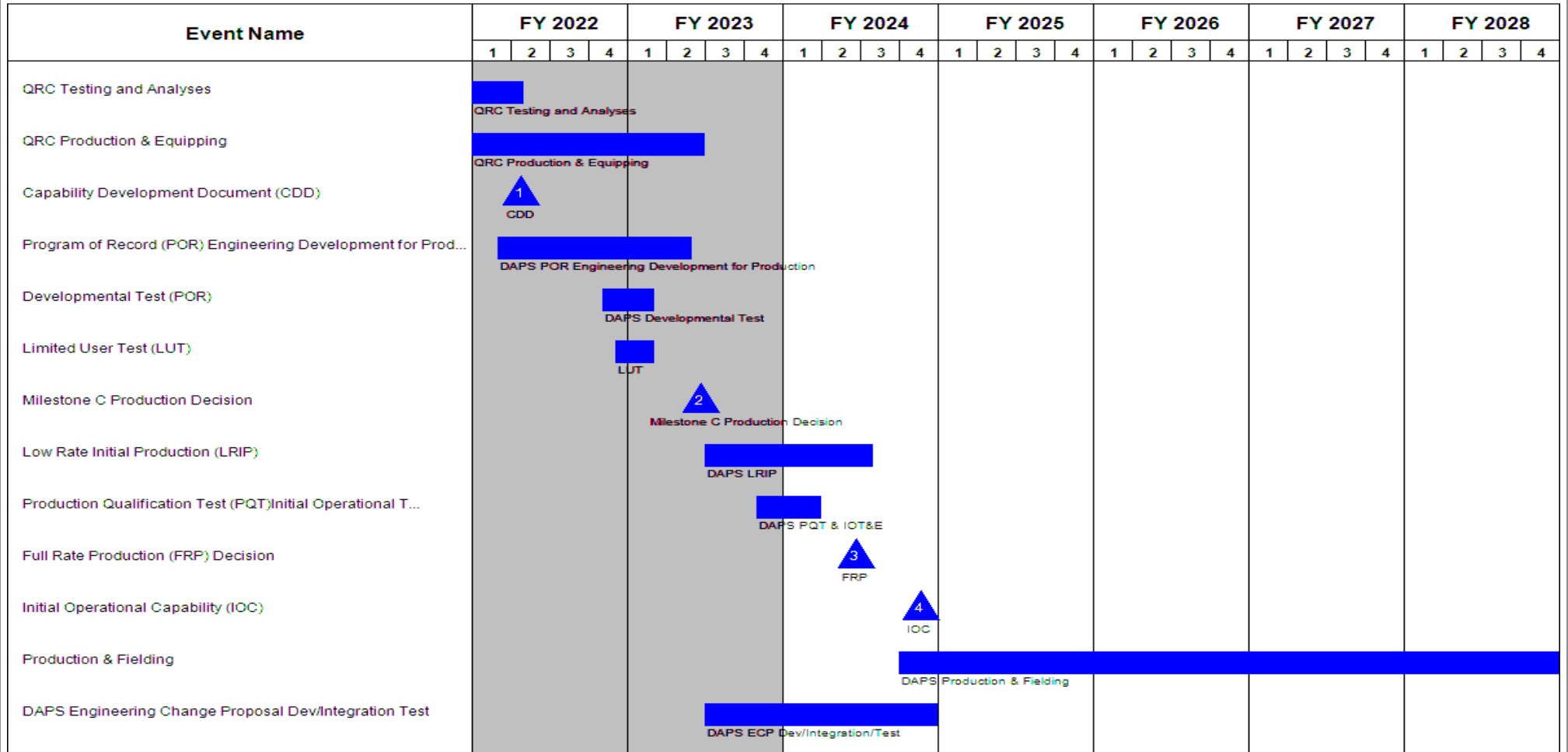
**Remarks**  
FY 2024 Product Development increased due to evaluation and execution of an engineering change proposal for integration of an Anti-Jam (AJ) Antenna capability.

<b>Support (\$ in Millions)</b>				<b>FY 2022</b>		<b>FY 2023</b>		<b>FY 2024 Base</b>		<b>FY 2024 OCO</b>		<b>FY 2024 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Engineering and Technical Services - Government	Various	C5ISR : Various	0.280	0.250	Nov 2021	0.857	Nov 2022	0.893	Nov 2023	-		0.893	Continuing	Continuing	Continuing
Engineering and Technical Services - Contractor	C/CPFF	Various : Various	0.232	0.354	Dec 2021	0.760	Dec 2022	0.699	Dec 2023	-		0.699	Continuing	Continuing	Continuing
<b>Subtotal</b>			0.512	0.604		1.617		1.592		-		1.592	Continuing	Continuing	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2024 Army</b>		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / <i>Assured Positioning, Navigation and Timing (PNT)</i>	<b>Project (Number/Name)</b> EH8 / <i>DISMOUNTED</i>



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2024 Army		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / <i>Assured Positioning, Navigation and Timing (PNT)</i>	<b>Project (Number/Name)</b> EH8 / <i>DISMOUNTED</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
QRC Testing and Analyses	2	2021	1	2022
QRC Production & Equipping	3	2021	2	2023
Capability Development Document (CDD)	2	2022	2	2022
Program of Record (POR) Engineering Development for Production	1	2022	2	2023
Developmental Test (POR)	4	2022	1	2023
Limited User Test (LUT)	4	2022	1	2023
Milestone C Production Decision	2	2023	2	2023
Low Rate Initial Production (LRIP)	3	2023	3	2024
Production Qualification Test (PQT)Initial Operational Test & Evaluation (IOT&E)	4	2023	1	2024
Full Rate Production (FRP) Decision	2	2024	2	2024
Initial Operational Capability (IOC)	4	2024	4	2024
Production & Fielding	4	2024	4	2028
DAPS Engineering Change Proposal Dev/Integration Test	3	2023	4	2024

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**Exhibit R-2A, RDT&E Project Justification:** PB 2024 Army **Date:** March 2023

<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / <i>Assured Positioning, Navigation and Timing (PNT)</i>	<b>Project (Number/Name)</b> EJ2 / <i>MOUNTED</i>
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
EJ2: <i>MOUNTED</i>	-	33.398	15.649	13.838	-	13.838	22.490	7.572	6.849	6.925	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Mounted Assured Positioning, Navigation and Timing System (MAPS) meets congressional (10 USC 2281) and Department of Defense guidance to provide resilient and survivable, M-Code Global Positioning System (GPS) capable Ground User Equipment (MGUE) receivers. The MAPS will deliver systems that provide the Army's combat forces access to assured PNT information under conditions where space-based GPS may be limited or denied to enable Army forces the ability to move, shoot, communicate, and provide situational awareness. MAPS addresses two critical capability gaps: Access and Integrity. Access is the ability to retrieve PNT information in a contested Electronic Warfare/Cyber environment. Integrity is the ability to trust the PNT information. PNT is a critical enabler of many Army Maneuver, Fire and Command and Control systems that are dependent on accurate Position and Timing. The MAPS will provide PNT when GPS is degraded or denied through military code (M-Code) GPS, Alternative Navigation (ALTNV) signals, timing, sensor fusion, anti-jam antenna, and beam steering. This capability will deliver distributed assured PNT capabilities to Armored, Stryker and Infantry Brigade Combat Team (BCT) platforms in an iterative and affordable manner that allows for future modernization.

- MAPS GEN I is a Quick Reaction Capability (QRC) capability that concluded fielding in 1Q FY 2023 with 8 BCTs equipped.
- MAPS GEN II completed Milestone C in July 2022 and Initial Operating Capability (IOC) is planned for 1Q FY 2025.

Fiscal Year (FY) 2024 Base dollars in the amount of \$13.838 million supports completion of Initial Operational Test and Evaluation (IOT&E), MAPS system engineering, and management support. FY 2024 dollars will also support the development of component hardware and software elements of the modular open systems approach (MOSA) form factor that will inform future generations of MAPS systems.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2022	FY 2023	FY 2024
<b>Title:</b> Mounted APNT System (MAPS)	33.398	15.078	13.838
<b>Description:</b> Funding supports MAPS hardware and software development, systems engineering, platform and client system integration, development and operational testing, and program management efforts.			
<b>FY 2023 Plans:</b> Fiscal Year (FY) 2023 Base dollars in the amount of \$15.078 million support MAPS system engineering, management support, and Operational Assessment/Initial Operational Test and Evaluation. Completes final RDT&E integration efforts.			
<b>FY 2024 Plans:</b> Fiscal Year (FY) 2024 Base dollars in the amount of \$13.838 million supports completion of Initial Operational Test and Evaluation (IOT&E), MAPS system engineering, and management support. FY 2024 dollars will also support the development of component			

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**Exhibit R-2A, RDT&E Project Justification:** PB 2024 Army **Date:** March 2023

<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / <i>Assured Positioning, Navigation and Timing (PNT)</i>	<b>Project (Number/Name)</b> EJ2 / MOUNTED
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2022	FY 2023	FY 2024
hardware and software elements of the modular open systems approach (MOSA) form factor that will inform future generations of MAPS systems.  <b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> Funding decreased from \$15.078 million in FY 2023 to \$13.838 million in FY 2024. This decrease is due to completion of RDTE funded platform integration.			
<b>Title:</b> Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR) <b>Description:</b> Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR).  <b>FY 2023 Plans:</b> Funding transferred in accordance with Title 15 USC 638. <b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC 638.	-	0.571	-
<b>Accomplishments/Planned Programs Subtotals</b>	33.398	15.649	13.838

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

<u>Line Item</u>	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• K49030: <i>Mounted Hub A-PNT</i>	80.658	138.005	153.517	-	153.517	126.081	130.333	130.377	130.489	Continuing	Continuing
• ED5: <i>Assured Positioning, Navigation and Timing (PNT)</i>	19.856	-	3.013	-	3.013	4.022	5.033	5.037	4.033	0.000	40.994

**Remarks**  
K49030 / Mounted Hub APNT is an OPA subset of Line Item Number 9897K49000 / Assured Positioning, Navigation and Timing.  
  
0604120A ED5 Assured Positioning, Navigation and Timing will transition PNT Modernization/complementary PNT capabilities to the MAPS.

**D. Acquisition Strategy**  
The Mounted Assured Positioning, Navigation and Timing System (MAPS) acquisition strategy consists of an iterative development operations methodology for the development, testing, production and fielding of a material solution that implements Congressional guidance for M-Code capability (10 USC 2281), modular open systems approach (Reference House Report 116-442, 2020), and the MAPS Capability Development Document (approved 12 September 2020) performance requirements. The MAPS strategy leveraged competitive Other Transaction Authority (OTA) agreements to assess industry capabilities, develop prototypes, and mature technology upgrades. Developmental test and operational assessment results informed a best value decision in September 2020 of the selected material solution for final engineering development, production and manufacturing readiness, and Limited User Test (LUT). LUT results informed a major capabilities acquisition program

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Army		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / <i>Assured Positioning, Navigation and Timing (PNT)</i>	<b>Project (Number/Name)</b> EJ2 / <i>MOUNTED</i>
<p>Milestone C decision in July 2022. A follow-on hybrid fixed priced indefinite delivery indefinite quantity FAR production contract was awarded providing production test articles for Initial Operational Test and Evaluation (IOT&amp;E) in 4Q FY 2023 to 2Q FY 2024 and demonstrate production ramp-up. The IOT&amp;E will demonstrate capability for fielding to Stryker Brigade Combat Teams (BCTs) and the full rate production decision in 4Q FY 2024. FY 2025 follow on test and evaluation will demonstrate capability for remaining Armored Brigade Combat Teams (ABCT) key leader and key combat platforms.</p> <p>Acquisition of the hardware and software components for the Modular Open Systems Approach form factor will be performed using Broad Agency Announcements and OTAs to assess industry capabilities, develop prototypes, and mature technology upgrades.</p>		

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Army** **Date:** March 2023

<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / Assured Positioning, Navigation and Timing (PNT)	<b>Project (Number/Name)</b> EJ2 / MOUNTED
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<b>Management Services (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Project Management Support	C/CPFF	Various : Various	1.812	1.455	Nov 2021	0.629	Jan 2023	0.805	Jan 2024	-		0.805	Continuing	Continuing	Continuing
FY 2023 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.571	Mar 2023	-		-		-	0.000	0.571	-
<b>Subtotal</b>			1.812	1.455		1.200		0.805		-		0.805	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Manufacturing Readiness (Product Maturation) Contract	C/FFP	Collins Aerospace : APG, MD	21.195	1.164	Nov 2021	-		-		-		-	0.000	22.359	-
Mounted PNT Integration - Combat Platforms	C/CPFF	Various : Various	19.544	17.506	May 2022	2.616	Dec 2022	-		-		-	0.000	39.666	-
Mounted PNT Integration - Combat Support Platforms	C/CPFF	Various : Various	0.407	-		-		-		-		-	0.000	0.407	-
Mounted PNT Integration - Combat Services Support Platforms	Various	Various : Various	-	3.914	Mar 2022	0.705	Feb 2023	-		-		-	0.000	4.619	-
Client Software Integration (Various)	MIPR	AvMC / S3l : Huntsville, AL	0.805	0.400	Apr 2022	0.566	Mar 2023	-		-		-	0.000	1.771	-
MAPS MOSA component Hardware and Software development	Various	Various : Various	-	-		-		5.630	Jan 2024	-		5.630	0.000	5.630	-
<b>Subtotal</b>			41.951	22.984		3.887		5.630		-		5.630	0.000	74.452	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Army** **Date:** March 2023

<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / Assured Positioning, Navigation and Timing (PNT)	<b>Project (Number/Name)</b> EJ2 / MOUNTED
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<b>Support (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineering and Technical Services - Government	Various	C5ISR : Various	0.979	1.871	Jan 2022	1.775	Oct 2022	0.779	Nov 2023	-		0.779	0.000	5.404	-
Engineering and Technical Services - Contractor	C/CPFF	Various : Various	4.913	5.392	Jan 2022	3.207	Dec 2022	0.933	Jan 2024	-		0.933	0.000	14.445	-
<b>Subtotal</b>			5.892	7.263		4.982		1.712		-		1.712	0.000	19.849	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Field Testing / Development Test	MIPR	Various : TBD	7.109	1.696	Jan 2022	-		-		-		-	0.000	8.805	-
Initial Operational Test & Evaluation (IOT&E)	TBD	Various : TBD	-	-		5.580	Jan 2023	5.691	Nov 2023	-		5.691	0.000	11.271	-
<b>Subtotal</b>			7.109	1.696		5.580		5.691		-		5.691	0.000	20.076	N/A

**Remarks**  
Due to complexity of the denied and degraded PNT environment required for operational testing, as well as troop availability, IOT&E will occur in two locations spanning two fiscal years.

	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	56.764	33.398	15.649	13.838	-	13.838	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2024 Army</b>			<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / Assured Positioning, Navigation and Timing (PNT)	<b>Project (Number/Name)</b> EJ2 / MOUNTED	

Event Name	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	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
Client and Platform Integration (RDT&E)	[Redacted]				[Redacted]																							
Client and Platform Integration (OPA)	[Redacted]				[Redacted]																							
Production Maturation - Phase 3	[Redacted]				[Redacted]																							
Development Test	[Redacted]				[Redacted]																							
Milestone C Low Rate Initial Production (LRIP) Decision	[Redacted]				[Redacted]																							
Production Contract Award	[Redacted]				[Redacted]																							
LRIP / Full Rate Production (FRP) and Fielding	[Redacted]				[Redacted]																							
Initial Operational Test & Evaluation	[Redacted]				[Redacted]				[Redacted]																			
Full Rate Production Decision	[Redacted]				[Redacted]				[Redacted]				[Redacted]															
Initial Operational Capability	[Redacted]				[Redacted]				[Redacted]				[Redacted]															
Follow on Test and Evaluation	[Redacted]				[Redacted]				[Redacted]				[Redacted]															
MAPS MOSA Component Hardware & Software Development	[Redacted]				[Redacted]				[Redacted]				[Redacted]															

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2024 Army		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604120A / <i>Assured Positioning, Navigation and Timing (PNT)</i>	<b>Project (Number/Name)</b> EJ2 / <i>MOUNTED</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Client and Platform Integration (RDT&E)	3	2019	3	2023
Client and Platform Integration (OPA)	2	2022	4	2026
Mounted APNT Prototyping and Testing - Phase 1	1	2019	4	2019
Mounted APNT Prototyping and Testing - Phase 2	4	2019	4	2020
Operational Tech Demonstration	4	2020	4	2020
Direct Requirement Decision Selected Material Solution	4	2020	4	2020
Production Maturation - Phase 3	4	2020	4	2022
Development Test	3	2021	4	2022
Limited User Test	4	2021	4	2021
Milestone C Low Rate Initial Production (LRIP) Decision	4	2022	4	2022
Production Contract Award	4	2022	4	2022
LRIP / Full Rate Production (FRP) and Fielding	4	2022	4	2028
Initial Operational Test & Evaluation	4	2023	2	2024
Full Rate Production Decision	4	2024	4	2024
Initial Operational Capability	1	2025	1	2025
Follow on Test and Evaluation	1	2025	1	2025
MAPS MOSA Component Hardware & Software Development	1	2024	4	2025