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Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army **Date:** April 2022

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 4: Advanced Component Development & Prototypes (ACD&P)	R-1 Program Element (Number/Name) PE 0604035A / Low Earth Orbit (LEO) Satellite Capability
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COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	-	21.850	19.638	35.509	-	35.509	39.672	22.904	23.328	23.486	Continuing	Continuing
<i>BX7: Low Earth Orbit (LEO) Satellite Capability</i>	-	21.850	19.638	35.509	-	35.509	39.672	22.904	23.328	23.486	Continuing	Continuing

A. Mission Description and Budget Item Justification

The United States Army Tactical Space Strategy provides tactical land component forces with space-based capabilities required to close the top three Large Scale Combat Operations (LSCO) gaps. National, DoD, commercial space-based, and High Altitude (HA) sensor data will be integrated into ground architecture to provide resilient communications, assured Positioning, Navigation, and Timing (PNT), deep sensing capabilities, and Processing Exploitation and Dissemination (PED) required in the targeting process. These capabilities will enable rapid and responsive Sensor-to-Shooter (S2S) applications required to engage and defeat A2/AD forces and enable force projection and maneuver in contested Multi-Domain Operations.

The LEO Satellite Capability is now called the LEO Battle Management Command, Control (BMC2) and Ground Infrastructure. The BMC2 and Ground Infrastructure will provide prototyping, experimentation, and risk reduction activities for ground architecture, supporting wide-area, responsive, and deep-area sensing required for Beyond-Line-of-Sight (BLOS) targeting and force maneuver, significantly reducing Sensor to Shooter (S2S) timelines. It will enable Warfighters at echelon to dynamically task, receive and disseminate data to directly support live-fire S2S demonstrations and assessments including Assured Positioning, Navigation, and Timing/s (APNT/S) Cross Functional Team (CFT) Campaign of Learning and Army Futures Command (AFC) Project Convergence.

B. Program Change Summary (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	21.850	19.638	0.000	-	0.000
Current President's Budget	21.850	19.638	35.509	-	35.509
Total Adjustments	0.000	0.000	35.509	-	35.509
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	35.509	-	35.509

Change Summary Explanation

FY 2023 funding increase reflects the fact that the FY 2022 President's Budget request did not include out-year funding.

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Appropriation/Budget Activity 2040 / 4					R-1 Program Element (Number/Name) PE 0604035A / <i>Low Earth Orbit (LEO) Satellite Capability</i>				Project (Number/Name) BX7 / <i>Low Earth Orbit (LEO) Satellite Capability</i>			
COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
<i>BX7: Low Earth Orbit (LEO) Satellite Capability</i>	-	21.850	19.638	35.509	-	35.509	39.672	22.904	23.328	23.486	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In an Army Budget memorandum dated, 21 September 2020, the Army changed the name of this Project from 'Low Earth Orbit (LEO) Satellite Capability' to 'Battle Management Command and Control (BMC2) and Ground Infrastructure for FY22 and beyond.'

A. Mission Description and Budget Item Justification

The United States Army Tactical Space Strategy provides tactical land component forces with space-based capabilities required to close the top three Large Scale Combat Operations (LSCO) gaps. National, Department of Defense (DoD), commercial Space-based, and High Altitude (HA) sensor data will be integrated into ground architecture to provide resilient communications, assured Positioning, Navigation, and Timing (PNT), deep sensing capabilities and Processing Exploitation and Dissemination (PED) required in the targeting process. These capabilities will enable rapid and responsive Sensor-to-Shooter (S2S) applications required to engage and defeat A2/AD forces and enable force projection and maneuver in contested Multi-Domain Operations.

The Low Earth Orbit (LEO) Battle Management Command and Control (BMC2) and Ground Infrastructure will provide prototyping, experimentation, and risk reduction activities for ground architecture, supporting wide-area, responsive, and deep-area sensing required for Beyond Line of Sight (BLOS) targeting and force maneuver, significantly reducing Sensor to Shooter (S2S) timelines. It will enable Warfighters at the tactical edge to dynamically task, receive and disseminate data to directly support live-fire S2S demonstrations and assessments including Assured Positioning, Navigation, and Timing (APNT) Cross Functional Team (CFT) Campaign of Learning and Army Futures Command (AFC) Project Convergence.

FY2023 Base funding in the amount of \$35.509 million provides prototyping, experimentation, and risk reduction activities for the Army Tactical Intelligence Targeting Access Node (TITAN) and Army Theater-Level Access Node (ATHENA) ground station architectures. This supports wide-area, responsive, and deep-area sensing and force maneuver. It will also enable ground stations to dynamically task, receive and disseminate data to directly support live-fire, S2S demonstrations and assessments.

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

	FY 2021	FY 2022	FY 2023
Title: LEO Satellite Capability	17.100	18.922	35.509
Description: The United States Army Tactical Space Strategy provides tactical land component forces with space-based capabilities required to close the top three Large Scale Combat Operations (LSCO) gaps. National, DoD, commercial space-based, and High Altitude (HA) sensor data will be integrated into ground architecture to provide resilient communications, assured Positioning, Navigation, and Timing (PNT), deep sensing capabilities, and Processing Exploitation and Dissemination (PED)			

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Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604035A / <i>Low Earth Orbit (LEO) Satellite Capability</i>	Project (Number/Name) BX7 / <i>Low Earth Orbit (LEO) Satellite Capability</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023
<p>required in the targeting process. These capabilities will enable rapid and responsive Sensor-to-Shooter (S2S) applications required to engage and defeat A2/AD forces and enable force projection and maneuver in contested Multi-Domain Operations.</p> <p>The LEO Satellite Capability is now called the LEO Battle Management Command, Control (BMC2) and Ground Infrastructure. The BMC2 and Ground Infrastructure will provide prototyping, experimentation, and risk reduction activities for ground architecture, supporting wide-area, responsive, and deep-area sensing required for Beyond-Line-of-Sight (BLOS) targeting and force maneuver, significantly reducing Sensor to Shooter (S2S) timelines. It will enable Warfighters at echelon to dynamically task, receive and disseminate data to directly support live-fire S2S demonstrations and assessments including Assured Positioning, Navigation, and Timing/s (APNT/S) Cross Functional Team (CFT) Campaign of Learning and Army Futures Command (AFC) Project Convergence.</p> <p>FY 2022 Plans: Continues the demonstration and validation of ground architecture, evaluating ability to provide wide-area, responsive, and deep-area sensing required for BLOS targeting and force maneuver, significantly reducing S2S timelines. Ground architecture will be evaluated through multiple events including the Assured Position, Navigation, Timing (APNT) Cross Functional Team (CFT) Campaign of Learning and AFC Project Convergence. These will provide a realistic operational environment to evaluate the integrated Intelligence, Surveillance, and Reconnaissance (ISR), Positioning, Navigation and Timing (PNT), Battle Management Command and Control (BMC2), and communications data to identify and locate targets of interest in denied and contested environments actionable by the tactical Warfighter. This will be executed through the S2S Demo/Experimentation Plan which began with the first Positioning, Navigation and Timing (PNT) Assessment Exercise (PNTAX) in FY19, working through three Live Fire Exercises and follow on exercises in Europe and the Pacific, and culminating with the Project Convergence series of exercises. This Demo/Experimentation cycle is extremely important as it is the Army's mechanism to ensure current and future funding is being correctly applied against the most critical requirements. It provides an iterative framework for rapid concept of operations and tactics, techniques, and procedures development, evaluation and revision and for rapid technology insertion.</p> <p>FY 2023 Plans: Battle Management and Control (BMC2) and Ground Infrastructure (renamed from LEO Satellite Capability) continues the demonstration and validation of ground architecture, evaluating ability to provide wide-area, responsive, and deep-area sensing required for BLOS targeting and force maneuver, significantly reducing S2S timelines. Ground architecture will be evaluated through multiple assessment events including the Assured Position, Navigation, Timing (APNT) Cross Functional Team (CFT) Campaign of Learning and AFC Project Convergence. These will provide a realistic operational environment to evaluate the integrated ISR, Positioning, Navigation and Timing (PNT), Battle Management Command and Control (BMC2), and communications data to identify and locate targets of interest in denied and contested environments actionable by the tactical Warfighter. This will be executed through the S2S Demo/ Experimentation Plan which began with the first Positioning, Navigation</p>			

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Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604035A / Low Earth Orbit (LEO) Sate llite Capability	Project (Number/Name) BX7 / Low Earth Orbit (LEO) Satellite Capability		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2021	FY 2022	FY 2023
<p>and Timing (PNT) Assessment Exercise (PNTAX) in FY19, working through three Live-Fire Exercises and follow-on exercises in Europe and the Pacific, and culminating with a FY 2023 Project Convergence exercise. This Demo/Experimentation cycle is extremely important as it is the Army's mechanism to ensure current and future funding is being correctly applied against the most critical requirements. It provides an iterative framework for rapid concept of operations and tactics, techniques, and procedures development, evaluation and revision and for rapid technology insertion.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Increase from FY 2022 (\$19.638 million) to FY 2023 (\$35.509 million) reflects achieved objectives for Army influence on development of National assets and payloads through A-PNT CFT Campaign of Learning and AFC Project Convergence. The increase also reflects the realignment of PE 0603766A Project CC5 "LEO ISR" funds to PE 0604035A Project BX7 "Battle Management Command and Control (BMC2) and Ground Infrastructure" (renamed from 'LEO Satellite Capability') to continue efforts in this area. Project CC5 "LEO ISR" is focused on the payload development and prototyping, and PE 0604035A Project BX7 ?Battle Management Command and Control (BMC2) and Ground Infrastructure? is focused on the ground ingest/ infrastructure development.</p>				
<p>Title: APNT Integrated Space Communications</p> <p>Description: Development of a unique advanced space communications capability to explore advanced ground based space communications technologies and concepts utilizing bi-static Radio Frequency (RF) scattering and propagation with precision frequency, phase, and power management. This space communications capability will develop and demonstrate multiple advanced Army LEO space communications concepts and will also assess interfacing with multiple Joint Service space communication missions</p>		4.750	-	-
<p>Title: SBIR/STTR</p> <p>Description: FY22 SBIR/STTR fund transfer.</p> <p>FY 2022 Plans: In FY22, \$.628 million in SBIR and \$.088 million transferred to STTR.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Decrease is due to no planned SIBR/STTR costs in PB 2023.</p>		-	0.716	-
Accomplishments/Planned Programs Subtotals		21.850	19.638	35.509

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

Line Item	FY 2021	FY 2022	FY 2023	FY 2023	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	Cost To	
			Base	OCO	Total					Complete	Total Cost
• 0603766A: <i>Tactical Electronic Surveillance System - Adv Dev</i>	182.400	113.365	72.314	-	72.314	64.799	37.048	36.646	37.072	Continuing	Continuing

Remarks

Development by Project BX7 'LEO Battle Command and Control (BMC2) and Ground Infrastructure' is in conjunction and complement Project CC5 'LEO ISR'. ref. PE 0603766A.CC5

D. Acquisition Strategy

The Army signed a Memorandum of Agreement (MOA) with the Mission Partner on November 19, 2019, at the direction of Under Secretary of Defense (Intelligence) (USD(I)) and Office of Management and Budget (OMB). This relationship has shown promise to build and deliver capacity for the Army. The MOA will allow the Army to leverage orbit experimental ISR satellites that will accelerate the Army's development of Concept of Operations (CONOPs), Tactics, Techniques and Procedures (TTPs), and refine requirements necessary to mitigate the deep-sensing gap, shorten the S2S timeline and improve situational awareness for Warfighters at both the operational and tactical levels.

This funding will enable the Army to utilize on-orbit demonstrations and numerous large-scale exercises within United States European Command (EUCOM) and U.S. Indo-Pacific Command (INDOPACOM) areas of responsibility (AORs). These demonstrations will help define the Army's tactical requirements, CONOPs, and TTPs for leveraging on-demand/direct link theater access, at echelon, to space-based ISR capabilities with trained/certified Soldiers. This will turn previously "opportunistic" collection into "assured" collection to support dynamic targeting and enhanced situational awareness. It will enable ground stations to dynamically task, receive and disseminate data to directly support live-fire S2S demonstrations and assessments including Assured Position, Navigation, Timing (APNT) Cross Functional Team (CFT) Campaign of Learning and AFC Project Convergence. Existing Mission Partner contracts and Aviation & Missile Technology Consortium (AMTC) OTAs will be used for Prototype Development, Engineering Services and Test and Evaluation Support.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army												Date: April 2022			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 4				PE 0604035A / Low Earth Orbit (LEO) Satellite Capability				BX7 / Low Earth Orbit (LEO) Satellite Capability							
Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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
Matrix Gov/SETA Support LEO	C/FFP	Multiple : Multiple Locations	-	3.000	Oct 2020	-		-		-		-	0.000	3.000	Continuing
Matrix Gov/SETA Support APNT Integrated Space Communications	TBD	Multiple : Multiple Locations	-	1.000	Oct 2020	-		-		-		-	0.000	1.000	Continuing
Prototype Development and Engineering Services Support	C/FFP	Multiple : Multiple	-	-		3.930	Oct 2021	24.690	Oct 2022	-		24.690	0.000	28.620	-
SBIR/STTR	TBD	HQDA : Pentagon, Arlington, VA	-	-		0.716	Mar 2022	-		-		-	0.000	0.716	-
Subtotal			-	4.000		4.646		24.690		-		24.690	0.000	33.336	N/A
Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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
LEO Satellite Infrastructure Capabilities Development	TBD	Multiple : Multiple	-	14.100	Feb 2021	10.992	Jan 2022	6.454	Jan 2023	-		6.454	0.000	31.546	Continuing
APNT Integrated Space Communications	C/FFP	Classified : Classified	-	3.750	Jan 2021	-		-		-		-	0.000	3.750	Continuing
Subtotal			-	17.850		10.992		6.454		-		6.454	0.000	35.296	N/A
Test and Evaluation (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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
LEO Infrastructure Test and Evaluation	TBD	Multiple : TBD	-	-		4.000	Jan 2022	4.365	Jan 2023	-		4.365	0.000	8.365	-
Subtotal			-	-		4.000		4.365		-		4.365	0.000	8.365	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604035A / Low Earth Orbit (LEO) Satellite Capability	Project (Number/Name) BX7 / Low Earth Orbit (LEO) Satellite Capability	

Event Name	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	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
BMC2 and Ground Infrastructure																												

Note
LEO activities transitioned to this PE 0604035A Project BX7 in FY2022 from previous PE 1206308A, Project FE5 Space And Missile Defense Integration.

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604035A / <i>Low Earth Orbit (LEO) Satellite Capability</i>	Project (Number/Name) BX7 / <i>Low Earth Orbit (LEO) Satellite Capability</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
BMC2 and Ground Infrastructure	1	2021	4	2027