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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1206770F / <i>Enterprise Ground Services</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	0.000	118.870	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
673140: <i>Enterprise Ground Services EGS</i>	-	0.000	118.870	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY 2021, PE 1206770F, Enterprise Ground Services efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1206770SF Enterprise Ground Services from Appropriation 3600, Budget Activity 07 due to the creation of a new Appropriation for Space Force.

The Enterprise Ground Services (EGS) program will provide a robust enterprise ground architecture for Air Force space systems. The EGS capability will become the primary ground command and control (C2) suite of services for the Air Force Space Enterprise to meet evolving current and future space domain demands. EGS is based on Multi-Mission Satellite Operations Center (MMSOC) C2 capabilities developed under the Research and Development Space and Missile Operations (RDSMO) program.

The EGS C2 program will perform technology maturation, experiments, prototyping and operational mission transition for increased commonality and resiliency in space program ground systems. EGS will focus efforts on the rapid development and deployment of tactical C2 services, developing and integrating on-premises and cloud infrastructure and laboratories at multiple sites, advanced concept exploration, prototype development and demonstrations, user experience maturation, training and Concept of Operations (CONOPS) refinement, cyber operations and operational mission training support. These efforts will require support such as systems engineering, integration and test, standards and interface development, architecture development, enhanced cyber security development and implementation. Programs and projects in the space warfighting enterprise are evaluating ways to maximize innovation, resiliency, and our ability to rapidly respond to known and emerging threats. Space enterprise efforts aim to execute technology risk reduction efforts, integration of new or repurposed capabilities, enterprise decision-making tools, experimentation, and rapid prototyping and fielding via all appropriate acquisition authorities and contract mechanisms.

Over the Future Years Defense Program (FYDP) EGS will be developing and deploying C2 services and software applications that support transitioning legacy and new missions such as Missile Warning, Missile Defense, MILSATCOM, Space Situational Awareness and various classified and experimental satellites and missions to the EGS open architecture. The modifications to core software applications provided by EGS are being made in an Agile DevSecOps environment, which has been fundamentally designed into EGS since its inception.

Space acquisition must respond with speed and agility to emerging adversary threats. Space & Missile Systems Center (SMC) is transforming the organization and implementation of space acquisition to an enterprise approach, maximizing innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program/project priorities according to an integrated unclassified/classified enterprise space architecture. Expanding the appropriate acquisition

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authorities and contract mechanisms to deliver capability sooner, SMC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.

The program element may include necessary civilian pay expenses required to manage, execute, and deliver EGS capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.000	138.870	116.830	0.000	116.830
Current President's Budget	0.000	118.870	0.000	0.000	0.000
Total Adjustments	0.000	-20.000	-116.830	0.000	-116.830
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-20.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-116.830	0.000	-116.830

Change Summary Explanation

FY 2020: -\$20.000M; Congressional Reduction for contract delay.

FY 2021: -\$116.830M; Funds starting in FY 2021 were transferred from RDT&E, Air Force to RDT&E, Space Force.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: Enterprise Ground Services (EGS) Development	0.000	63.962	0.000
Description: Perform prototype mission partner demonstrations, cybersecurity and crypto development and implementation, standards and interface refining, training and CONOPs refinement, advance concept maturation, integration and test of mission unique software, and integration of common application and services. Expand development environment in order to develop software applications and services in support of onboarding additional satellite missions.			
FY 2020 Plans:			

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Continue maturation of EGS laboratories including providing an enduring capability to support DevSecOps at the Space Management Battle Lab at the Catalyst Campus. Continue the development and deployment of C2 services, prototype Mission Partner Demonstrations, cybersecurity and crypto development and implementation, platform development and interface refining, training and CONOPs refinement, advance concept maturation, support integration and test of mission unique software, and integration of common applications and services at the distributed System Integration Lab. Expand User Experience guidelines to include multiple services beyond TT&C, Ground Resource Manager, and Mission Management. Expand EGS core services based on mission needs. Mature EGS deployment automation and testing. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>				
<p>Title: EGS Pre-Operations (Pre-Ops) Support</p> <p>Description: Maintain EGS hardware and software baselines, update software licenses, cyber security, help desk operations, and associated training.</p> <p>FY 2020 Plans: Conduct pre-ops support activities for satellites using EGS to include maintaining EGS hardware baseline, updating software licenses, cyber security, help desk stand up operations, as well as associated training. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>		0.000	24.200	0.000
<p>Title: EGS Deployment</p> <p>Description: Rapidly deploy tactical C2 services and space domain capabilities to support customer-funded mission transition activities including future mission acquisition planning and risk reduction efforts.</p> <p>FY 2020 Plans: Continue the maturation of EGS prototype data centers, networks and links to converge capabilities across the EGS enterprise. Continue integration efforts with current and future space domain capabilities. Build on the FY 2019 deliveries by building out</p>		0.000	30.708	0.000

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>the enclave at Buckley Air Force Base to be identical to the EGS Instances at Schriever Air Force Base and Kirtland Air Force Base for resilience. Continue developing the programmatic, technical and architectural roadmap to enable the phased transition of mission partners to EGS. Support customer-funded mission on-boarding including future mission acquisition planning and risk reduction efforts. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>				
Accomplishments/Planned Programs Subtotals		0.000	118.870	0.000
D. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
FY 2019 EGS funds were allocated in the RDSMO Program Element (PE) 1203173F; in FY 2020 EGS was established as PE 1206770F.				
E. Acquisition Strategy				
<p>The EGS acquisition strategy focuses on rapidly delivering C2 prototypes and operational capabilities to warfighters, while leveraging industry best practices for agile development and continuous integration /delivery (CI/CD). One of the key tenets of the EGS acquisition strategy is to maintain government ownership of the technical baseline. As a result, EGS uses a combination of existing and new contracts, and agreements with industry and academia to procure prototypes, platform as a service (PaaS) capabilities, system engineering services, and pre-operations support for mission users. Leverage the two SBIR Phase 3 contracts that were awarded in late FY 2019 to scale EGS capabilities and enable more rapid and development and deployment of tactical C2 services to operational users.</p>				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1206770F / Enterprise Ground Services	Project (Number/Name) 673140 / Enterprise Ground Services EGS
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Pre-Ops Support	Various	Various : Various	-	-		24.200	Jan 2020	0.000		-		0.000	Continuing	Continuing	-
HW, SW and Integration	Various	Various : Various	-	-		14.052	Mar 2020	0.000		-		0.000	Continuing	Continuing	-
Development	Various	Various : Various	-	-		39.784	Oct 2019	0.000		-		0.000	Continuing	Continuing	-
Technical Mission Analysis (FFRDC Aerospace Costs)	MIPR	Aerospace : El Segundo, CA	-	-		6.457	Oct 2019	0.000		-		0.000	Continuing	Continuing	-
Enterprise Systems Engineering and Integration (SE&I)	Various	MITRE : Bedford, MA	-	-		16.656	Oct 2019	0.000		-		0.000	Continuing	Continuing	-
Subtotal			-	-		101.149		0.000		-		0.000	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
FFRDC (Aerospace)	MIPR	Aerospace : El Segundo, CA	-	-		5.255	Oct 2019	-		-		-	Continuing	Continuing	-
A&AS Support	Various	Varioius : Various	-	-		11.956	Nov 2019	0.000		-		0.000	Continuing	Continuing	-
Other Support	Various	Various : El Segundo, CA	-	-		0.510	Dec 2019	0.000		-		0.000	Continuing	Continuing	-
Subtotal			-	-		17.721		0.000		-		0.000	Continuing	Continuing	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-	118.870	0.000	-	0.000	Continuing	Continuing	N/A

Remarks
 FY 2018-2019 Enterprise Ground Services (EGS) funds were allocated in the RDSMO Program Element (PE) 1203173F and in FY 2020 EGS funds transferred to Program Element (PE) 1206770F, Project 673140.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1206770F / <i>Enterprise Ground Services</i>	Project (Number/Name) 673140 / <i>Enterprise Ground Services EGS</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

EGS Development																											
System Integration Lab (SIL)																											
Space Management Battle Lab (SMBL)																											
Development to Operations (DevOps)																											
EGS Deployment																											
EGS Deployment																											
Buckley AFB Initial Capability																											
EGS Pre-Ops Support																											
EGS Pre-Ops Support																											
Mission Integration																											
-HEO Operations Migration to EGS (HOME)																											
-Mission Partner																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1206770F / <i>Enterprise Ground Services</i>	Project (Number/Name) 673140 / <i>Enterprise Ground Services EGS</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>EGS Development</i>				
System Integration Lab (SIL)	1	2020	4	2020
Space Management Battle Lab (SMBL)	1	2020	4	2020
Development to Operations (DevOps)	1	2020	4	2020
<i>EGS Deployment</i>				
EGS Deployment	1	2020	4	2020
Buckley AFB Initial Capability	2	2020	2	2020
<i>EGS Pre-Ops Support</i>				
EGS Pre-Ops Support	1	2020	4	2020
Mission Integration	1	2020	4	2020
-HEO Operations Migration to EGS (HOME)	3	2020	3	2020
-Mission Partner	4	2020	4	2020

Note

Singular events depicted above represent milestones. All milestones include effort prior to and after the event.
 EGS Initial Enterprise Capability milestone includes initial delivery and maturation of tactical C2 enterprise services and space domain capabilities.
 EGS Deployment milestones include initial build-outs of EGS enclaves at operational sites. Continuous Integration/Continuous Deployment is on-going.
 EGS Pre-Ops support milestones include phased initial integration of mission partners and EGS. Pre-ops support is on-going.