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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 0305099F / <i>Global Air Traffic Management (GATM)</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	-	3.966	4.544	4.645	0.000	4.645	4.743	4.828	4.914	5.004	Continuing	Continuing
674689: <i>Global Access Architecture</i>	-	3.966	4.544	4.645	0.000	4.645	4.743	4.828	4.914	5.004	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program element funds the Air Force Life Cycle Management Center (AFLCMC) Aerospace Management Systems Division (AMSD), the designated Air Force (AF) Communications, Navigation, Surveillance/Air Traffic Management (CNS/ATM) and Navigation Safety Center of Excellence (COE). The COE conducts highly specialized analysis, assessment and performance monitoring of military and civil CNS/ATM capabilities and ensures manned and unmanned aircraft system conformance to national and international civil aviation standards allowing safe and efficient access to global airspace. COE expertise is provided to Headquarters Air Force, AF Major Commands (MAJCOM), and weapon system program offices. This centralized capability supplements the MAJCOMs and over 30 AF weapon system program offices with resident CNS/ATM technical expertise.

This funding enables the COE to monitor and participate in government and industry technical forums and U.S. and International civil aviation standards bodies such as the Federal Aviation Administration (FAA), International Civil Aviation Organization (ICAO), Radio Technical Commission for Aeronautics (RTCA), Airlines Electronic Engineering Committee (AEEC) and others. These organizations are responsible for the development and assessment of international civil aviation standards for safe and efficient flight operations in worldwide airspace. COE personnel analyze civil aviation standards as they are being developed and work to influence them to support Department of Defense (DoD) interests.

Specific technical and engineering criteria established by U.S. and International civil aviation standards are documented in generic performance matrices (GPMs). The COE works with MAJCOM and program office personnel and develops strategies to implement CNS/ATM capability requirements on AF weapon systems and tailor the GPMs to each platform's unique avionics architecture and operational mission. After completion of CNS/ATM component integration and testing, COE personnel validate platform performance against the aviation standards necessary for the platform to operate safely and efficiently in worldwide airspace. This performance assessment is submitted to the aircraft program office and becomes part of their Airworthiness certification package.

The COE provides technical analysis and assessments of CNS/ATM and navigation safety avionics equipment throughout the lifecycle of manned and unmanned aircraft platforms. Efforts include and are not limited to performance assessment, test support, performance monitoring, interoperability testing, cybersecurity assessments, and the development and assessment of CNS/ATM capabilities for unmanned platforms. Unmanned platform support includes, and is not limited to location-specific Ground Based Detect and Avoid (GBDAA) radar and airspace characterization, and evaluation of emerging unmanned aircraft system technologies.

The COE administers and manages multiple contracts including the electronic Global Air Traffic Management (iGATM) catalog to enable centralized procurement of CNS/ATM and navigation safety avionics equipment, navigation data, and technical engineering services for aircraft platform program offices and other mission partners.

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Technical engineering services may include and are not limited to performance monitoring, interoperability testing, cybersecurity assessments, and the development and assessment of CNS/ATM capabilities for emerging unmanned platform technologies such as location-specific GBDAA characterization. The iGATM catalog may also offer hardware, software, risk kits, operations and training materials, and the installation and check-out of GBDAA and other emerging unmanned see and avoid technologies and systems. These contracts are used by aircraft program offices across the DoD, among other federal agencies, and in support of foreign military sales.

The Digital Aeronautical Flight Information File (DAFIF) electronic navigation database is developed and maintained by the National Geospatial Intelligence Agency (NGA) and contains critical safety of flight information used by all DoD flight crews to fly Instrument Flight Rules (IFR) procedures, safely navigate airways and fly Instrument Approach Procedures (IAPs) to civil and military airfields worldwide. The COE performs periodic and event driven audits of NGA and alternate industry navigation source data providers and navigation data software tools required by civil aviation authorities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver CNS/ATM weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

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	4.106	4.544	4.654	0.000	4.654
Current President's Budget	3.966	4.544	4.645	0.000	4.645
Total Adjustments	-0.140	0.000	-0.009	0.000	-0.009
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• 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	-0.140	0.000			
• Other Adjustments	0.000	0.000	-0.009	0.000	-0.009

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: CNS/ATM COE Administration of DoD Avionics Equipment Catalog	0.796	0.798	0.800
Description: Multiple contract vehicles with multiple avionics vendors that enable centralized procurement of CNS/ATM and navigation safety avionics equipment/components, navigation data, and technical engineering services. Supports numerous DoD, US Federal Agency, and Foreign Military Sales program offices. Provide preferred customer pricing and extended warranty.			

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>FY 2020 Plans: Continue administration of the DoD electronic avionics equipment catalog and monitor industry for new CNS/ATM products and technical services which could be added to catalog. Follow-on catalog ID/IQ contract planned 4QFY20.</p> <p>FY 2021 Plans: Continue administration of the CNS/ATM electronic storefront and enhanced DoD electronic avionics equipment catalog. Monitor industry for new CNS/ATM products and technical services which could be added to catalog.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increase due to inflation.</p>				
<p>Title: CNS/ATM COE Digital Aeronautical Flight Information File (DAFIF) Management</p> <p>Description: Perform periodic audits of the processes and procedures utilized by organizations involved in the development and distribution of critical safety of flight electronic databases used by aircrews to fly instrument flight rules procedures worldwide. Ensures the validity of multiple sources of information critical to implementation of international performance based navigation (PBN) standards.</p> <p>FY 2020 Plans: Continue efforts with DoD agencies and the FAA to audit/certify electronic navigational databases and sources, and develop performance based procedures required to operate without restriction in the National Airspace System (NAS) and in international civil aviation environments. Continue to publish procedures and databases with the required degree of accuracy/performance necessary to operate manned and remotely piloted aircraft in NAS.</p> <p>FY 2021 Plans: Continue efforts with DoD agencies and the FAA to audit/certify electronic navigational databases and sources, and develop performance based procedures required to operate without restriction in the NAS and in international civil aviation environments. Continue to publish procedures and databases with sufficient accuracy/performance necessary to operate manned and remotely piloted aircraft in NAS.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding decrease due to economic adjustments.</p>		1.738	1.883	1.881
<p>Title: CNS/ATM COE Standards Bodies Engagement and Generic Performance Matrix (GPM) Development</p> <p>Description: Participate in technical forums to understand and influence civil aviation standards and incorporate DoD interests to ensure safe and efficient access of AF manned and unmanned aircraft to the global airspace. Create new and/or revise GPMs used by AF platform program offices to ensure aircraft comply with civil aviation requirements. Tailor GPMs for program offices</p>		1.432	1.863	1.964

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>to apply standards to unique aircraft avionics architectures. Assist 30 aircraft program offices with the development of CNS/ATM related test and evaluation plans, the analysis of test/performance data, and the assessment of aircraft CNS/ATM performance through preparation of a Performance Assessment Report (PAR).</p> <p>FY 2020 Plans: Continue development of generic and tailored performance matrices to ensure AF manned and remotely piloted aircraft are capable and certified to operate safely and efficiently in worldwide civil airspace in accordance with emerging performance based CNS/ATM requirements. Anticipated support to aircraft platforms in FY20 includes and is not limited to: A-10, B-1, B-52, C-5, C-17, C-130, C-130, E-8, E-3, F-16, F-22, F-35, UH-1N, KC-135, KC-46A, RQ-4, MQ-9, HH-60W and VC-25A/B.</p> <p>FY 2021 Plans: Prioritize participation in technical forums and civil aviation standards bodies based on funding and operational requirements of AF platforms. Continue development of generic and tailored performance matrices to ensure AF manned and remotely piloted aircraft are capable and certified to operate safely and efficiently in worldwide civil airspace in accordance with emerging performance based CNS/ATM requirements. Continue to support AF aircraft platform program office test and design reviews, analysis of test/performance data, and performance assessment reports. Prioritize manpower support to provide deliverable products such as the TPM or PAR to ACAT 1 and Reportable modification programs, to include but limited to: T-X, VC-25B, F-35, HH-60W, and UH-1 Replacement program. Support will be provided to AF platform program offices based on manpower availability and operational requirements of AF platforms. FY21 platforms support requests are anticipated by at least the following program offices: A-10, B-1, B-2, B-52, C-5, C-17, C-130, CV-22, E-3, E-4, E-8, E-11, F-15, F-16, F-22, UH-1N, KC-135, KC-46A, RQ-4, MQ-9, HH-60W and VC-25A/B.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increase due to increase in platform support requests and inflation.</p>			
Accomplishments/Planned Programs Subtotals	3.966	4.544	4.645

D. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

E. Acquisition Strategy
This program primarily supports the acquisition of contractor advisory and assistance service (A&AS) and other technical support personnel to support the efforts described in Section C. This program also provides for the acquisition of contractor services in support of various program management activities within the COE. All of these services are acquired via the issuance of task/delivery orders against existing contractor support contract vehicles available to the CNS/ATM COE.

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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 0305099F / <i>Global Air Traffic Management (GATM)</i>	Project (Number/Name) 674689 / <i>Global Access Architecture</i>
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Support (\$ 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			
Support	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
CNS/ATM Center of Excellence: Technical support for CNS/ATM requirement assessments, GPM development, DAFIF navigation data chain audits/certification, and CNS/ATM ID/IQ contract management.	C/T&M	MITRE : Bedford, MA	-	2.064	Oct 2018	2.614	Oct 2019	2.733	Oct 2020	-		2.733	Continuing	Continuing	-
CNS/ATM Center of Excellence: Technical support for operational requirement assessments, GPM development, DAFIF navigation data chain audits/certification, and CNS/ATM ID/IQ contract management.	C/CPFF	Oasis Systems : Lexington, MA	-	1.069	Jul 2019	1.090	Jul 2020	1.100	Jul 2021	-		1.100	Continuing	Continuing	-
Subtotal			-	3.133		3.704		3.833		-		3.833	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			
Management Services	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Program office support - PMA (Contract Services)	C/T&M	Oasis Systems : Lexington, MA	-	0.540	Jul 2019	0.549	Jul 2020	0.550	Jul 2021	-		0.550	Continuing	Continuing	-
Program office support - PMA (Contract Svcs)	C/T&M	Tecolote/Quantech : Bedford, MA	-	0.055	Oct 2018	0.073	Oct 2019	0.091	Oct 2020	-		0.091	Continuing	Continuing	-
Program office support - PMA (Other Govt Costs)	Various	Various : Bedford, MA	-	0.238	Oct 2018	0.218	Oct 2019	0.171	Oct 2020	-		0.171	Continuing	Continuing	-
Subtotal			-	0.833		0.840		0.812		-		0.812	Continuing	Continuing	N/A

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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 0305099F / <i>Global Air Traffic Management (GATM)</i>	Project (Number/Name) 674689 / <i>Global Access Architecture</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
CNS/ATM COE																												
Generic Performance Matrix Development																												
DAFIF Management																												
CNS/ATM iGATM II Contract Proposal Evaluations																												
CNS/ATM iGATM II Contract Administration																												

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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 0305099F / <i>Global Air Traffic Management (GATM)</i>	Project (Number/Name) 674689 / <i>Global Access Architecture</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
CNS/ATM COE				
Generic Performance Matrix Development	1	2020	4	2025
DAFIF Management	1	2020	4	2025
CNS/ATM iGATM II Contract Proposal Evaluations	1	2020	2	2021
CNS/ATM iGATM II Contract Administration	1	2020	2	2022