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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force **Date:** May 2021

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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	4.404	4.637	4.672	0.000	4.672	-	-	-	-	-	-
674689: <i>Global Access Architecture</i>	-	4.404	4.637	4.672	0.000	4.672	-	-	-	-	-	-
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) Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM) and Navigation Safety Center of Excellence (COE). In accordance with AFI 63-101 and AFPAM 63-129, the COE conducts highly specialized analysis, engineering assessments, and performance monitoring of military and civil CNS/ATM capabilities which ensures manned and unmanned aircraft system conformance to national and international civil aviation standards, allowing safe and efficient access to global airspace. The COE's assessment of compliance with CNS/ATM standards feed directly into the Airworthiness approval process, according to Airworthiness Bulletin-325. The COE provides centralized avionics expertise to Headquarters Air Force, AF Major Commands (MAJCOM), and weapon system program offices. This centralized CNS/ATM technical expertise capability supplements all MAJCOMs and AF weapon system program offices. 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.

The majority of COE funding is allocated to engineering services provided by a Federally Funded Research and Development Center and contractor support. A reduction in budget will directly affect all aircraft program offices looking to equip with the latest CNS/ATM capabilities required for airspace access, preferred routing, or increased safety of flight.

Per AFPAM 63-129 the COE must maintain an online site for dissemination of CNS/ATM information as well as a catalog of common CNS/ATM products. The COE is overhauling its online presence through a Phase II SBIR effort to consolidate COE activities and streamline operations in a 'one-stop shop' storefront. It provides seamless data management, centralized knowledge hub, engineering workspace, communications management, working group management, and CNS/ATM product catalog. The website may also be used as a foundational platform to increase collaboration amongst key CNS/ATM stakeholders. An example of this is consolidated avionics equipage information being stored on the site to answer queries from leadership, civil aviation authorities, and the operational community. Organic and/or contractor-support sustainment funding for the COE online storefront will be required starting in FY23 following the development of the site.

This funding enables the COE to participate in government and industry technical forums as well as 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), a Department of Defense (DoD) voting member of the 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 DoD interests.

UNCLASSIFIED

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<p>Applicable technical and engineering criteria established by U.S. and international civil aviation standards are documented in the COE maintained Generic Performance Matrices (GPMs). The COE works with MAJCOM and aircraft System Program Office (SPO) personnel and develops strategies to implement CNS/ATM capability requirements on AF weapon systems as well as 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 interoperate with air traffic control and other airspace users safely and efficiently in worldwide airspace. The resulting performance assessment reports are submitted to the aircraft program office and becomes part of their Airworthiness and Operational Safety, Sustainability, and Effectiveness (OSS&E) certification package.</p> <p>The COE provides technical analysis and assessments of CNS/ATM and navigation safety avionics equipment throughout the life cycle of manned and unmanned aircraft platforms. Efforts include but are not limited to performance assessment, test support, performance monitoring, interoperability testing, cybersecurity assessments, and the development of CNS/ATM capabilities for unmanned platforms. Unmanned platform support includes location-specific Ground Based Detect and Avoid (GBDAA) radar and airspace characterization, and evaluation of emerging unmanned aircraft system technologies. Currently, the COE is surging to meet program office assessment demands. In addition, the COE is projecting an increase in Communications and Navigation performance assessments beginning in FY22 through the FYDP due to new CNS/ATM capabilities to include, but not limited to: M-Code, ARC-210 replacements, SATCOM upgrades, and performance based navigation.</p> <p>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. Technical engineering services may include avionics interoperability testing, cybersecurity assessments, and the development and assessment of CNS/ATM capabilities for emerging unmanned platform technologies. 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.</p> <p>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 the majority of 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 navigation source data, alternate industry navigation source data providers, and navigation data software tools required by civil aviation authorities.</p> <p>This program element may include necessary civilian pay expenses required to manage, execute, and deliver the Global Air Traffic Management system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.000M was expended for civilian pay expenses in this program element, and in FY21 \$0.000M is forecasted for civilian pay expenses in this program element.</p> <p>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.</p>		

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B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	
Previous President's Budget	4.544	4.645	4.743	0.000	4.743	
Current President's Budget	4.404	4.637	4.672	0.000	4.672	
Total Adjustments	-0.140	-0.008	-0.071	0.000	-0.071	
• 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	-0.008	-0.071	0.000	-0.071	
C. Accomplishments/Planned Programs (\$ in Millions)				FY 2020	FY 2021	FY 2022
Title: CNS/ATM COE Administration of DoD Avionics Equipment Catalog				0.750	0.797	0.818
Description: In accordance with AFPAM 63-129 Section 2.7.7 and AFI 63-101 Section 5.4.6.2, the CNS/ATM COE maintains a centralized Indefinite Delivery/Indefinite Quantity (ID/IQ) contract which contains pre-approved products for use by implementing aircraft SPOs. These include or will include: navigation safety avionics equipment/components, navigation data, and technical engineering services. Supports numerous DoD, US Federal Agencies, and Foreign Military Sales program offices. Provide preferred customer pricing and extended warranty.						
FY 2021 Plans: Continue administration of the CNS/ATM electronic storefront and enhanced DoD electronic avionics equipment catalog. Conduct market research, monitor industry for new CNS/ATM products, and conduct aircraft SPO data calls for avionics equipment which could be added to catalog.						
FY 2022 Plans: Continue administration of the CNS/ATM electronic storefront and enhanced DoD electronic avionics equipment catalog. Conduct market research, monitor industry for new CNS/ATM products, and conduct aircraft SPO data calls for avionics equipment which could be added to catalog.						
FY 2021 to FY 2022 Increase/Decrease Statement: Funding increased due to inflation.						
Title: CNS/ATM COE Digital Aeronautical Flight Information File (DAFIF) Management				1.837	1.888	1.877

UNCLASSIFIED

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<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 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 globally.</p> <p>FY 2022 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 globally.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to inflation in the budget.</p>				
<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 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 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.</p>		1.817	1.952	1.977

UNCLASSIFIED

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>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: : AT-6, T-7A, F-35, HH-60W, MH-139, KC-135, C-130J, F-16, and E-11. Support will be provided to AF platform program offices based on manpower availability and operational requirements of AF platforms. FY21 platform support requests are anticipated by: A-10, B-1, B-2, B-52, C-5, C-17, C-130H,C-130J, CV-22, E-3, E-4, E-8, E-11, F-15EX, F-16, F-22, HC-130J, UH-1N, KC-135, KC-46, MC-130H, RQ-4, MQ-9, HH-60W and VC-25.</p> <p><i>FY 2022 Plans:</i> 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: HC-130J, VC-25, KC-135, C-17, and C-130H. Support will be provided to AF platform program offices based on manpower availability and operational requirements of AF platforms. FY22 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-130H,C-130J, CV-22, E-3, E-4, E-8, E-11, F-15EX, F-16, F-22, HC-130J, UH-1N, KC-135, KC-46, MC-130H RQ-4, MQ-9, HH-60W and VC-25.</p> <p><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i> Funding increase to support additional platform support requests and inflation.</p>			
Accomplishments/Planned Programs Subtotals	4.404	4.637	4.672

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.

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force **Date:** May 2021

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 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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			
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	-	2.548	Oct 2019	2.646	Oct 2020	2.665	Oct 2021	-		2.665	-	-	-
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	-	1.016	Jul 2020	1.160	Jul 2021	1.176	Jul 2022	-		1.176	-	-	-
Subtotal			-	3.564		3.806		3.841		-		3.841	-	-	N/A

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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			
Program office support - PMA (Contract Services)	C/T&M	Oasis Systems : Lexington, MA	-	0.549	Jul 2020	0.550	Jul 2021	0.550	Jul 2022	-		0.550	-	-	-
Program office support - PMA (Contract Svcs)	C/T&M	Tecolote/Quantech : Bedford, MA	-	0.073	Oct 2019	0.061	Oct 2020	0.061	Oct 2021	-		0.061	-	-	-
Program office support - PMA (Other Govt Costs)	Various	Various : Bedford, MA	-	0.218	Oct 2019	0.220	Oct 2020	0.220	Oct 2021	-		0.220	-	-	-
Subtotal			-	0.840		0.831		0.831		-		0.831	-	-	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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 Administration	

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
CNS/ATM COE				
Generic Performance Matrix Development	1	2020	4	2026
DAFIF Management	1	2020	4	2026
CNS/ATM iGATM II Contract Administration	2	2021	2	2026