

PART 1 - SECTION C

STATEMENT OF WORK

C.1 GENERAL

C.1.1 Objective

The Federal Aviation Administration's (FAA's) mission is to provide the safest, most efficient aerospace system in the world. The FAA's vision is to transform the aviation system to reflect the highest standards of safety and efficiency and be a model for the world.

The objective of this contract is to provide a broad range of research, service analysis, strategic planning, systems engineering (SE), technical, financial, and programmatic support services, and other aviation related support services, that will enable the FAA to accomplish its National Airspace System (NAS), Mission Support, and other aviation related mission objectives. Section C.2 (Scope) further defines the scope of the contract.

C.1.2 Background

- (a) With the expected growth in air traffic operations and our aging infrastructure, the FAA, in collaboration with its aviation partners, other Federal agencies/departments, foreign entities, and users of the NAS and the larger national air transportation system, continues the task of modernizing and transforming the NAS to meet the future demands of Air Traffic. The overarching objectives for the future remain the same — maximizing airspace capacity with more sophisticated and seamlessly integrated information about the future position of aircraft at a given time — while maintaining the safest air travel possible. The FAA made great progress since the Next Generation Air Transportation System (NextGen) was just a concept. FAA has consistently leveraged their investments to deliver benefits to the NAS every day. Air traffic controllers already have better information to track and separate aircraft safely and efficiently. Pilots have more aeronautical, traffic, and weather information inside the cockpit. Airlines fly faster, more direct routes to get passengers to their destinations more quickly while burning less fuel and producing fewer emissions (i.e., reduced environmental and energy impacts). The FAA is on target to meet their original high-level objectives for NextGen by 2025. By that time, major NextGen transformational systems will be in place, and the FAA expects to achieve additional individual benefits by leveraging NextGen capabilities all along the way. Beyond that date, the FAA will continue to accrue benefits through enterprise-level advanced applications, additional aircraft equipment, and full workforce adoption of a time-based management system. Working closely with stakeholders, the FAA invested in research and pre-implementation work to determine the feasibility of advanced concepts and their associated benefits. The target is still the same but the pathway is being refined. Concepts not deemed feasible or beneficial are no longer

reflected in the Future of the NAS. What continues to be reflected is the dynamic nature of the NAS. The FAA must accommodate new entrants such as unmanned aircraft and commercial space vehicles, as well as address evolving challenges such as cybersecurity and NAS sustainment and resiliency. The FAA will continue to work with the aviation user community through the NextGen Advisory Committee (NAC), the Drone Advisory Committee (DAC), the Commercial Space Transportation Advisory Committee (COMSTAC), other Federal Advisory Committees (FACs), the operational workforce and other stakeholders to plan and prioritize future investments and to achieve seamlessly integrated enterprise benefits. NextGen Portfolios are laid out in the NextGen Implementation Plan and include: improved surface operations; improved approaches and low-visibility operations; improved multiple runway operations; performance based navigation; time based flow management; collaborative air traffic management; separation management; on-demand NAS information; environment and energy; system safety management; NAS infrastructure; and still ensuring our leadership position in managing the safest and most efficient air transportation system in the world.

- (b) In order to accomplish NextGen, as well as other aviation related activities, a portfolio of contract support services vehicles were awarded in 2010 and in 2015 under the titles of Systems Engineering 2020 (SE-2020) and Systems Engineering 2025 (SE-2025). The scope of the support services of this contract is in direct support of U.S. aeronautics development and the transformation of the national air transportation system. The FAA intends, but is not required, to manage this contract as a follow-on to the SE-2020/2025 portfolio of contract vehicles.
- (c) The transformation to this vision will not be made by the FAA alone. It requires other member Federal agencies, as well as partnerships in the public sector (e.g., airport authorities, state/local governments, etc.), private sector entities (e.g., airlines, manufacturers, etc.), and academic institutions to create a world-class consortium focused on identifying solutions for transforming the NAS into the future. The FAA is committed to transforming the aviation system in conjunction with FAA partner Federal agencies and public/private entities. The multi-agency public/private initiative includes the Departments of Transportation, Defense, Commerce, and Homeland Security, as well as the FAA, the National Aeronautics and Space Administration (NASA), the White House Office of Science and Technology Policy (OSTP), public sector, and private entities. The future of the NAS vision is an integrated evolutionary plan to take the FAA beyond ground-based radar technology and voice communications into the second century of aviation using modern technology, updated procedures and new equipment, satellite-based operations, updated communications and automation, and improved weather and traffic management capabilities.
- (d) To realize this vision, the FAA must make coordinated improvements on multiple fronts. “The NextGen Implementation Plan”, “NextGen Priorities Joint Implementation Plan Update”, “National Aviation Research Plan (NARP) and Annual Review”, “NextGen

Implementation Plan”, “NextGen Segment Implementation Plan (NSIP)”, “NextGen Business Plan”, “Vision for Trajectory Based Operations”, “Performance Based Navigation (PBN) NAS Navigation Strategy”, “NAS Horizons”, and “The Future of the NAS” will be the mechanisms by which the FAA holds itself accountable to its customers and the aviation community for progress toward the Future of the NAS vision. See <https://www.faa.gov/nextgen/library/>.

- (e) The NAS Enterprise Architecture (EA) aggregates and describes the research and systems needed to achieve the goals of the FAA for the NAS and serves as the basis to evaluate and document needed upgrades. The NAS EA provides a description of the specific NAS systems and subsystems undergoing research & development, in production, or planned for future development. The NAS Architecture recognizes that maintenance and upgrade efforts of the numerous NAS systems and facilities is a continuing integrated process rather than a singular effort culminating in a final end-state system design. The FAA’s NAS Architecture can be found at <https://www.faa.gov/nextgen/library/>.

C.2 SCOPE

C.2.1 General

- (a) Subject to the exclusions set forth in (a)(2)(i) below:

- (1) The Scope of this contract covers a broad range of support services the FAA may require in connection with:
- (i) All the FAA’s Acquisition Management System (AMS) Lifecycle Management Policy activities covered by:
 - a. Section 2.2 - Research for Service Analysis.
 - b. Section 2.3 - Service Analysis and Strategic Planning.
 - c. Section 2.4 - Concept and Requirements Definition.
 - d. Section 2.5 - Investment Analysis.
 - e. Section 2.6 - Solution Implementation EXCEPT as set forth in (a)(2)(i).
 - f. Section 2.8 - Mission Support Operations-Funded Lifecycle Management Policy EXCEPT as set forth in (a)(2)(i).
 - (ii) All Aviation, Innovation, and New Entrants related activities that fall outside the AMS Lifecycle Management Policy. This includes, but is not limited to research, analysis, and assessment supporting the development of systems, standards, policies, published rules, and procedures.
 - (iii) SE, technical, financial, and programmatic support services, and other aviation related support services, that include but are not limited to, systems engineering and integration, investment and business case analysis, system acquisition program planning and management, system development and implementation planning and management, System Life Extension Program/Technical Refresh planning, program

and contract management, forecasting and business/financial/information management.

- (iv) Other support services for NAS, Mission Support, and other aviation related efforts that the FAA may require under the FAA Acquisition Management System (AMS).
 - (v) The Contractor must support the application of scientific and analytical disciplines to conduct applied research directed toward data collection/reduction, analysis, and concept exploration and development required to satisfy existing and emerging demand for NAS services. Applied research is defined as the systematic study to gain the knowledge or understanding necessary to determine the means by which a recognized and specific need may be met.
- (2) For NAS and Mission Support capital investments, the support services are provided through all the phases of the AMS Lifecycle Management Policy, with the exception of:
- (i) Activities after the NAS Final Investment Decision (FID) point in the AMS Lifecycle Management Policy or after the Mission Support Operations-Funded Lifecycle Management Policy Investment Commitment Decision (decision point 3) that actually are:
 - a. Product Design;
 - b. Full-Scale Development;
 - c. Full-Scale Production;
 - d. Full-Scale Installation and Deployment;
 - e. Maintenance and Operations (M&O) and Retirement; and
 - f. Program management support for program offices in the fields responsible for fielding and/or maintaining and operating NAS systems.
 - (b) Since the NAS or Mission Support encompasses far more than the FAA's infrastructure, this contract allows for studies of systems that may or may not ever be owned by the FAA.
 - (c) The FAA AMS Lifecycle Management Policy can be found at: <http://fast.faa.gov/>.
 - (d) The FAA intends for this contract to remain current and continue to provide a full range of support services within the contract scope throughout the contract's period of performance (PoP). Accordingly, the FAA may make updates to the contract, as appropriate, to ensure the contract continues to provide a full range of services within the contract scope. This includes, but is not limited to:
 - (i) Updates to references to AMS Lifecycle Management Policy. The Scope of this contract references terms described in the AMS Lifecycle Management Policy. The FAA may revise the AMS Lifecycle Management Policy from time to time. If such a revision occurs, the FAA may update the contract's references to the AMS Lifecycle Management Policy, as appropriate. If such updates are needed, the FAA will implement them in a manner that will not materially modify the substantive scope of the contract.

- (ii) Updates to Tasking Requirements. The Tasking Requirements listed in Section C.3 are not intended to be an exclusive list of the services that can be ordered within the scope of the contract. The FAA may add or revise Tasking Requirements to cover additional services within the scope of the contract.
- (iii) Updates to Core and Additional Capabilities. The Core and Additional Capabilities listed in Appendix A are not intended to be an exclusive list of the Core and Additional Capabilities required under the scope of the contract. The FAA may add or revise Core and Additional Capabilities to cover capabilities within the scope of the contract.

Updates to references to AMS Lifecycle Management Policy, updates to the Tasking Requirements, and updates to the Core and Additional Capabilities are within the specific scope of the contract and will not constitute a “change” for purposes of the Changes Clause.

- (e) The Contractor must, in response to Task Orders (TOs) issued under this contract, provide the full range of support services required by the contract. When the FAA orders work under this contract, it will do so by issuing individually-funded TOs that identify and define specific requirements within the Tasking Requirements listed in Section C.3.
- (f) The Contractor may be issued TOs that are related to the development of future NAS systems, as well as other areas that are legacy NAS systems, Mission Support, and other aviation related systems.

C.2.2 Task Order Management

- (a) TO management is a mandatory element for all TOs placed under this contract. TO management must provide the appropriate program management and project control necessary to manage the TO; ensure that the cost, schedule and quality requirements for each TO are continually tracked and the status communicated to the FAA; and ensure that each TO is successfully completed.
- (b) The Contractor must furnish and make available all personnel, supplies, equipment, materials, data, facilities, and services necessary to perform the work under this contract.
- (c) The Contractor must provide quality technical, engineering, analytical, planning, and management support to achieve the requirements of this Statement of Work (SOW).
- (d) When determined by the FAA, the Contractor may be required to interface with system integration Contractors, equipment manufacturers, airport personnel, various FAA and U.S. Government and Military organizations, and international organizations.

C.2.3 Applicable Documents

Applicable AMS policy/guidance, FAA/DOT orders, process guidelines, military standards, or other relevant documents may be specified and identified as references within the individual TOs. FAA orders and notices can be found at:

https://www.faa.gov/regulations_policies/orders_notices/.

C.2.4 Government Furnished Property

All Government Furnished Property (GFP), to include information, material, and equipment, will be specified within the individual TO. All GFP is the property of the Government and must not be transferred to any individual or agency, public or private, without the express written approval of the Contracting Officer (CO), except as required for the specific performance of the TO. The FAA will specify GFP in individual TOs.

C.2.5 Security Requirements

Security requirements, applicable to the work to be performed under each TO, may be identified within the individual TO. Additional security clearances may be needed for specific TOs. Candidates identified for performance under those TOs must hold or be eligible to obtain the requisite security clearance.

C.2.6 Data Deliverables

Specific data deliverable requirements may be included in the individual TOs issued under this contract, either as an item in a Contract Data Requirements List (CDRL) or specified in the TO.

C.2.7 Quality Management Compliance

The Contractor is responsible for ensuring the quality of all work efforts and deliverables, cost control, and adherence to schedules. The Contractor must maintain a Quality Management System that is current to the latest ISO-9001 version or a comparable standard.

C.2.8 Protection of Human Participants

The Contractor must ensure the safety and well-being of all human subjects taking part in FAA-sponsored activities or FAA-conducted scientific research under any TO for which the Contractor is providing support and must adhere strictly to the provisions of the Federal Policy for the Protection of Human Subjects (49 CFR Part 11).

C.2.9 Core and Additional Capabilities

- (a) TOs issued under this contract will require the Contractor to perform technical services, possess specialized experience or expertise with particular capabilities, and apply specific techniques or analyses. These capabilities and techniques are referred to as Core and Additional Capabilities and are identified in Appendix A of this SOW.
- (b) The Core and Additional Capabilities are capabilities that are needed to perform the Tasking Requirements. The Core and Additional Capabilities do not define the scope of this contract.

The Core and Additional Capabilities are intended to be applied consistently with the scope of the particular contract.

C.3 TASKING REQUIREMENTS

Each Tasking Requirement contains a broad overview of services required, definitions as necessary and in some cases examples of the type of work efforts anticipated within an area for illustrative purposes. It should be noted that any examples provided are representative only, and do not necessarily indicate an all-inclusive listing of the support services required and that may be requested within that Tasking Requirement under individually issued TOs.

C.3.1 System Engineering Management

As tasked, the Contractor must support all aspects of systems engineering and integration activities associated with planning, managing, supporting, executing, and maintaining system engineering processes, programs and work, which includes, but is not limited to the following:

- Drafting the Systems Engineering Management Plan (SEMP), specification tree, the program risk analysis, the decision control process, system planning, technical performance measurement, technical reviews, subcontractor and vendor reviews, work authorization, and technical documentation control;
- Measuring and improving the effectiveness and efficiency of system engineering processes; and
- Integrating technical planning to provide program management with specific guidance and recommendations on how to execute a requirement-based and structurally managed program.

C.3.2 Innovation Support Services

As tasked, the Contractor must support identifying, tracking, and assessing innovative solutions (e.g., aircraft design, flight deck technology, automation, remote piloting, flight planning, Unmanned Aircraft Systems (UAS) Traffic Management (UTM)) under development worldwide that may impact or influence ongoing FAA programs, which includes, but is not limited to the following:

- Assessing program impact, developing recommendations and adjusting program and planning elements;
- Tracking and prioritizing rapidly changing global aviation innovation, analyzing time to market, assessing operational and business impacts (e.g., safety, efficiency, NextGen planning, impact to architectures, etc.), and developing dynamic strategic outlooks;
- Developing and establishing innovation programs to drive rapid transformative change on selected issues, technologies, and programs; and
- Developing and fostering innovation capabilities within organizations, including establishing innovation laboratories, establishing sandboxes, and developing leadership transition strategies and innovation programs.

C.3.3 System Requirements and Definition

As tasked, the Contractor must support all activities associated with transforming the information in the Mission Need Statement (MNS) into initial preliminary Program Requirements (pPR) documents, which includes the Requirements Correlation Matrix and the Mission Need Correlation Matrix and is consistent with the operational concept. The Contractor must also define and refine pPR into performance requirements of a final Program Requirements (fPR) document and transform the fPR requirements into an effective solution via design specifications. This system engineering effort, which is applicable to each component of the solution throughout the program lifecycle, includes drafting and maintaining design criteria, and preparing and maintaining system-level data flows, block diagrams, change proposals, and documentation trees. This includes, but is not limited to, the following activities:

- Supporting requirements management activities to identify and manage the requirements that describe the desired characteristics of the system. The Requirements Management process defines, collects, documents, and manages all requirements, including the complete requirements set consisting of the MNS, the pPR and fPR documents, and the system and procurement specifications;
- Supporting risk management activities to identify and analyze the uncertainties of achieving program objectives and developing plans to reduce the likelihood and consequences of those uncertainties. Risk management is applied throughout the acquisition management lifecycle to: 1) identify and assess risk areas, 2) develop and execute risk mitigation or elimination strategies, 3) track and evaluate mitigation efforts, and 4) continue mitigation activity until risk is eliminated or its consequences reduced to acceptable levels;
- Supporting lifecycle engineering to identify and manage requirements for system lifecycle attributes, including real estate management, deployment and transition, integrated logistics support, sustainment/technology evolution, and disposal;
- Supporting functional analyses to describe the functional characteristics based on stakeholder needs, using functional flow diagramming as a representative structured analysis process, and to translate needs into a sequenced and traceable functional architecture; and
- Supporting the synthesis of alternatives to define design solutions and to identify systems that satisfy the requirements baseline. Synthesis translates the requirements, as set in context by the Functional Architecture, into the design architecture, consisting of the Physical Architecture with its associated technical requirements.

C.3.4 Analysis, Design, and Integration

As tasked, the Contractor must provide support to program office(s) in charge of hardware, software, telecommunications, user functions, services, and facilities, which includes, but is not limited to, the following:

- Overall analysis;
- Design and integration;
- Test and evaluation;
- Intra-system and inter-system compatibility assurance; and
- Allocation of functional capabilities.

C.3.5 Value Engineering

As tasked, the Contractor must provide value engineering support services. These include, but are not limited to, analyzing current designs versus alternative designs in order to:

- Provide value added and cost reduction of alternative architectures;
- Perform trade-off studies and detailed analysis to develop a series of design alternatives/viable approaches; and
- Recommend the most balanced technical solution(s) among a set of proposed viable solutions.

C.3.6 Supportability, Maintainability, and Reliability Engineering

As tasked, the Contractor must support all engineering activities and analyses undertaken during solution development as part of the engineering and design effort, to assist in complying with supportability and other logistics support objectives. These activities include, but are not limited to, the following:

- Supportability analyses identifying the most cost effective system support over the entire lifecycle;
- Maintenance planning activities associated with measuring the ability of an item or solution to be retained or restored to a specific condition of readiness;
- Reliability engineering to define the engineering processes required to examine the probability of a solution to perform its mission over the intended PoP and under expected operation conditions; and
- Requisite engineering, scientific, and analytical disciplines to ensure that systems and platforms to be developed, deployed, and maintained in the NAS include Reliability, Availability, and Maintainability (RAM) requirements within their design, development, and lifecycle.

C.3.7 Quality Assurance and Quality Control Program

As tasked, the Contractor must support all activities associated with planning, establishing procedures, evaluating and verifying/auditing that are required for, but are not limited to, during procurement, production, receipt, storage, and issue of products or services that are necessary to develop the solution in accordance with identified Quality Assurance and Quality Control Standards and/or Quality Standard Operation Procedures documents. These activities include, but are not limited to, the following:

(a) Certain TOs may include activities that require Contractors to support the FAA in complying with various Quality systems or models. Examples of Quality systems or models include but are not limited to:

- Various International Organization for Standardization (ISO) standards such as:
 - ISO-9001, and
 - ISO-14001 (which is affiliated with Environmental Management Systems (EMS));
- Safety Risk Management/Safety Management System (SRM/SMS); and
- Capability Maturity Model Integration (CMMI).

- (b) Some TOs may require the Contractor to assist the FAA in meeting their compliance or to support the FAA in becoming compliant with Quality systems or models.
- (c) Other TOs may require the Contractor to be compliant with Quality systems or models. If there is a requirement included in a TO that a Contractor must be compliant, it is the responsibility of the Prime Contractor (utilizing subcontractors as appropriate) to ensure Quality Management support or compliance requirements are met.

C.3.8 Configuration Management

As tasked, the Contractor must support all activities associated with establishing and maintaining the consistency of a product's performance, functional, and physical attributes with its requirements, design, and operational information throughout its life. This includes, but is not limited to, the establishment, monitoring, and administration of change control procedures, including collecting, processing, distributing, and tracking modification request forms; establishment and administration of Change Control Boards (CCBs); and formal audits to compare products to documentation. It also includes configuration management of hardware, software, facilities, data, interfaces, tools, and documentation.

C.3.9 NAS and Mission Support Information Security (INFOSEC) Support

As tasked, the Contractor must support FAA efforts to address the security of information and computing resources including, but not limited to, the identification, evaluation and proposal of candidate technical security solutions for both existing and future Mission Support and NAS Systems. The Contractor must support the FAA security Assessment and Authorization (CA) package as defined in FAA Order 1370.121. Additionally, NAS INFOSEC Support includes, but is not limited to:

- Assessing the vulnerability of NAS, Mission Support, and other FAA/DOT systems to unauthorized access, use, or susceptibility to sabotage, and assessing system security threat survivability;
- Analyzing the source and impact of incursions/attempted incursions;
- Identifying and implementing necessary corrective responses;
- Protecting proprietary information to which the Government and its users have access;
- Maintaining security policies/procedures for NAS and Mission Support systems and subsystems;
- Analyzing and prioritizing security measure enhancements and/or upgrades for all operational NAS and Mission Support systems;
- Verifying and analyzing security features incorporated in new or modified systems;
- Administering the INFOSEC of software development and distribution platforms;

- Addressing security policies and procedures for the development, maintenance and support of the NAS and Mission Support EA Framework with an emphasis on the Information System Security (ISS); and
- Developing and securing all required ISS NAS and Mission Support EA views, datasets and/or databases, and participating in NAS and Mission Support EA working groups.

C.3.10 Technical, Engineering, and Scientific Support

As tasked, the Contractor must provide a variety of Technical, Engineering, and Scientific expertise and assistance involving the research, design, analysis, study, implementation, integration, and transition of Mission Support systems, NAS modernization systems, components, software, equipment, and facilities. The support for Mission Support systems and the NAS includes, but is not limited to, the following:

- Research and assessment of industry equipment and performance in order to develop and propose valid and usable operational concepts, standards and criteria;
- Assessment of wide information and telecommunications security services for the enterprise including concept and scenario development, emerging technology evaluation, data analysis, and performance metrics to improve boundary protection and effectively address incident detection and response;
- Assessment of enterprise-wide communications needs, trends in avionics, potential resolutions to capability gaps and the associated risks;
- Technical, architectural, operational, cost analyses, standards, and modeling to support the implementation of communications, navigation and surveillance services;
- Development of requirements and approval criteria based on human factors research on current and future surface safety logic capabilities;
- Identification, modeling, analysis, and feasibility assessment of new or advanced technologies, capabilities, operations, and standards that mitigate safety issues;
- Identification and assessment of technical and safety issues and the development/validation of operational concepts and scenarios to seamlessly integrate new entrants;
- Pre and post evaluation technology improvements to compile lessons learned and validate that anticipated benefits from current research, systems engineering, and technical analyses that have been realized recently;
- Analysis of economic, environmental, and other policy impacts on the enterprise, system users, and other stakeholders;
- Development of valid and usable operational criteria, operational performance data, analytical techniques and tools to support the FAA research and technical analyses and FAA activities in the assessment of safety risk, the development of innovative new approaches and support of SMS decision making; and
- Creation, maintenance, and use of data repository/data bases (including public, private, and sensitive data), analytical tools and models, simulation capabilities, data

mining and other analytical capabilities to support complex and sensitive data analyses.

C.3.11 System Safety Engineering and Management

As tasked, the Contractor must provide System Safety Engineering and Management support. This includes but is not limited to the following support:

- Planning, conducting, documenting, identifying, classifying, analyzing, assessing hazards, identifying safety threats, and associated risks;
- Studying and recommending measures to mitigate hazards or reduce risk to an acceptable level, verifying that mitigation measures are incorporated into product design and implementation, and assessing residual risk;
- Assessing the predicted efficacy of identified mitigation procedures/techniques and the expected impacts upon NAS system operations;
- Establishing and maintaining safety policies and procedures for NAS systems and subsystems, examples of which are below:
 - Assessing safety capabilities and levels of effectiveness for all operational NAS systems;
 - Supporting the development and maintenance of the system safety portions of FAA Enterprise Architecture Framework;
 - Developing and securing storage of all required Safety NAS EA views, datasets and/or databases;
 - Participating in FAA NAS EA working groups;
- Analyzing and prioritizing of safety measure enhancements or upgrades for all operational NAS systems; and
- Verifying and analyzing safety features incorporated in new or modified systems.

C.3.12 Other System Engineering Specialties

(a) As tasked, the Contractor must support specialty engineering disciplines including but not limited to:

- Analysis of system requirements, functions, solutions, and/or interfaces using specialized skills and tools;
- Derivation of requirements;
- Synthesis of solutions;
- Selection of alternatives; and
- System-of-Systems Integration.

(b) Further details of specialty engineering can be found at the following:

https://fast.faa.gov/EMP_Systems_Engineering.cfm and FAA Systems Engineering Manual at: <https://sep.faa.gov/file/get/2974>.

C.3.13 NAS and Mission Support Enterprise Architecture Support

As tasked, the Contractor must support the development and maintenance of the NAS Enterprise Architecture (EA) including, but not limited to, the following:

- Supporting artifacts that describe the evolution of the NAS EA and Mission Support EA;
- Development and maintenance of “FAA road maps” and milestones;
- Development of operational analyses and studies;
- Support of strategic and program mission and investment analysis activities;
- Analysis, tracking, and reporting of connections and dependencies between the research & development (R&D) portfolios, the NAS EA, the NextGen portfolio, and other U.S. and International R&D programs;
- Development of operational concepts for the NAS/Mission Support and their translation into capabilities, operational improvements, and performance requirements;
- Development and maintenance of an integrated suite of applications and tools, including a web-based administrative application, to input, collect, organize, maintain, modify, display and distribute NAS/Mission Support EA information;
- Development of evolution and transition strategies of the NAS/Mission Support EA; and
- Identifying and assessing Future NAS capability alternatives and concepts that address system issues, shortfalls, technological defects, risks, and other issues.

C.3.14 Technology Opportunities Support

As tasked, the Contractor must support activities associated with new technological opportunities. This includes but is not limited to identifying, quantifying, and keeping abreast of potential technological opportunities for supporting the Mission Support systems and NAS services. This includes being cognizant of existing Commercial-Off-The-Shelf (COTS) hardware/software systems, emerging technologies, and the potential for technology transfer of research outcomes to enable the FAA to continue to perform its mission in a safe, efficient, and cost effective manner.

C.3.15 Test Resources

As tasked, the Contractor must support the following activities: planning and/or performing tests and evaluations; developing and testing prototypes; providing test equipment; providing simulation and modeling software/tools; and providing test support resources. This includes but is not limited to:

- Emerging technology assessment and evaluation;
- Third party technology transfer and large demonstrations evaluation;
- Generation of operational and development testing;
- Test plans, test procedures, test analysis, and test reports;
- Prototype testing and demonstration;

- Concept feasibility and evaluation, alternative analysis;
- Operational Capability Demonstration (OCD) and Operational Capability Test (OCT);
- First Article Testing (FAT), Physical/Functional Configuration Audits (PCAs/FCAs); and
- Test and Evaluation (T&E), Independent/Operational Test and Evaluation (I/OT&E).

This support is for Verification and Validation (V&V) engineering during the conceptual engineering, the Investment Analysis and the Solution Implementation phases of the AMS Lifecycle Management Policy.

C.3.16 Laboratory Facilities

As tasked, the Contractor must support FAA Research, Service Analyses and Strategic Planning activities, System Engineering activities, which include but are not limited to planning, designing, documenting, operating and maintaining laboratory facilities (e.g., William J. Hughes Technical Center (WJHTC) labs, Florida Test Bed (FTB) lab, NASA NextGen CNS Testbed lab, and other laboratory facilities).

C.3.17 Investment Portfolio Management

As tasked, the Contractor must support efforts to optimize the FAA's investment portfolio. The Investment Decision Authority (IDA) and its subordinate review boards evaluate new investment opportunities for inclusion in a service portfolio, on-going investment programs within the portfolio, and the efficiency and effectiveness of operational portfolio assets that include, but are not limited to, the following:

- Investment Selection;
- Investment Control; and
- Operational Evaluation.

C.3.18 Lifecycle, Earned Investment and Business Case Analyses

As tasked, the Contractor must support a full range of investment analysis activities that include, but are not limited to, the following:

- Business Case Development and Integration;
- Lifecycle Cost Estimation;
- Operations Research and Benefits Estimation; and
- Policy, Standards, Training and Special Studies.

C.3.19 Forecasting and Strategy Development

As tasked, the Contractor must support quantitative analysis through the use of simulations, models, tools, forecasts, and other analytical techniques. Support must include, but is not limited to, the following areas:

- System and Service Delivery Point (SDP) forecasts;
- Scenario forecasting;
- Trend analysis;
- Metrics development;
- Operational impact analysis;
- Operations planning analysis;

- FAA/industry/academia coordination;
- Business Outlook;
- Business Plan interface;
- Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis;
- Business trends and updates;
- Modeling, simulation & analysis;
- Strategy position papers;
- Strategic analysis briefings; and
- Updates of FAA strategy.

C.3.20 Business Planning

As tasked, the Contractor must support the analysis, formulation, documentation, and maintenance of business plans. Support must include, but is not limited to, the following:

- Preparation, production, and maintenance of the FAA's Business Plans; and
- FAA strategic management process and FAA business planning analysis.

C.3.21 Performance Analysis

As tasked, the Contractor must support the planning, development and evaluation of FAA and broader NAS performance measurement activities (facility level and system wide). This support must include, but is not limited to, the following:

- Internal and external education and coordination of performance measures (including definitions and methodology);
- Accuracy of data collection and analysis;
- Implementation of new metrics;
- Alignment of metrics to DOT and FAA measures and goals (e.g., Strategy 2013 objectives) and broader Future NAS goals;
- Selection of Critical-To-Quality (CTQ) measures;
- Identifying Key Performance Indicators (KPIs);
- Assessing the system/process stability and capability of the FAA service;
- Modeling support; and
- Technical and analytical support for planning, development, and evaluation of metrics.

C.3.22 NAS Modernization Information Technology (IT) Support

As tasked, the Contractor must provide Information Technology (IT) automation support to enhance the FAA's ability to support NAS modernization. Types of IT support will include, but are not limited to, the following: providing application and management support of FAA supplied software in support of NAS modernization efforts; assisting in the development of user manuals for Government provided software; maintaining and coordinating the automation equipment inventory program; supporting user access to the LAN; hardware/software

configuration/maintenance; web-based collaboration platform and support tools, such as Knowledge Services Network (KSN)/SharePoint, Oracle, and Tableau, development and management support; performing systems diagnostics and analyzing results; and providing technical assistance as necessary.

C.3.23 Policy Studies

As tasked, the Contractor must support and perform policy studies, which includes, but is not limited to, analysis of policy and organizational issues inherent in the NAS transformation, development of alternatives, analysis and assessment of trade-offs between competing goals and interagency objectives/priorities, analysis of constraints, stakeholder analysis, and conflict identification and resolution.

C.3.24 Program Planning and Financial Management

As tasked, the Contractor must provide services to support FAA financial management and planning activities, which must include, but are not limited to, the following:

- Corporate Work Plan (CWP);
- Capitalization and Audit Functions;
- Interagency Agreement Support;
- Capital Investment Team (CIT);
- Budget and Financial Planning and Analysis;
- Acquisition Baseline Management;
- Cost Analysis and Accounting;
- Finance, budget, acquisition, logistics, and systems business processes and developing control environments to reduce audit risk and sustainment costs;
- Enhancing accuracy of business data and increasing transparency over agency dollars for more informed decision making; and
- Agency Plan Development (e.g., NARP, Capital Investment Plan (CIP)).

C.3.25 Program Management Support

As tasked, the Contractor must provide support for FAA program activities associated with business and administrative planning, organizing, directing, coordination, controlling, and approval actions designed to accomplish overall program objectives. These must include, but are not limited to, the following:

- Program/project planning, scheduling, and tracking;
- Portfolio management;
- Developing Office of Management and Budget (OMB) 300 artifacts;
- Using data analytics and visualization tools/services in portfolio management and specific decision tools;
- Risk identification and mitigation planning, Risk-Based Decision Making (RBDM);

- Developing and maintaining technical and financial program baselines;
- Technical writing and outreach support; and
- Technical support in preparing agencies for internal and external audits, including approaches to address business, technology, and financial statement risk and industry practices to identify and address auditability elements of cost accumulation and financial reporting processes, including complying with Federal Accounting Standards Advisory Board, OMB, Treasury, Office of Inspector General (OIG), other financial requirements.

C.3.26 Program Management System Tools

- (a) The FAA uses a number of automated program management tools that require operational, maintenance and automation support. These program management tools are currently primarily ORACLE and web-based applications.
- (b) As tasked, the Contractor must provide support to maintain, host, and update FAA Program Management Tools that include, but are not limited to, the following:
- Regional Information System (REGIS) – Provides "cuff records" for financial management for the Operations (OPS) appropriation;
 - Corporate Work Plan (CWP) – Supports prioritization, planning and scheduling for systems deployment, implementation and capitalization;
 - Financial Management System (FMS) – Provides procurement tracking, and budget execution for the facilities and equipment (F&E) appropriation;
 - Budget Execution Tool (BET) – Provides budget allocation planning and execution for the OPS appropriation;
 - Standard Automating Processing System (SAPS) – Supports staffing and personnel management;
 - Personnel Compensation and Benefits Model (PCB Model) – Provides detailed salary forecasting capability for budget formulation under various staffing assumptions;
 - Strategic Planning Information, Reporting and Evaluation (SPIRE) – Provides F&E Resource Planning Documents (RPDs) budget formulation, CIP, program baseline management and performance reporting, strategic business planning, and monthly reporting of FAA progress supporting flight plan goals;
 - Cost Accounting System (CAS) – Supports analysis of business rules for the cost allocation process and develops recommendations for system enhancements to improve the usability of cost reports for management decision making;
 - Reimbursable Toolset – Supports development, maintenance, and enhancement of automated systems, tools and processes required to meet requirements for reimbursable funds control and management reporting;
 - Oracle Business Intelligence Wide Accounting Network (OBIWAN) – An FAA specific system designed to meet the need for a centralized repository of all financial data;

- DELPHI Funds Control Module – A custom module in DELPHI, which enables FAA financial systems users to perform project level accounting and monitor fund utilizations; and
- National Program Capitalization Tool (NPCT) – A web application used to complete the NPCT form and to complete project set-up in DELPHI for F&E and OPS funded capital projects.

C.3.27 Information Systems Development and Maintenance

As tasked, the Contractor must provide information technologies support that includes, but is not limited to, the following:

- Providing database design, development, operation and maintenance;
- Creating, maintaining, and using data repository/database (including public, private, and sensitive data), data mining and other analytical capabilities to support complex and sensitive data analyses;
- Evaluating computer and communication security;
- Designing, developing and maintaining specified web sites;
- Providing multi-media, graphic design, and implementation;
- Hosting, maintaining, and upgrading commercial and FAA developed automated applications and models; and
- Providing Enterprise Information Management (EIM) support in managing the FAA and aviation data and information as an enterprise to improve efficiency, reduce costs, promote transparency and enable business insight.

C.3.28 Training

As tasked, the Contractor must support efforts in designing, developing and providing/delivering training that includes, but is not limited to, the following:

- Automated systems, applications and models utilization;
- Investment Analysis;
- Financial system utilization;
- Procedural and policy implementation;
- Leadership/Professional Development;
- Systems engineering, technical, and programmatic; and
- Pilot and aircraft safety certification.

C.3.29 Business Process Re-engineering (BPR)

(a) Business Process Re-engineering (BPR) is a process improvement initiative intended to identify inefficiencies and duplication of activities within an organization's mission to reduce overall operational costs. It also establishes strategic business relationships with industry, national and international government agencies, and global Air Navigation Service

Providers (ANSPs) that leverage FAA core competencies to promote global cost effectiveness and operational efficiency.

(b) As tasked, the Contractor must support BPR activities that include, but are not limited to, the following:

- Defining and benchmarking an organization’s mission and business processes;
- Identifying process inefficiencies in meeting organizational missions;
- Identifying cost and operational efficiencies;
- Recommending changes to core business processes;
- Developing workforce and automation tools; and
- Developing plans, costs, models and schedules for recommended changes or tool development.

(c) As tasked, the Contractor must provide support services to promote the development of future organization leaders that meets the challenges of today and the future and enables the organization workforce to execute its mission. The Contractor must support transforming the future workforce to meet evolving knowledge, capabilities, and abilities through the selection, guidance, and training of leaders, technical professionals, and other needed functional skills to meet the future of the NAS. The Contractor must advise, recommend, develop, and execute necessary plans, training, and processes to promote a highly productive, agile and effective workforce that embodies big-picture systems thinking, collaboration and innovation, and leading with influence. This includes, but is not limited to, support for the following:

- Ensure managerial leadership excellence and continuity;
- Build and sustain technical knowledge and influence;
- Enhance and improve leadership and workforce development;
- Attract and retain top talent/ensure continuous talent supply (i.e., Human Capital/Workforce); and
- Evolve organizational culture for improved performance.

C.3.30 Aircraft Certification

As tasked, the Contractor must support all efforts in aircraft certification, including all safety-related quality assurance actions, such as flight inspection, aircraft certification, regulatory requirements, establishing safety standards for operations, monitoring safety performance, issuing and maintaining certificates and licenses, and developing and revalidating procedures such as approach and landing procedures. This must include, but is not limited to, supporting the following:

- Developing rules and guidance material associated with all aspects of aircraft certification;
- Certifying that aircraft, engines, propellers, and aircraft parts and appliances comply with the FAA's safety regulations;

- Examining aircraft products' performance and design, inspecting the manufacturers' production systems, and conducting ongoing oversight;
- Monitoring and analyzing service difficulty issues and taking action as appropriate to ensure continued safe operation of the product;
- Working with our international counterparts to achieve safer air travel around the globe; and
- Collaborating with the aerospace industry, other Government agencies, and universities to reduce accidents and to develop technology and methods to design, produce, and operate safer aircraft.

C.3.31 Software Engineering

As tasked, the Contractor must support efforts in all aspects of software (SW) engineering throughout all phases of the Software Engineering Lifecycle involving the design, development, testing, maintenance of software and related software activities. This support must include, but is not limited to the following:

- Full agile software development and application framework lifecycle support;
- SW documentation development and reviews;
- SW requirements development and analysis;
- SW specification development and compliance assessments;
- SW development cost estimates and assessments;
- Monitor coding and unit/string testing;
- Monitor software unit integration and testing;
- SW verification and validation;
- SW configuration management monitoring;
- SW transition planning;
- Analysis and metric generation for Program Technical Reports;
- SW Independent Verification & Validation (IV&V);
- SW maintenance support; and
- Algorithm evaluation

C.3.32 Verification & Validation (V&V) Program

As tasked, the Contractor must support all V&V activities required during procurement, production, receipt, storage, and issue that are necessary to develop the solution in accordance with identified standards and specifications. This includes, but is not limited to, the following:

- Activities associated with planning, establishing procedures, evaluating and testing;
- Validation of analyses activities to provide the required level of fidelity and accuracy in a timely manner;
- An Analysis Management Plan that outlines the details of the various analysis methods and tools is either generated or incorporated into the program plan; and

- Validation and Verification (V&V) activities to support a determination that the system and process requirements are correct, have been met, and that the system is ready for use in the operational environment for which it is intended (i.e., that the system requirements are unambiguous, correct, complete, consistent, operationally and technically feasible, and verifiable).
- There are two categories of verification: test and assessment.
 1. Test is the disciplined and controlled subsection of the system requirements to conditions that replicate operations in a real or simulated action.
 2. Assessment includes analysis, demonstration, inspection, and verification by similarity, validation of records, simulation, and review of design documentation.

C.3.33 Horizon Scanning, Technology Scouting, and Market Analysis

As tasked, the Contractor must support the development of comprehensive data driven recommendations based on trends in the technology marketplace. This includes, but is not limited to, the following:

- Regularly scanning large sets of data to provide analyses of technologies on the horizon that can enable FAA to fulfill current and evolving NAS missions;
- Applying targeted analysis and responding to inquiries for deep dives into specified technologies to satisfy FAA NextGen technology gaps;
- Data analytics best practices using a combination of international innovation hubs, commercial partnerships with data companies, and scientific research institutions; and
- Producing recommendations and conclusions about the analyzed data to enable investment decisions for NextGen programs, the NAS, and Mission Support systems.

C.3.34 Demand for National Airspace System (NAS) Services Support

(a) The following are the high level activities performed by the FAA for the aviation community that contribute to the flow of aircraft throughout the NAS. They can be found at <https://sep.faa.gov/>. As tasked, the Contractor must support all activities associated with the demand for NAS services which include, but are not limited to, the following:

- Air Traffic Control (ATC) – Advisory;
- ATC – Separation Assurance;
- Aircraft Certification;
- Airport Management;
- Airspace Management;
- Emergency and Alerting;
- Enterprise Management;
- Infrastructure – Information Management;
- Aviation Navigation;
- Traffic Management (TM) – Strategic Flow;

- TM – Synchronization;
 - Trajectory Based Operations (TBO);
 - Performance-Based-Navigation (PBN);
 - Aviation Security;
 - Surface Operations & Data Sharing;
 - Multiple Runway Operations (MRO);
 - Aviation Safety;
 - Incident Detection & Response;
 - Unmanned Aircraft System (UAS);
 - Commercial Space;
 - Common Surveillance; and
 - Aviation Energy and Environmental Impact Assessments;
- (b) As tasked, the Contractor must support activities associated with the demand for NAS services which include, but are not limited to, identifying and quantifying (including data collection) projected demand for the aforementioned NAS services, based on diverse inputs in the form of external demand for airport and airspace service and capacity, long-range plans and projections, local site trends, performance and supportability trends of fielded equipment, and current/planned NAS capabilities.

C.3.35 Identified Projected Supply of Services

As tasked, the Contractor must support all activities associated with identified projected supply of services. This includes but is not limited to, identifying and quantifying the existing and projected supply of services based on performance and supportability data, external and internal assessments of FAA-provided services, and assessments of current and planned NAS capabilities.

C.3.36 Mission Needs Analysis & Assessment Support

As tasked, the Contractor must support all activities associated with mission needs analysis and assessment. This includes but is not limited to, analyzing, quantifying, revalidating, and documenting requisite operational improvements by identifying and prioritizing capability shortfalls/gap analysis (the difference between demand and supply) of the existing NAS services.

C.3.37 Future NAS Research & Development Portfolio Optimization

As tasked, the Contractor must conduct future NAS research & development, which includes but is not limited to, research & development in the focus areas described in (a) and (b) below.

- (a) Those geared towards the FAA's implementation of Future of the NAS. In addition, this plan delineates initiatives that have cross-cutting implications and inter-dependencies from not only a cost and schedule perspective, but also from a technological and operational point of view that embraces all users of the NAS. These initiatives can be found at

<https://www.faa.gov/nextgen/library/>. The initiatives include, but are not limited to, the following:

- Implement/Transition to Trajectory-Based Operations (TBO);
- Increase capacity/efficiency and arrivals/departures at High Density Airports;
- Improve Multiple Runways Operations (IMRO);
- Improve approaches and low-visibility operations;
- Increase access to airport and flexibility in the terminal environment and improve surface operation on the airport surface;
- Improve Integrated Surface Information in the Terminal Environment;
- Improve NAS Resiliency & NAS Infrastructure;
- Enhance Safety and Situational Awareness on the Flight Deck;
- Improve Information Management, Information-Sharing, on-demand NAS information, and incorporation of information/data into Decision Making;
- Improve Collaborative Air Traffic Management (CATM) and industry engagement;
- Reduce Weather Impact;
- Improve separation assurance and management;
- Improve and enhance system safety, cybersecurity, and environmental protection/performance;
- Encourage cost containment through rationalizing and rebalancing services while modernizing infrastructure;
- Encourage, facilitate, and promote Commercial Space;
- Reduce Environmental and Energy Impacts including noise, carbon dioxide emissions, and alternative fuels, etc.;
- Facilitate and Integrate UAS operations and Commercial Space in low-attitude operations and high-attitude operations into the NAS;
- Research Urban Air Mobility (UAM) application;
- Increase PBN routes procedures;
- Enhance traffic flow management and Time-Based Flow Management (TBFM); and
- Retain Aviation Global Leadership in promoting Modernization and Global Harmonization.

(b) Some research is anticipated to be conducted with partnering agencies as well as in collaboration with other countries. These global research focus areas can be found at <https://www.faa.gov/nextgen/library/>, and include, but are not limited to, the following;

- Develop Airport Infrastructure to Meet Future Demand;
- Establish an Effective Security System without Limiting Mobility or Civil Liberties;

- Establish an Agile Air Traffic System;
- Establish User-Specific Situational Awareness;
- Establish a Comprehensive Proactive Safety Management Approach;
- Develop Environmental Protection that Allows Sustained Aviation Growth;
- Develop a System-Wide Capability to Reduce Weather Impacts; and
- Harmonize Equipage and Operations Globally.

SOW APPENDIX A

CORE CAPABILITIES and ADDITIONAL CAPABILITIES

A.1 CORE CAPABILITIES

The following are descriptions of the Core Capabilities (i.e., Aviation Domains and Cross-Cutting Edge Techniques and Skills):

A.1.1 Avionics Systems: Technical knowledge and experience in the systems engineering and testing activities of avionics systems, their functions, capabilities and interface requirements, and associated standards compliance requirements

A.1.2 Commercial Space: Technical knowledge and experience with launch and reentry vehicles; Super/Hypersonic Aircraft; space tourism; NAS Air transportation Systems links to commercial space; and the challenges of safely and efficiently integrating commercial space with current NAS Airspace ATM operations. Evaluation of economic, technological, and institutional developments related to commercial space and advice on new ideas and approaches for Federal policies, regulations, standards, and programs.

A.1.3 Cybersecurity: Technical knowledge and experience in cybersecurity risks in the NAS, Research & Development, and Mission Support Systems in accordance with the Presidential Executive Order (EO) 13636, EO 13800, Presidential Policy Directive (PPD) 21, Federal Information Security Modernization Act (FISMA), the NIST Cybersecurity Framework (CSF) (e.g., Framework Core Functions: Identify, Protect, Detect, Respond, Recover), OMB Circular A-130 Appendix III, and FAA Cybersecurity Strategy. This knowledge and experience includes, but is not limited to, the continuous monitoring/identifying, protecting, detecting, responding, and recovering of any cyber-attacks that may/may not impact the continuity of mission, detection, of and effective response to incidents, and resiliency to protect information systems and information infrastructure along with the sensitive data they contain from unauthorized access, use, disclosure, disruption, modification, or destruction from threats that can impact confidentiality, integrity, and availability of the information, information technology services, and communications.

A.1.4 Enterprise Architecture Products & Enterprise Services: Technical knowledge and experience in the development of Enterprise Architecture products and the Enterprise Services in the area of aviation.

A.1.5 Integrated Laboratories & Operations: Technical knowledge and experience in the design, development, operation, and maintenance of integrated aviation laboratories and test beds.

A.1.6 Trajectory Based Operations (TBO): Technical knowledge and experience in defining, planning and transitioning the NAS to TBO by making flight operations more efficient and predictable, while maintaining operational flexibility. TBO (i.e., initial TBO (iTBO), Full TBO, and Dynamic TBO) is an ATM methodology for strategically planning, managing, and optimizing flights throughout the operation by using time-based management, information exchange between air and ground systems, and the aircraft's ability to fly precise paths in time and space.

A.1.7 Unmanned Aircraft Systems (UAS): Technical knowledge and experience with UAS operations, including UAS Traffic Management (UTM) at low altitudes beyond visual line-of-sight (BVLOS) to facilitate their integration safely and efficiently into the air traffic management operation of the NAS. This effort requires collaboration with a broad spectrum of stakeholders, which includes manufacturers, commercial vendors, industry trade associations, technical standards organizations, academic institutions, research & development centers, governmental agencies, and other regulators. Ultimately, technical knowledge and experience to support UAS integration into the NAS without reducing existing capacity, decreasing safety, negatively impacting current operators, or increasing the risk to airspace users or persons and property on the ground any more than the integration of comparable new and novel technologies. In those areas of the NAS that have demanding communications, navigation, and surveillance performance requirements, successful demonstration of UAS to meet these requirements will be necessary.

A.1.8 Air Traffic Management (ATM) Automation: Technical knowledge and experience in NAS ATM automation systems (e.g., Terminal Automated Modernization/Replacement (TAMR), Terminal Facility Display Management (TFDM), Decision Support Tools (DSTs), En Route Automation Modernization (ERAM), Traffic Flow Management System (TFMS), Time Based Flow Management (TBFM), and Advanced Technologies and Oceanic Procedures (A-TOP) (Ocean 21)) and future NAS systems to include awareness of international system development trends and latest developments to include trust in a framework format of blockchain technology.

A.1.9 Communications, Navigation, and Surveillance (CNS): Technical knowledge and experience in voice and data communications, navigation, and surveillance ground/air/satellite-based communication, navigation, and surveillance (CNS) systems, including common surveillance, spectrum engineering, standards, policies, and procedures.

A.2 ADDITIONAL CAPABILITIES

The following are descriptions of Additional Capabilities (i.e., Aviation Domains and Cross-Cutting Edge Techniques and Skills):

A.2.1 Air Traffic Rules and Procedures: Technical and operational knowledge and experience in current procedures and policies, and technical and operational experience in developing proposed rules and procedures related to Air Traffic operations in the NAS.

A.2.2 Airspace Design and Analysis: Technical knowledge and experience in airspace analysis, design/redesign, test, procedure development and configuration recommendations.

A.2.3 Cost Benefit Analysis: Capability to prepare rough order of magnitude cost-benefit analysis. Conduct lifecycle cost and benefit analyses for individual and grouping of concepts commensurate with the scope and level of maturity of the concept. Technical knowledge and experience in providing Investment Analysis cost and benefit studies for large scale government type programs.

A.2.4 Modeling and Simulation: Technical knowledge and experience in the design, development, testing and execution of modeling and simulation using appropriate/validated tools. Developing foundational methods and tools for addressing problems characterized as system-of-systems. Establishment of an effective frame of reference, crafting of a common lexicon, and study of various modeling, operation analysis, and simulation techniques, including fast-time modeling and simulation, probabilistic robust design (including uncertainty modeling/management), agent-based modeling, network theory, object oriented simulations, and tools for capturing the interaction of requirements, concepts, and technologies.

A.2.5 Human Factors: Technical knowledge and experience to identify, analyze, model, and predict the physical, cognitive, and social behavior characteristics of human interactions within the aviation system environments.

A.2.6 Human-in-the-Loop Simulations: Technical knowledge and experience to simulate and evaluate human interactions within aviation environments in dynamic situations.

A.2.7 Information Technology: Technical knowledge and experience in the development, implementation, and lifecycle support of information technology systems, flexible alternative for Networking, evolving advance computing technologies such as

information trust frameworks, blockchain technologies, and quantum computing that may be used in future NAS and Mission Support Systems.

A.2.8 Investment Analysis: Technical knowledge and experience in providing Investment Analysis cost studies for large scale government type programs.

A.2.9 NAS Air Traffic Facilities: Technical knowledge and experience in the operations, maintenance, and certification of various types, kinds, and functions of NAS Air Traffic facilities.

A.2.10 Information Management Services (IMS): Technical knowledge and experience in providing industry best practices around data and information management, capabilities, and services. Information management will enable FAA’s workforce and the aviation communities to more easily find, access, and analyze the information needed to make business and operational decisions.

A.2.11 Operational Concept Development and Validation: Technical knowledge and experience of the activities performed to support concept development and validation. Concept development is characterized as the process that describes, evaluates, and prepares a proposed capability, technology or procedure. Validation activities help quantify and qualify the operational feasibility and expected benefits of the concept.

A.2.12 Aerospace Medical: Technical knowledge and experience to develop new and innovative ways to support FAA regulatory and advisory missions to improve the safety of humans in civilian aerospace operations. As such, the goal is to continuously maintain the Absorptive Capacity for applying Science, Medicine, Bioengineering, and Technology to unrelentingly enhance human safety.

A.2.13 Program Planning and Financial Analysis: Technical knowledge and experience in providing support to large organizational programs pertaining to planning and financial analysis.

A.2.14 Security: Technical knowledge and experience in researching, designing, and developing and implementing of policies; procedures; standards; systems; and infrastructure to ensure the security (e.g., cyber, information, physical, etc.) of the NAS & Mission Support, including, but are not limited to:

1. NAS and relevant Mission Support information systems;
2. Air Traffic Management operations and crisis response (both internal and external to the FAA);
3. Technical knowledge of National Institute of Standards and Technology (NIST) federal and special publications; particularly those providing details

for FAA compliance with the Federal Information Security Management Act (FISMA);

4. Technical knowledge and experience in the control families defined in NIST SP 800 series;
5. Technical knowledge and experience in FAA Information Security and Privacy (IS&P) Program and Policy, FAA Order 1370.121; FAA Information/Data Management, FAA Order 1375.1; and
6. Technical knowledge and experience in FAA Facility Security Management Program, FAA Order 1600.69.

A.2.15 Service-Oriented Architecture: Technical knowledge and experience in designing and developing procedures and systems, such as System Wide Information Management (SWIM), which provide network centricity and service orientation to NAS and Mission Support systems.

A.2.16 Standards Development: Technical knowledge and experience in the development and implementation of both national and international technical aviation standards (e.g., FAA and ICAO standards).

A.2.17 NAS System Safety: Technical knowledge and experience with FAA and International SRM/SMS by assessing NAS system operational safety of the proposed initiative. This assessment identifies, assesses, and documents operational hazards and risks associated with alternative system solutions. No alternative is pursued whose operational risk cannot be mitigated to an acceptable level at affordable cost.

A.2.18 Weather: Technical knowledge and experience associated with detection, collection, processing, analysis, and dissemination of weather data and the integration of weather data into automated decision-aiding systems, including weather avoidance and impact.

A.2.19 Environmental Analysis: Technical knowledge and experience in environmental analysis including baseline analysis, alternatives analyses, and the National Environmental Policy Act (NEPA) and the use of tools such as the FAA’s Aviation Environmental Design Tool (AEDT). Proven skills in generating environmental analysis metrics (e.g., noise, emissions, fuel burn) from fast-time and human-in-the-loop simulations as well as historical data.

A.2.20 Systems Engineering & Integration: Technical knowledge and experience with Systems Engineering and Integration involving the design and development, testing,

installation, implementation, integration and transition of systems and systems-of-systems, components and equipment as required by the FAA Systems Engineering Manual (SEM).

A.2.21 William J. Hughes Technical Center (WJHTC) Laboratory Operations:

Technical knowledge and experience with the FAA William J. Hughes Technical Center (WJHTC) Laboratory which is the nation's premier air transportation system laboratory in the test and evaluation, verification and validation, and the sustainment of the FAA's full spectrum of aviation systems. WJHTC activities span the development of scientific solutions to current and future air transportation safety challenges by conducting applied research & development utilizing a robust, one-of-a-kind, world class laboratory environment to identify integrated system solutions for the modernization and sustainment of the NAS for delivering the future NAS operational capabilities.

A.2.22 Airplane Modernization and Manufacturing (Large – 14 Code of Federal Regulations (CFR) Part 25 and other applicable Parts) Support Services: Technical knowledge and support services experience in the research, design, engineering, manufacturing (i.e., safety, certification, standards, etc.), modernization, including Hypersonic/Supersonic Transport (SST) and certification of transport category airplanes above a Maximum Takeoff Weight of 12,500 lbs.

A.2.23 Airplane Modernization and Manufacturing (Small - 14 Code of Federal Regulations (CFR) Part 23 and other applicable Parts) Support Services: Technical knowledge and support services experience in the research, design, engineering, manufacturing (i.e., safety, certification, standards, etc.), modernization, including Hypersonic/Supersonic Transport (SST) and certification of airplanes in utility and acrobatic categories up to a Maximum Takeoff Weight of 12,500 lbs., and commuter airplanes up to a Maximum Takeoff Weight of 19,000 lbs.

A.2.24 Large Scale Demonstrations: Technical knowledge and experience in planning and conducting complex, large scale aviation demonstrations (which includes Pre-operational Trials) in a controlled laboratory setting, site specific demonstration test bed, or operational field environment.

A.2.25 Rotorcraft Modernization and Manufacturing (Large – 14 CFR Part 29 and other applicable Parts) Support Services: Technical knowledge and support services experience in the research, design, engineering, manufacturing (i.e., safety, certification, standards, etc.), modernization, and certification of rotorcraft with a Maximum Takeoff Weight greater than 7,000 lbs. and less than 20,000 lbs.

A.2.26 Rotorcraft Modernization and Manufacturing (Small – 14 CFR Part 27 and other applicable Parts) Support Services: Technical knowledge and support services experience in the research, design, engineering, manufacturing (i.e., safety, certification, standards, etc.), modernization, and certification of rotorcraft up to a Maximum Takeoff

Weight of 7,000 lbs. and a maximum of nine passengers.

A.2.27 Simulators, Airplane (Large – 14 CFR Part 25 and other applicable Parts) Support Services: Access to, technical knowledge of, and support services experience using and networking simulators for Part 25 transport category airplanes into large scale disparate simulation test beds.

A.2.28 Simulators, Airplane (Large – 14 CFR Part 25 – Level C and D Fidelity and other applicable Parts) Support Services: Access to, technical knowledge of, and support services experience using and networking simulators for Part 25 transport category airplanes at different fidelity levels into large scale disparate simulation test beds.

A.2.29 Simulators, Rotorcraft (Large – 14 CFR Part 29 – Level C and D Fidelity and other applicable Parts) Support Services: Access to, technical knowledge of, and support services experience using and networking simulators for Part 29 rotorcraft at different fidelity levels into large scale disparate simulation test beds.

A.2.30 System of Systems (SoS) Integration: Technical knowledge and experience in the integration of system of systems (SoS) that allows the FAA to leverage new or existing systems capabilities to provide needed and unique functionality to fulfill a common operational need. The SoS approach results in an integrated capability greater than the sum of the capabilities of the constituent systems.

A.2.31 Aviation Safety and Certification: Technical knowledge and experience in the aviation safety and certification programs that advance operational safety (surveillance, oversight, education, inspections), establish safety rules and regulations (rulemaking), and certify the aviation competency of people (pilots) and organizations (individual airlines) and the airworthiness of aircraft and equipment.

A.2.32 Performance-Based-Navigation (PBN): Technical knowledge and experience in navigation (i.e., Area Navigation (RNAV)/Required Navigation Performance (RNP)) based on specified system performance requirements for aircraft operating on an air traffic route, instrument approach procedure, or in a designated airspace.

A.2.33 Cloud Computing: Technical knowledge and experience in Cloud computing as a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model is composed of five essential characteristics (i.e., on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service), three service models (i.e., Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS)), and four deployment models (i.e., private cloud, community cloud, public cloud, and hybrid cloud).

A.2.34 Data Analytics (DA): Technical knowledge and experience in the process of

examining data sets, especially aviation data sources and formats, in order to draw conclusions about the information they contain, increasingly with the aid of specialized systems and software. Data analytics technologies and techniques are widely used in the aviation communities to enable organizations to make more-informed business decisions and by scientists and researchers to verify or disprove scientific models, theories and hypotheses.

A.2.35 Intelligent Automation and Artificial Intelligence (IAAI)/Machine Learning Systems: Technical knowledge and experience in the simulation of human intelligence processes by machines, especially computer systems. These processes include learning (the acquisition of information and rules for using the information), reasoning (using rules to reach approximate or definite conclusions) and self-correction. An IAAI system that combines and utilizes mainly machine learning and other types of Predictive Data Analytics methods to achieve artificial intelligence capabilities.

(End of Section C)