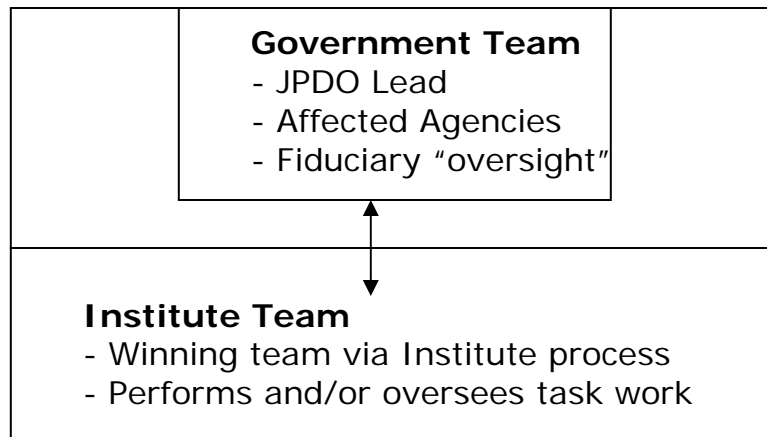


Statement of Work

NextGen Integrated Communications, Navigation and Surveillance (ICNS) Strategic Study

Context of this Study Task



For this task, the Government seeks a partnership approach with the NextGen Institute. This task is provided to the NextGen Institute for the purposes of defining the Government's objectives for this work, and for executing the Institute's internal process for competitively selecting a team to perform the work. The task describes the work to be performed by the "Institute Team" as shown above – this work is a component of a larger effort that will also involve a selected number of individuals on the "Government Team". The Government component of the work is not described herein.

As discussed elsewhere in this SOW, the Government will provide feedback to the Institute Team throughout the course of the Institute's performance of this study task, which may affect certain aspects of this study task, within legal/regulatory and fiduciary constraints.

Study Overview:

Having baselined the NextGen Plan, which includes the Concept of Operations, and AWG avionics roadmap, it is necessary to pursue analyses of the key issues facing NextGen stakeholders. By analyzing these high-impact issues and providing information on how to resolve them, the JPDO can improve the far term strategic planning process (i.e., CY 2018+) and support multi-agency decision-making.

One of the issue areas is NextGen Integrated Communications, Navigation and Surveillance (ICNS). There are potential benefits, principally reduced cost and complexity of operating the NAS, associated with implementation of an ICNS system as part of NextGen. Only a limited amount of work has been done to date to better understand what would be needed to achieve the far-term ICNS system and the risks associated with pursuing such a system.

While many of the individual aspects of NextGen ICNS have been identified and are in development, such as Required Navigation Performance and cooperative surveillance utilizing Automatic Dependent Surveillance – Broadcast (ADS-B), a far-term fully integrated CNS perspective that looks beyond these mid-term improvements has yet to be articulated in sufficient detail to guide research, demonstration, development, integration and implementation. ICNS is inherently a multi-agency endeavor as systems or elements of systems may be provided by multiple agencies and have a major impact on private sector investment in avionics. Therefore, the purpose of this study is to characterize a far-term NextGen ICNS architecture in sufficient detail to guide multi-agency and public-private collaboration, planning and action.

Scope of Analysis:

NextGen includes policies, systems, operations and business interests that span multiple organizations across the public and private sectors. Therefore the scope of this study should include technical, economic, operational, policy and organizational dimensions.

The NextGen Plan will be used to frame government agency and private sector planning. Therefore, it is critical that traceability from and to NextGen planning documents is maintained. Specifically, the work and work products shall be traceable to the NextGen Avionics Roadmap Capabilities (also NAS EA top-level segment view) and following ConOps v2.0 sections:

- 2.4.5 Separation Management Process
- 2.4.6 Trajectory-Based Aircraft Procedures
- 2.4.8 Arrival/Departure TBO
- 2.4.8.1 Super-Density Arrival/Departure Ops
- 2.5 Classic Airspace and Operations

The scope and depth of the analysis must provide sufficiently detailed NextGen ICNS narratives and scenarios to identify and analyze a far-term ICNS architecture. The narratives and scenarios for far-term NextGen ICNS shall address how ICNS capabilities would be used to support/enable super-density arrival/departure operations. This shall include at a minimum, the following from section 2.4.8.1 of the NextGen ConOps V 2.0:

- Use of RNP operations
- Use of capabilities/procedures that enable consistent operations in very low visibility conditions
- Improved runway incursion prevention procedures and technologies

The study must also include the interface of ICNS to operator flight planning systems, aircraft capabilities and avionics functions, and Air Navigation Service Provider (ANSP) systems and functions. The study will use results of modeling and analysis efforts sponsored by the JPDO and other organizations and include analysis of nominal and off-nominal operations. The outcome desired is (1) a set of narratives and scenarios for the far-term NextGen ICNS that can be incorporated in the NextGen Concept of Operations, and NextGen Avionics Roadmap; (2) identification of the dimensions of the far-term NextGen ICNS design space, the drivers for each dimension, and the relative sensitivities of performance, cost, risk and time to each of these drivers; (3) identification of robust alternatives consistent with the NextGen Plan; (4) development of top-level functional, performance, and interoperability requirements for the target far-term NextGen ICNS architecture; and, (5) Identification and prioritization of tasks and decisions to instantiate the far-term NextGen ICNS in agency plans, including analysis of the need and scope for a Joint Concept Technology Demonstration (JCTD).

Tasks

The first phase will develop an operational narrative/scenario, create top-level ICNS requirements to enable the operational scenarios, identify a set of alternatives, and identify and prioritize the analyses to be conducted. At the end of Phase 1, there will be a review with the Government Team, to assess the results and provide feedback and decisions prior to Phase 2. Phase 2 will further define and expand Phase 1 products, execute the required analyses, and develop the remaining deliverables.

Phase 1:

Based on the NextGen Plan:

1. Develop at least one far-term ICNS narrative/scenario for validation, with JPDO personnel not on the Government Team, to be aligned with the NextGen plan.
2. Define the critical far-term NextGen ICNS functional, performance, and interoperability requirements to enable each ICNS narrative/scenario.
3. Describe the ICNS design space and two or more robust architecture alternatives. The design space and alternatives should be consistent with the NextGen Plan, but provide the structure and detail necessary to

- either come to a decision (a recommended far-term ICNS architecture), or frame the key issues that must be resolved.
4. Provide a preliminary assessment of the extent of change needed to evolve from the mid-term (as defined by the FAA NextGen Implementation Plan and EA infrastructure roadmaps) to the far-term ICNS architecture alternative(s). This also includes consideration of the NextGen Avionics Roadmap and current operator flight planning systems.
 5. Develop and describe the analytical approach that would be applied in Phase 2 to assess the alternatives within the design space. Develop a reference list of all past analysis and research that will be used to support the analysis. Prioritize the analyses to be performed.
 6. Conduct a JPDO review based on the results for the purpose of collecting feedback and developing the final proposed set of Phase 2 analyses.

Phase 2:

Based on the results of Phase 1 and subsequent Government Team review, feedback, prioritization and decision-making:

1. Analyze alternatives and summarize relative strengths and weaknesses of alternatives within the design space.
2. Perform other analyses identified and approved in Phase 1.
3. Document cost and benefit mechanisms and risk areas.
4. Update and add depth to the narratives/scenarios.
5. Update and add depth to the assessment of the extent to which current systems and practices would need to change, including summary documentation of current systems.
6. Document findings with respect to user or system needs and performance requirements.
7. Document findings with respect to NextGen goals and metrics.
8. Define specific actions, as needed, for R&D, analysis, demonstration and other actions as well as the associated dependencies and critical paths for resolving issues, if any, within the design space.
9. Highlight any critical long-pole issues that need JPDO attention.
10. Conduct a JPDO review of the Phase 2 results prior to completion of final deliverables.

Deliverables:

Phase 1:

1. A presentation that summarizes the results of Phase 1.
2. At least one ICNS narrative/scenario
3. For each ICNS narrative/scenario: functional, performance, and interoperability requirements; design space and alternatives.
4. A preliminary "extent of change" assessment
5. Proposed, prioritized Phase 2 analyses for JPDO approval.

Phase 2: The Phase 2 deliverables identified below (by Subtask) shall be provided as shown:

Subtask 1 –

Critical Path Action Plan - Provide an action plan which defines specific activities for R&D, analysis, demonstrations, and other actions that addresses the critical paths to achieving the 3 scenarios provided under Phase 1. The action plan will include a list of actions and their goals, time frame and basic approaches meet the future ICNS operations.

Subtask 2 –

1. System/Practices Change Assessment – Provide the impact on current JPDO planning for the 2018 – 2025 timeframe, as described in the current Integrated Work Plan and NextGen Avionics Roadmap necessary to achieve the ICNS architecture provided under the Phase 1 activity.

Subtask 3 -

1. Analysis of Alternatives – Provide a report which documents the results of analyzing the alternatives for ICNS implementation in the 2018-2025 timeframe which includes the relative strengths and weaknesses of the alternatives. The report will contain a Risk Matrix that will document identified risks and their relative levels.

2. System Needs/Performance Requirements – Provide a matrix of System and User needs as well as key performance requirements to meet the ICNS vision as defined in the 3 scenarios.

3. Phase 2 Final Review – Conduct a Government team review of Phase 2 results prior to final delivery

Task Management

1. Schedule and Resources:

-Prior to Phase 1 execution, shall hold a kick-off workshop with the JPDO and the selected contractor. A kick-off meeting likewise will be held before the start of Phase 2.

Phase 1: \$500K, Deliverables due no-later-than April 30, 2009.

Phase 2: \$700K, Subtask 1, Deliverable due no-later-than June 18, 2009;

\$350K, Subtask 2, Deliverables due no-later-than July 30, 2009;

\$700K, Subtask 3, Deliverables due no-later-than Sept. 15, 2009.

2. Funding:

TOTAL FUNDING SHALL NOT EXCEED \$2250K on this Firm Fixed Price (FFP) contract.