Transforming the National Airspace System

Booz Allen Hamilton’s Engineering Experts Integrate the New Systems, Policies, Procedures, and Training for the FAA

The US air traffic control system supports over 35% of global air traffic, yet its aging infrastructure and procedures are nearing obsolescence. Booz Allen is one of the key engineering consultants for the Federal Aviation Administration’s Next Generation Air Transportation System (NextGen), a comprehensive overhaul to make air travel more convenient, dependable, safe, environmentally efficient, and supportive of the national economy.

Reimagining Aviation Infrastructure

Since 1926, what is now called the Federal Aviation Administration (FAA) has governed the US airspace. Complexity pervades operations of about 50,000 daily flights from approximately 19,000 airports, 600 air traffic control facilities and 14,500 air traffic controllers, 10,000 technicians and inspectors, 71,000 pieces of equipment, and 41,000 facilities. Yet in an age of rapidly evolving aircraft technology, the air traffic control (ATC) systems infrastructure is old – 20, 30, even 50 years. The ground systems haven’t kept up with the aircraft systems, or avionics, with which they must interface. Avionics are the aircraft computers that monitor and control flight functions, including: communications, navigation, traffic avoidance, and weather data display. Modern avionics capabilities could enable additional efficiency, safety, and environmental benefits to aviation stakeholders, but delays in systems integration with NextGen ATC capabilities and infrastructure constrains these potential benefits while adding to the cost of implementation. The strategic challenge is to reimagine and transform the US aviation infrastructure and business models to revitalize its operations.

NextGen: System for the Future

NextGen is a portfolio of FAA-led programs to transform the ATC system. In essence, it entails changing from a ground-based system of air traffic control to a more air- and space-centric system that takes full advantage of advanced avionics and satellite based navigation. The new system will scale to support a higher volume of air traffic more safely and efficiently – reducing delays, saving fuel, and reducing aviation’s environmental impact. While the FAA is responsible for much of the legacy and new ATC infrastructure, a significant portion of the NextGen development cost lies with airlines and airports that are responsible for complementary pieces of infrastructure necessary to achieve operational transformation. NextGen transformation is occurring in stages with incremental improvements to the core capabilities of air traffic control and management: communications, navigation, surveillance, and automation. The success of NextGen hinges upon integrating a system-of-systems comprising advanced ATC automation and avionics capabilities. It also requires an evolution in policy, airspace design, and workforce competencies to deliver the expected operational benefits from these systems. A unique challenge for NextGen systems engineering and integration is coordinating capability development and deployment efforts between the public and private sector stakeholders to synchronize technology investments, implementation, and use.
What Booz Allen Does

Booz Allen was chosen as one of seven prime vendors to help the FAA with the critical systems engineering, operations analysis, financial analysis, and program management support necessary for the successful implementation of NextGen. The FAA Systems Engineering 2020 (SE-2020) contract is one of the largest support contracts ever awarded by FAA. This ten year systems engineering, research, and mission analysis contract enlists Booz Allen to provide a broad range of systems engineering, investment, and business case analysis, planning, forecasting and business/financial analysis, and information management services to support the NextGen transformation.

Four Dimensions of the Project

Booz Allen’s overarching role as a SE-2020 prime contractor supporting NextGen covers multiple dimensions.

Engineering & Science. Booz Allen is providing engineering and program management services to help the FAA acquire, test, and implement the systems, policies, procedures, and training for integrated programs in the NextGen portfolio. We support the development of the FAA’s Enterprise Architecture, requirements development, systems engineering, governance, concept development, and simulation. We have created and delivered NAS Enterprise Architecture and Infrastructure roadmaps that are being used to integrate NextGen programs.

Workforce Development. NextGen will change how the FAA workforce approaches its mission. For example, today’s commercial and military aircraft have sophisticated automation systems that provide decision support to pilots. Similarly, air traffic controllers will need such decision support systems as the level of traffic volume and complexity grows. Booz Allen is supporting FAA workforce initiatives such as training for controllers and engineers, development of competency models, and modernization of training methods. We have developed new courses to train the next generation of systems engineers and have taught hundreds of FAA technical staff in engineering and risk management as they prepare to support NextGen.

Business Planning. Our program management support for NextGen includes programmatic and economic analysis for new air traffic control technologies and facilities. In addition, we provide investment analysis and business case support including transition studies, financial models, business continuity services, feasibility analysis, and acquisition strategies. These products serve as the foundation for business cases, and will help validate and quantify program requirements. We have developed initial lifecycle cost estimates for the entire NextGen program as well as for components of the program such as the next generation of ATC facilities.

Policies & Procedures. We are helping the FAA develop and evaluate new policies, procedures, and operational requirements necessary to achieve NextGen performance objectives such as: increase throughput and capacity, enhanced safety and security, and improved environmental efficiency. We have supported the development of data models and requirements in collaboration with ATC and aviation SMEs to achieve the necessary standardization of data and terms that will ultimately enable NextGen System Wide Information Management (SWIM) - a network-centric, “cloud-based” capability that will transform information sharing and exchange among aviation stakeholders.

Helping FAA Be Ready for What’s Next

With decades of experience supporting large system acquisitions, Booz Allen is the ideal “integration agent” for NextGen. We combine the “science and art” of Systems Engineering & Integration to ensure that the portfolio of NextGen capabilities are being implemented on time, within budget, and to expected performance targets while managing risks. Our operational expertise includes a team of former pilots and air traffic controllers. These subject matter experts add a level of fidelity to NextGen because our expertise is operationally relevant and supports development of programs and procedures in a sensible, safe way. With our support, the benefits of NextGen will accrue to the FAA, the Department of Defense, commercial industry, and to all consumers and workers touched by air travel.

About Booz Allen Hamilton

Booz Allen Hamilton has been at the forefront of strategy and technology consulting for nearly a century. The firm provides services primarily to the US government, and to major corporations, institutions, and not-for-profit organizations. Booz Allen offers clients deep functional knowledge spanning strategy, organization, engineering, operations, technology, and analytics. To learn more, visit www.boozallen.com.