U.S. Department
of Transportation

**Federal Aviation
Administration**

Office of the Administrator

800 Independence Ave., S.W.
Washington, D.C. 20591

October 22, 2013

The Honorable John D. Rockefeller, IV
Chairman, Committee on Commerce, Science,
and Transportation
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

As required by Section 225(a) of the FAA Modernization and Reform Act of 2012, an initial report was submitted to Congress on March 7, 2013, outlining the strategy of the Federal Aviation Administration for implementing, on an accelerated basis, the NextGen capabilities produced by the Greener Skies project, as recommended in the final report of the RTCA NextGen Mid-Term Implementation Task Force 5 issued on September 9, 2009. Enclosed is the first subsequent report required by Section 225(b) which provides an updated status on the Greener Skies project.

Identical letters have been sent to Chairman Shuster, Senator Thune, and Congressman Rahall.

Sincerely,

Michael P. Huerta
Administrator

Enclosure

U.S. Department
of Transportation

**Federal Aviation
Administration**

Office of the Administrator

800 Independence Ave., S.W.
Washington, D.C. 20591

October 22, 2013

The Honorable John Thune
Committee on Commerce, Science
and Transportation
United States Senate
Washington, DC 20510

Dear Senator Hutchison:

As required by Section 225(a) of the FAA Modernization and Reform Act of 2012, an initial report was submitted to Congress on March 7, 2013, outlining the strategy of the Federal Aviation Administration for implementing, on an accelerated basis, the NextGen capabilities produced by the Greener Skies project, as recommended in the final report of the RTCA NextGen Mid-Term Implementation Task Force 5 issued on September 9, 2009. Enclosed is the first subsequent report required by Section 225(b) which provides an updated status on the Greener Skies project.

Identical letters have been sent to Chairmen Rockefeller and Shuster and Congressman Rahall.

Sincerely,

Michael P. Huerta
Administrator

Enclosure

U.S. Department
of Transportation

**Federal Aviation
Administration**

Office of the Administrator

800 Independence Ave., S.W.
Washington, D.C. 20591

October 22, 2013

The Honorable Bill Shuster
Chairman, Committee on Transportation
and Infrastructure
House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

As required by Section 225(a) of the FAA Modernization and Reform Act of 2012, an initial report was submitted to Congress on March 7, 2013, outlining the strategy of the Federal Aviation Administration for implementing, on an accelerated basis, the NextGen capabilities produced by the Greener Skies project, as recommended in the final report of the RTCA NextGen Mid-Term Implementation Task Force 5 issued on September 9, 2009. Enclosed is the first subsequent report required by Section 225(b) which provides an updated status on the Greener Skies project.

Identical letters have been sent to Chairman Rockefeller, Senator Thune, and Congressman Rahall.

Sincerely,

Michael P. Huerta
Administrator

Enclosure

U.S. Department
of Transportation

**Federal Aviation
Administration**

Office of the Administrator

800 Independence Ave., S.W.
Washington, D.C. 20591

October 22, 2013

The Honorable Nick J. Rahall, II
Committee on Transportation
and Infrastructure
House of Representatives
Washington, DC 20515

Dear Congressman Rahall:

As required by Section 225(a) of the FAA Modernization and Reform Act of 2012, an initial report was submitted to Congress on March 7, 2013, outlining the strategy of the Federal Aviation Administration for implementing, on an accelerated basis, the NextGen capabilities produced by the Greener Skies project, as recommended in the final report of the RTCA NextGen Mid-Term Implementation Task Force 5 issued on September 9, 2009. Enclosed is the first subsequent report required by Section 225(b) which provides an updated status on the Greener Skies project.

Identical letters have been sent to Chairmen Rockefeller and Shuster and Senator Thune.

Sincerely,

Michael P. Huerta
Administrator

Enclosure

REPORT ON STATUS OF GREENER SKIES PROJECT

Report to Committee on Commerce, Science, and Transportation of the Senate and to the Committee on Transportation and Infrastructure of the House of Representatives

This report states the strategy and progress of the Federal Aviation Administration (FAA) for implementing, on an accelerated basis, the Next Generation Air Transportation System (NextGen) operational capabilities produced by the "Greener Skies over Seattle" project, as recommended in the final report of the RTCA NextGen Mid-Term Implementation Task Force 5 that was issued on September 9, 2009.

The Greener Skies project is a collaborative project between the FAA, airlines, the Port of Seattle, and The Boeing Corporation to introduce Performance Based Navigation (PBN) technology that takes advantage of user investments in aircraft avionics. It includes adding 10 new instrument flight procedures, expanding use of Optimized Profile Descents (OPD), Area Navigation (RNAV), Standard Terminal Arrivals (STARs), and Required Navigation Performance (RNP)[1] approaches.

In July 2010, the FAA's NextGen Management Board authorized Greener Skies, which is currently operating as a three-initiative project. Initiative One (i1), started in September 2010, provides for the design and initial implementation of PBN instrument flight procedures into the complex airspace around Seattle, Washington. Initiative Two (i2) was started in April 2011, and provides the research and safety studies needed to explore changes to air traffic control separation standards to maximize the benefits of PBN utilization. Initiative Three (i3), started in December 2012, allows for the modification of the air traffic control standards such that the applicable PBN instrument flight procedures may be implemented across the National Airspace System (NAS), provided the i2 studies confirm the new standards are safe and provide value added efficiencies. The three Greener Skies efforts are being conducted simultaneously such that the i1 procedure designs can be analyzed by i2, and the results of the i2 safety studies may guide the i3 document changes.

In December 2011, the FAA completed the final draft design of the i1 PBN instrument flight procedures to allow air traffic controllers to issue, and airlines to fly, environmentally-friendly, fuel-efficient shorter routes to runways at Seattle-Tacoma International Airport. These designs include OPD RNAV Standard Terminal Arrival Routes (STARs) that connect to RNAV, RNP, RNAV Visual Flight Procedure and Instrument Landing System (ILS) approaches. This connectivity allows aircraft flight management systems to fly more efficient descent paths to the runway with minimal required interaction between controllers and pilots. In 2012, these designs were thoroughly tested by the lead operator (Alaska Airlines) in a Boeing 737 (B-737) simulator.

---

[1] **RNAV and RNP – Area Navigation and Required Navigation Performance** are the two types of Performance-Based Navigation (PBN) that allow an aircraft to fly a specific path between two 3D-defined points. RNAV and RNP systems are fundamentally similar. The key difference between them is RNP has a requirement for on-board performance monitoring and alerting, that is not required for RNAV.

In accordance with the 18-step collaborative process for the development and implementation of PBN procedures, the FAA authorized i1 flight trials, which were conducted by Alaska Airlines, Horizon, US Airways, and Sky West between June 11, 2012 and August 2, 2012.

The environmental review of the Greener Skies project was completed in November 2012 in accordance with the National Environmental Policy Act (NEPA) and applicable implementing regulations and orders.

In terms of the projected timeline for full implementation, all of the i1 PBN instrument flight procedures were published on March 7, 2013, including two new RNAV STARs and eight new RNP approaches. The RNAV STARs were fully implemented for daily use on March 20, 2013. Over 75 percent of all eligible flights immediately began using the new STARs and the usage numbers have been slowly rising. The RNP approaches were implemented for qualified operators on April 25, 2013. When traffic allows, selected flights are being cleared by air traffic control for these new approaches. However, full use of these RNP instrument approach procedures will be limited by current air traffic control separation rules and weather minima, until such time that i2 is successfully completed. The i1 team is now conducting post-implementation actions (last step of 18-step process) with the new PBN procedures. As a result of this collaborative review, a design change to one of the RNAV STARs was submitted in June 2013, to improve the descent profile and to increase user participation. This amendment was expedited through the normal process and the revised STAR (HAWKZ THREE) was published on August 22, 2013.

Once the FAA implements the new PBN procedures, the next challenge is to develop the operational basis to increase their utilization in all weather and high traffic operations. In April 2011, the i2 team began the process of researching air traffic control concepts to accomplish this goal. In September 2011, the FAA contracted with The Boeing Company to provide the analytical support services for the safety analysis of Established-on-RNP[2] and Concurrent Approaches[3]. This supports the RTCA Task Force 5 recommendation to conduct activities that maximize the benefits from investments in equipage made by operators in support of NextGen.

The ultimate goal of research is to implement new air traffic control separation standards. A close integration of i2 efforts with the i3 implementation group will ensure a successful transition

---

[2] Established-on-RNP allows air traffic control to clear aircraft on an RNP approach with a Radius-to-Fix (RF) turn to final, adjacent to ILS or RNAV finals on the parallel runways. This procedure will decrease flying miles and allow aircraft to remain over less noise sensitive areas for longer times than procedures used for conventional approaches.

[3] Concurrent Approaches will authorize two approaches to descend over the top of one another while maintaining separation in any combination of ILS or RNAV approaches. This allows adjacent airport approaches to be conducted simultaneously while reducing the work required by controllers to keep the aircraft separated, while at the same time maintaining or increasing today's current level of safety.

from research to implementation. The choice to move forward with the Greener Skies i2 research was predicated on its expected value in Seattle as well as the anticipated value these new criteria will bring to similar locations across NAS. To that end, the i2 team purposely included on the team key Seattle stakeholders from local FAA air traffic control facilities, Western Terminal and Enroute Directorates, FAA's Western Service Center, Northwest Mountain Regional Administrator's office, Aviation Safety Organization, labor representatives from the National Air Traffic Controllers Association, the NextGen Program Office, Port of Seattle, Boeing Field, The Boeing Company, King County, Alaska Airlines and Horizon Airlines.

Working with the i2 team members, the Boeing team has delivered a project plan and a detailed Concept of Operations (ConOps) for both Established-on-RNP and Concurrent Approaches. In addition, Boeing released its initial Modeling and Simulation (M&S) Report of the Seattle Established-on-RNP and Concurrent Approaches instrument flight procedures in December 2012.

These documents are being used for the initial step of conducting the FAA's Safety Risk Management (SRM) process. SRM is becoming a standard throughout the aviation industry worldwide. SRM is a structured process within the FAA that analyzes all proposed changes to the NAS to insure they can be implemented without compromise to safety (see FAA Acquisition Management System Policy Section 4.12 at http://fast.faa.gov on Safety Management). The ConOps clearly defines the changes expected in the system resulting from new procedures compared to today's operations. The identified changes were used to highlight the potential hazards associated with these changes and have provided direction for the specific safety analysis and the Seattle M&S report described above.

Incorporating i2's M&S safety analysis data, the i3 team conducted its Established-on-RNP Safety Risk Management Panel (SRMP) in January 2013. The i2 team integrated comments from the panel into its safety analysis and provided an amendment to the Seattle M&S Report in June 2013. In addition, i2 also conducted Human-In-The-Loop (HITL) simulations of Established-on-RNP in April 2013, to supplement its safety case. Concurrently, the i3 team initiated its air traffic control waiver request on April 24, 2013, to enable the implementation of Established-on-RNP at Seattle. Currently, Boeing is also conducting NAS-wide modeling and simulation activities for Established-on-RNP, which are expected to be completed by December 2013.

The main challenge the FAA is encountering in carrying out the strategy is integrating today's instrument flight procedures and air traffic control standards with the current aircraft fleet equipage levels, while at the same time producing procedures that allow for the future, full implementation of PBN in an environmentally-complex airspace. The FAA is confident in the successful completion of the Greener Skies Project through i1, i2 and i3 with the continued cooperation of air traffic control, local authorities, and our aviation stakeholders.