

The beginning of NextGen is here.

A wide-ranging transformation and modernization of the Nation's air traffic system is underway.

NextGen is designed to reduce congestion, accommodate growth in commercial aviation, and benefit the environment. New systems will analyze and display real-time, detailed flight and weather data to create common situational awareness and improve decision-making among air traffic personnel and pilots. NextGen will benefit the environment through reductions in carbon emissions, fuel consumption and noise.

A multi-disciplinary Volpe Center team is supporting efforts to accelerate the NextGen components that will yield near-term benefits and provide key support on critical mid- and long-term NextGen programs.

Safe
Reliable
Efficient
User-Friendly
Environmentally Responsible

U.S. Secretary of Transportation Ray LaHood observes Human Factors simulator capabilities at the Volpe Center.



Photo courtesy of Linda Haas Photography

The Volpe Center is an innovative, Federal, fee-for-service agency within the U.S. Department of Transportation's Research and Innovative Technology Administration. The Volpe team is internationally recognized for its multidisciplinary expertise in all modes of transportation.

Since 1970, the Volpe Center has provided critical support to the DOT modal administrations and offices; other Federal agencies; state and local governments and organizations; foreign governments and entities; and the private sector.

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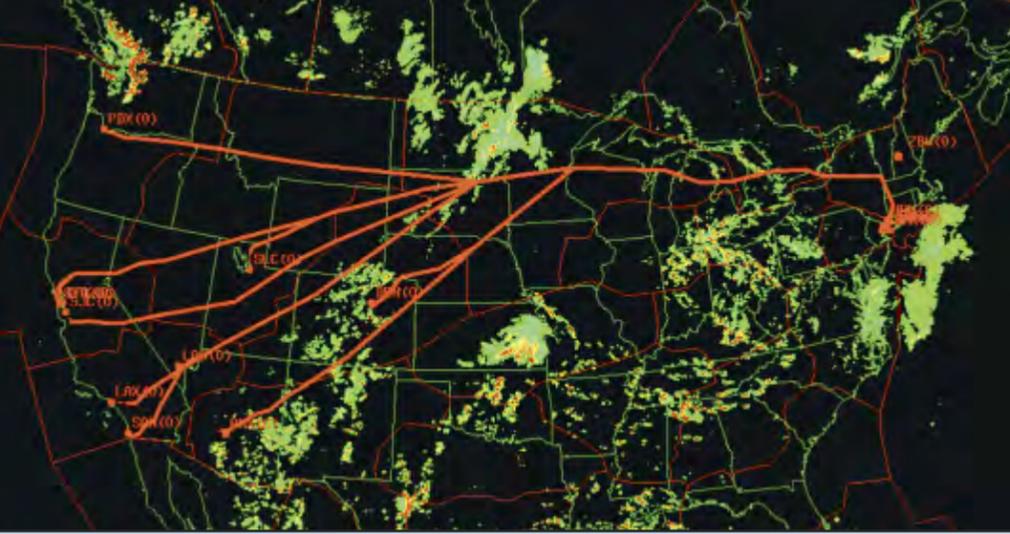
Cover Photo: © Steve Morris/Airliners.net

NextGen and the Volpe Center

In partnership with FAA and other key stakeholders, the Volpe Center is applying its expertise in engineering, operations, human factors, environmental and energy technology, and safety management systems to help design, develop, and deploy cutting-edge aviation systems.



U.S. Department of Transportation
Research and Innovative Technology
Administration



Volpe Center Image

The Re-Route Impact Assessment tool displays a re-route around convective weather.

ADS-B: A Successful Technological Leap

The Volpe Center provides critical support to FAA's Automatic Dependent Surveillance-Broadcast (ADS-B) implementation. The ADS-B system enables a continuous flow of data messages among aircraft in-flight and ground stations, transmitting real-time aircraft positions and trajectories, weather conditions, and airspace restrictions. This real-time data flow is a foundational technology for implementing NextGen improvements. The Volpe team was instrumental in negotiating the deployment of ADS-B weather and communications equipment to offshore oil platforms in the Gulf of Mexico. This will significantly increase the airspace capacity for the region by decreasing safe aircraft separation minimums.

Redefining Traffic Flow Management

A key player in the FAA's NextGen Collaborative Air Traffic Management Technologies program, the Volpe Center develops automated decision support tools and evaluates new technologies. These tools serve in tracking, predicting, and planning air traffic flow, dealing with airport congestion, and evaluating alternative routing strategies. They also provide new capabilities that create common air traffic situational awareness among the FAA traffic managers, air carriers, and other users of the National Airspace System.

For over 25 years, the Volpe Center has been developing innovative Traffic Flow Management tools. Recently, the Volpe Center deployed the Airspace Flow Program, allowing FAA personnel to deal with congestion in en-route airspace. The Volpe Center is also developing the Re-Route Impact Assessment tool to allow traffic managers to determine pre-departure re-routes around adverse weather conditions or other factors that cause congestion.

Advancing Aircraft Wake Turbulence Research

For 40 years, the Volpe Center has been measuring and analyzing wake turbulence and recommending adjustments to aviation standards to improve terminal air traffic safety and capacity. Through its research, the Volpe Center helped achieve a recent national rule change to allow a low-visibility arrival method for Closely-Spaced Parallel Runways (CSPR). CSPR is authorized at several airports, and is currently in use at Seattle-Tacoma International Airport (SEA). At SEA the per-runway capacity increase resulting from the CSPR Arrival project has provided a critical enhancement to the airport's arrival operations.

Enhancing System Wide Information Management

The Volpe Center is supporting the FAA in the establishment of the System Wide Information Management (SWIM) interface, which will facilitate the exchange of critical flight information. The Volpe Center is leading the development effort of the Terminal Data Distribution System (TDDS) and hosting the Integrated Terminal Weather System (ITWS), both SWIM Implementation Programs.

With ITWS, the Volpe Center successfully developed and delivered the first SWIM-compliant weather data feed, enabling traffic managers to adjust flight patterns at ITWS-equipped airports to accommodate to real-time changes in weather conditions and providing safer and more efficient air traffic management.

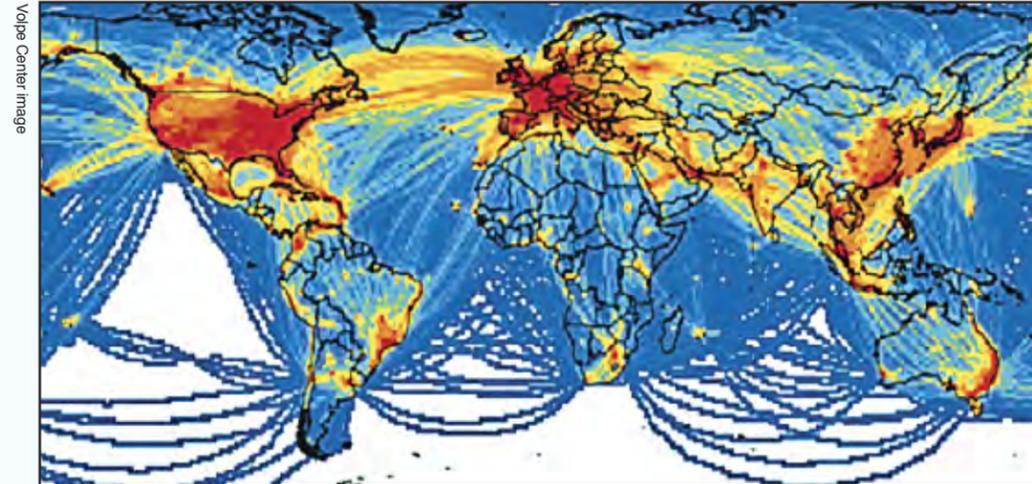
The Human Side of NextGen

The Volpe Center's human factors research is focused on how pilots, air traffic controllers, and air traffic managers gather information using current systems, how this process will change as a result of new NextGen systems, and how new systems can be designed to maintain or improve current levels of safety. Volpe Center studies include how NextGen will affect pilots' use of cockpit displays of traffic information, how satellite-based flight routes will affect the need for information, and how that information is conveyed to the pilot. The Volpe human factors team is now developing guidance for analyzing pilot-controller communications under NextGen.



Photo: AirTeamImages.com

The application of the Volpe Center's research on wake turbulence contributes to safe and efficient arrival operations.



Volpe Center Image

The Aviation Environmental Design Tool displays global emissions of carbon dioxide from commercial aircraft.

Mitigating the Environmental Impact of Aviation

The Volpe Center, in support of the FAA, is leading the design, development and maintenance of the Aviation Environmental Design Tool (AEDT), which calculates noise, fuel burn and emissions at the flight, airport, regional, national and global levels. AEDT is being integrated with a variety of airspace modeling and design tools and is being used to evaluate the environmental impacts of introducing a wide range of vehicle technologies into the National Airspace System. The Volpe Center is a global leader in conducting environmental modeling studies to support increased noise and emissions stringencies.

In order to meet environmental goals related to carbon-neutral growth and greenhouse gas emission reductions, the Volpe Center lends key support to the FAA co-sponsored Commercial Aviation

Alternative Fuels Initiative (CAAFI). This effort focuses on bringing aviation stakeholders together to promote the development, environmental and technical assessment and deployment of alternative aviation fuels. CAAFI-related Volpe activities include presentations to global stakeholders on aviation alternative fuels, facilitating international alternative fuel specifications, supporting development of environmental assessment strategies, and facilitating interactions between fuel producers and purchasers.

Quieter, Cleaner, Less Expensive Descents

The Volpe team is working on Optimized Profile Descent (OPD), a procedure by which controllers can clear pilots for smooth landing paths instead of stepped descents. OPDs result in a reduction in noise, fuel burn, and emissions.