FAA's
NextGen

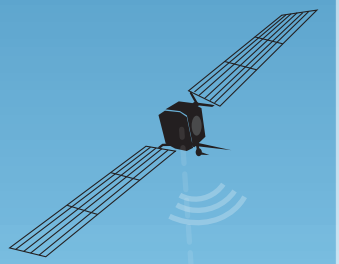
Federal Aviation Administration

Why NextGen Matters

NextGen is a comprehensive overhaul of our National Airspace System to make air travel more convenient and dependable, while ensuring your flight is as safe, secure and hassle-free as possible.

In a continuous roll-out of improvements and upgrades, the FAA is building the capability to guide and track air traffic more precisely and efficiently to save fuel and reduce noise and pollution. NextGen is better for our environment, and better for our economy.

- NextGen will be a better way of doing business. Travel will be more predictable because there will be fewer delays, less time sitting on the ground and holding in the air, with more flexibility to get around weather problems.
- NextGen will reduce aviation's impact on the environment. Flying will be quieter, cleaner and more fuel-efficient. We'll use alternative fuels, new equipment and operational procedures, lessening our impact on the climate. More precise flight paths help us limit the amount of noise that communities experience.
- NextGen will help us be even more proactive about preventing accidents with advanced safety management to enable us, with other government agencies and aviation partners, to better predict risks and then identify and resolve hazards.
- NextGen boils down to getting the right information to the right person at the right time. It will help controllers and operators make better decisions. This data will assist operators in keeping employees and passengers better informed.
- Our nation's economy depends on aviation. NextGen lays a foundation that will continually improve and accommodate future needs of air travel while strengthening the economy with one seamless global sky.
- NextGen will help communities make better use of their airports. More robust airports can help communities attract new jobs, and help current employers expand their businesses. By doing this the U.S. will strengthen its economy and help communities realize all the benefits that aviation can bring.
- NextGen will allow us to meet our increasing national security needs and ensure that travelers benefit from the highest levels of safety.



Excerpts from the FAA's NextGen Implementation Plan, March 2011, available at www.faa.gov/nextgen

NextGen Implementation Plan Executive Summary

The NextGen Implementation Plan provides an overview of the FAA's ongoing transition to the Next Generation Air Transportation System. The Plan lays out the agency's vision for transforming the way things work in our nation's skies and at our nation's airports by the end of the mid-term. The Plan further provides a status report on the NextGen deployments, capabilities and benefits we have already introduced into the National Airspace System (NAS), as well as the goals we have set and commitments we have made in support of our mid-term vision. Additionally, the Plan addresses the harmonization work we are doing with the global aviation community to ensure aircraft operating globally receive the operational benefits in various international air traffic environments.

The primary goals of NextGen are to enhance the safety and reliability of air transportation, to improve efficiency in the NAS and to reduce aviation's impact on our environment.

NEXTGEN TODAY

The FAA is continuing to achieve multiple critical NextGen milestones. Our deployment of the ground infrastructure that will support Automatic Dependent Surveillance-Broadcast (ADS-B) surveillance is on time and on budget. We are continuing to improve airspace efficiency and airport access. And we have enjoyed success in our early efforts to leverage surface data sharing in support of collaborative surface traffic management at select locations.

One of the FAA's most important steps forward this year was its decision to approve the nationwide use of ADS-B to separate suitably equipped aircraft in areas with ADS-B coverage. Equally significant was our release of a final rule requiring aircraft operating in most controlled airspace to be equipped to transmit their position to the ADS-B network by Jan. 1, 2020.

Maintaining and enhancing safety remains fundamental to all NextGen improvements, as does the FAA's commitment to environmental stewardship. Airspace improvements including Performance Based Navigation (PBN) are already reducing fuel burn and emissions. A new, cleaner-burning biofuel is expected to be approved for use by commercial aircraft early this year.

We also are striving to streamline our own internal processes to ensure that the NextGen capabilities emerging from our test beds and research centers begin producing operator benefits as quickly and safely as possible.

NEXTGEN BENEFITS

As airports and operators reap the benefits of the investments and deployments we are making today, the FAA continues to sharpen its projections of the benefits we expect NextGen to provide during the mid-term. Our latest estimates, which are sensitive to traffic and fuel price forecasts, indicate that by 2018, NextGen will reduce total delays (in-flight and on the ground) by about 35 percent compared with what would happen if we did nothing. That delay reduction will provide, through 2018, $23 billion in cumulative benefits to aircraft operators, the traveling public and the FAA. In the process, we will save about 1.4 billion gallons of aviation fuel during this period, reducing carbon dioxide emissions by 14 million tons.

The FAA expanded the demonstration activities and trials we use to develop NextGen capabilities, and which provide direct benefits to the members of the aviation community who partner with the FAA to conduct those activities. In Memphis, Tenn., both FedEx and Delta have reported savings from technologies and operational practices aimed at preventing long lines from forming at the end of the runway. Highly specialized Optimized Profile Descents known as Initial Tailored Arrivals have proven so successful, they are moving from demonstration to operational use at airports in San Francisco, Los Angeles and Miami. In addition to helping curb delays, surface management and Initial Tailored Arrivals help the environment by reducing fuel burn and emissions, and offering opportunities to manage noise.

NextGen technologies will work together to provide greater situational awareness both in the air and on the ground, enhancing safety throughout the system. Likewise, our

efforts to collect, analyze and share information on aviation trends will assist us in identifying and mitigating any potential risk associated with NextGen implementation.

NEXTGEN: OPERATING IN THE MID-TERM

In this update, the FAA reiterates its vision for the operational capabilities we expect to have in place by the end of the mid-term. That vision includes changes at every phase of flight, and it fundamentally revamps the way things work in the NAS. Common weather and system status information will dramatically improve flight planning. Technologies such as ADS-B and Data Communications (Data Comm), combined with PBN, will increase safety and capacity and save time and fuel, decreasing carbon emissions and improving our ability to address noise.

With NextGen, we must continue to advance safety as we look ahead at increasing air traffic and the introduction of very light jets, unmanned aircraft systems and commercial space flights. To continue to minimize risk as we introduce a wave of new NextGen capabilities over the next decade, the aviation community will continue to rely on Safety Management Systems, integrated safety cases and other proactive forms of management that allow us to assess the safety risk of all the proposed changes. Policies, procedures and systems on the ground and in the flight deck enable the mid-term system. We make the most of technologies and procedures that are in use today, as we introduce innovations that will fundamentally change air traffic automation, surveillance, communications, navigation and the way we manage information.

In addition to the advances we develop through the NextGen transformational programs and implementation portfolios, the mid-term system depends on coordination with and support from FAA specialists on safety, airports, the environment, policy development and the other building blocks of modern air traffic management. FAA information and management systems must keep these activities synchronized as we approach the mid-term, reach it and move forward. We will use a strategic Environmental Management System approach to integrate environmental and energy objectives into the planning, decision making and operation of NextGen. Under the Continuous Lower Emissions, Energy and Noise program, we are targeting partnerships with industry to advance noise and emissions reductions, while improving energy efficiency. We will continue to accelerate the certification and implementation of sustainable alternative fuels for use by aircraft fleets.

NEXTGEN AHEAD

Several milestones key to the NextGen mid-term vision are right around the corner.

This fall, an Aviation Rulemaking Committee is expected to submit initial recommendations on how the aviation community should move forward with the technology that brings ADS-B information into the cockpit (ensuring compatibility with the ADS-B Out avionics detailed in the 2010 final rule). We are also moving forward with the development of Data Comm, which is expected to provide initial tower capabilities in 2015.

Over the next few years, we will be making more NAS systems compatible with the network structure that will serve as the backbone for the digital exchange of NextGen information, and we expect to update our policies to leverage satellite navigation technology to increase the capacity of closely spaced parallel runways during poor visibility.

The FAA recognizes the magnitude of the effort necessary to achieve our NextGen goals, and we have provided a highly effective, structured management and governance architecture to ensure the timely, cost-effective delivery of all NextGen capabilities.

CHALLENGES

While the FAA remains confident we will achieve NextGen success, we recognize that many technical, programmatic and organizational challenges lie ahead. NextGen success depends on public and private stakeholder investments moving forward together. Operators must equip to take advantage of the capabilities we provide. Additionally, we must contend with varying timelines and levels of maturity among the incremental achievements that NextGen capabilities are built on. As we work to introduce new equipment and procedures into a NAS that is active 24 hours a day, seven days a week, we face limitations in terms of how much change the system can accommodate at any one time. Our key to successfully dealing with challenges is to anticipate them and incorporate mitigation strategies into our NextGen planning. For example, we are studying a number of financial and operational incentives aimed at encouraging operator equipage. Further, we have taken an integrated portfolio management approach that recognizes the interdependent nature of NextGen, rather than trying to administer NextGen as a series of individual programs and initiatives.

WHY NEXTGEN MATTERS

The advantages of NextGen will benefit almost everyone, whether they frequently travel by air or never fly at all. Those who do fly will enjoy fewer delays, the highest level of safety and more predictable trips. Many people who live in neighborhoods near airports will experience less aircraft noise and fewer emissions. And communities will make better use of their airports, strengthening their local economy. Our nation's economy depends on a healthy aviation industry. ■

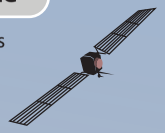
NextGen PHASES OF FLIGHT *Mid-Term*

SURFACE TRAFFIC MANAGEMENT

Automation optimizes taxi routing. Provides controllers and pilots all equipped aircraft and vehicle positions on airport. Real-time surface traffic picture visible to airlines, controllers and equipped operators. Surface movement management linked to departure and arrival sequencing. **ADS-B** and **ASDE-X** contribute to this function. Taxi times reduced and safety enhanced.

INTEGRATED FLIGHT PLANNING

Operators and traffic managers have immediate access to identical weather information through one data source.



ENHANCED SURFACE TRAFFIC OPERATIONS

Pilots and controllers talk less by radio. **Data Communications** expedite clearances, reduce communication errors. Pilot and controller workloads reduced.

STREAMLINED DEPARTURE MANAGEMENT

RNAV and **RNP** precision allow multiple departure paths from each runway. Departure capacity increased.

EFFICIENT CRUISE

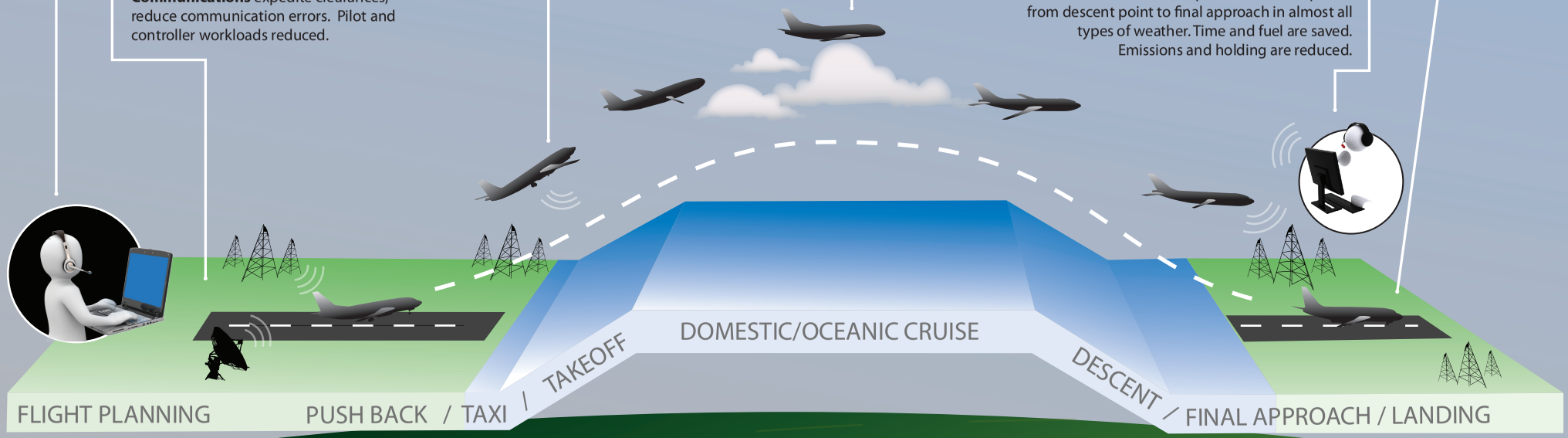
RNAV, **RNP** and **RVSM** utilize reduced separation requirements increasing airspace capacity. Aircraft fly most optimal path using trajectory-based operations considering wind, destination, weather and traffic. Re-routes determined with weather fused into decision-making tools are tailored to each aircraft. **Data Communications** reduce frequency congestion and errors. **ADS-B** supported routes available for equipped aircraft.

ENHANCED SURFACE TRAFFIC MANAGEMENT

Runway exit point, assigned gate and taxi route sent by **Data Communications** to pilots prior to approach. Pilot and controller workload reduced and safety improved.

STREAMLINED ARRIVAL MANAGEMENT

Arrival sequence planned hundreds of miles in advance. **RNAV** and **RNP** allow multiple precision paths to runway. Equipped aircraft fly precise horizontal and vertical paths at reduced power from descent point to final approach in almost all types of weather. Time and fuel are saved. Emissions and holding are reduced.



v03-2011