Federal Aviation Administration | NextGEN

NEXTGEN IS WORKING FOR AMERICA:
Chief NextGen Officer Update to Congress

2017

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The annual Chief NextGen Officer Update to Congress highlights recent accomplishments by the Federal Aviation Administration and its partners as we continue to modernize the nation's airspace through the Next Generation Air Transportation System, or NextGen.

Our National Airspace System (NAS) safely moves an average of 29,000 commercial and 70,000 general aviation flights per day. The FAA projects the number of domestic passengers flying in U.S. airspace will increase from 727 million in 2016 to more than 1 billion by 2037.

Through NextGen, the FAA continues to roll out new technologies to ensure the NAS can safely and efficiently handle future demand for air travel. NextGen improvements contribute to more on-time arrivals, fewer and shorter delays, fewer flight cancellations and less time waiting on the tarmac and in holding patterns.

Through 2016, NextGen has delivered about $2.7 billion worth of benefits. This figure is composed of $900 million in airline direct operating cost savings and nearly $1.8 billion in passenger time savings. Unlike transportation department entities, airlines do not specifically monetize benefits from passenger time savings, so the FAA will continue to work together with aviation stakeholders on the NextGen Advisory Committee (NAC) to improve our benefit estimates.

BUILDING THE FOUNDATION

NextGen is not one technology, product or goal. NextGen encompasses many innovative and transformative technologies and procedures that are being developed and implemented after thorough safety testing.

DATA COMM AHEAD OF SCHEDULE

At the start of 2016, Data Communications, or Data Comm, was operational at five airports. Today, Data Comm departure clearances are up and running at 55 airports nationwide — under budget and more than two years ahead of schedule — with seven more airports to be completed by 2019. More than 62-million passengers benefited from Data Comm in 2016. During severe weather, flights saved an average of 6 minutes in taxiing and an average of 11 minutes in shorter waits to leave the gate.

With Data Comm, air traffic controllers and pilots can transmit flight plans and other essential information digitally as typed messages rather than through sometimes complicated radio voice exchanges. More than 466,000 flights in 2016 received clearance via Data Comm.

Quicker clearances can be particularly helpful when air traffic controllers need to change flight plans, such as rerouting a plane around congestion or issuing a new cruising altitude to avoid bad weather. By helping flights get off the tarmac and into the air more efficiently, Data Comm helps airlines stay on schedule, enables passengers to meet connecting flights and assists cargo carriers in meeting their package delivery deadlines.

This switch from voice to text doesn't just speed things up. It also increases safety by reducing the chances of misunderstood verbal communications when pilots and air traffic controllers use radios.

In 2019, we will begin deploying Data Comm initial services at en route centers, which are air traffic control facilities that manage traffic at cruising altitude, including reroutes around major thunderstorms encountered in flight. As we build upon the new infrastructure, Data Comm will be integrated with a variety of NextGen automation tools to become a key piece in our future air traffic management plans.

IMPROVING AIRCRAFT TRACKING

Starting January 1, 2020, aircraft flying in most controlled airspace must be equipped with ADS-B Out. Federal regulations 14 CFR 91.225 and 14 CFR 91.227 contain the details. Aircraft operators are equipping with ADS-B Out at a rate of about 1,000 per month. U.S. airlines have committed to equip in time for the mandate and have provided equipage plans to the FAA through the NAC. MITRE is tracking the progress of those plans.

The Equip 2020 Working Group, composed of FAA and aviation industry representatives, is collaborating to identify and resolve barriers to equipage. For general aviation aircraft owners, cost is a concern. Equip 2020 worked with manufacturers to make lower cost equipment available on the market. In addition, the FAA provided a $500 rebate to further incentivize equipping by the most cost-sensitive segment of the general aviation community. The incentive resulted in an increase in the equipage rate.

Equip 2020 is conducting targeted outreach to general aviation owners and business aviation operators to ensure they have the appropriate information to make timely equipage decisions based on where they fly.

LEADING THROUGH AUTOMATION

The 11 terminal radar approach control facilities that control 80 percent of U.S. air traffic started using the Standard Terminal Automation Replacement System, or STARS, in 2016. STARS replaces multiple automation systems with a single state-of-the-art standardized platform that helps controllers work more efficiently.

STARS is operational at 70 terminal facilities. By 2019, it will be operational at more than 150 civil facilities and more than 80 military facilities. These successes in the terminal environment are coming on the heels of our successful deployment of the En Route Automation Modernization system at facilities that manage traffic at cruising altitude.

The enhancements to these foundational automation systems are a key component in enabling critical NextGen capabilities, such as ADS-B, in terminal and cruising-altitude airspace.

NAVIGATING MORE EFFICIENTLY

We have published more than 9,000 Performance Based Navigation procedures and routes to date, including hundreds that enhance air traffic control and flight operations at airports in metroplexes — busy metropolitan areas that have multiple airports. The satellite-based navigation procedures provide shorter, more efficient flight paths. Benefits include lower fuel consumption and emissions, as well as:

- Safe access to airspace near obstacles and terrain
- Vertical guidance for safer, more-stable approaches
- Increased efficiency in sequencing, spacing and merging, making arrivals at the gate more predictable for airlines
- Improved access to airports during low visibility, especially for general aviation
- Reduced flight track distance
- Reduced government spending on ground-based navigation aids.

ENHANCED DATA SHARING

Data sharing will be a key component as we advance NextGen concepts in coming years. As of October 2017, 170 consumers are registered to access air traffic management data through System Wide Information Management, or SWIM, with another 230 in process of becoming SWIM consumers.

SWIM provides a single point of access to near-real-time information, including flight data, weather, airport operations and special-use airspace status. Coupled with traffic-flow programs, SWIM allows the FAA and operators to improve airspace efficiency by sharing information among aircraft and approved consumers.

In 2016, the FAA established a common infrastructure and connection points at all 20 cruising-altitude air traffic control centers, replacing point-to-point connections. The new format supports collaboration within the domestic and international aviation communities, and provides users access to additional data products with improved bandwidth and security.

PLANNING FOR THE FUTURE

NORTHEAST CORRIDOR FOCUS

The FAA and the NAC established a new priority area in 2017 that focuses on improving operations in the Northeast Corridor — the busy airspace between Washington, D.C., and Boston that includes Philadelphia and New York City. With FAA support, the NAC is asking stakeholders to collaboratively define what they view as the region's primary challenges and opportunities, as well as how success will be defined.

The FAA will use that industry input to define joint implementation commitments for the Northeast Corridor, including government and industry milestones, and to define how implementing those priorities would create measurable benefits.

COLLABORATION HAS ALLOWED US TO SUCCESSFULLY MODERNIZE OUR FOUNDATIONAL INFRASTRUCTURE, BEGIN ADDING ADVANCED CAPABILITIES AND REAP GREATER BENEFITS EVERY YEAR.

TRAJECTORY-BASED OPERATIONS

As we continue to integrate and build on the NextGen infrastructure we have implemented, we will continue our shift to a time-based system with trajectory-based operations, or TBO. TBO will evolve our system from one that knows where an aircraft is at a specific time to one that will know where an aircraft will be at designated times along its projected flight path. This will enable maximum throughput and enhance the safety of flights, making them more efficient and predictable while offering more flexibility to fly around severe weather and overcome other disruptions.

The goal is to manage flights at major airports using NextGen's initial time-based capabilities by 2025.

Implementing TBO will require a culture change for many of our aviation partners. The move will require training and other human factors changes for air traffic controllers, pilots, traffic flow managers and dispatchers.

The aviation community will need to work closely with us as we move to this new model. To maximize efficiency, airlines and others will have to agree to equip, share information and use new metrics such as throughput and predictability to judge the system's effectiveness. We will continue to work collaboratively with the aviation community to take TBO from a concept to a reality. We have outlined our path to achieve this goal in the 2016 Future of the NAS report, which can be viewed at http://tinyurl.com/futureofthenas.

DRONE INTEGRATION

Adding to the complexities of the NAS, there is tremendous interest in expanding operations so that small unmanned aircraft systems (UAS), or drones, can be flown over people and beyond

line of sight at low altitude. The FAA projects the number of drone pilots will multiply 10 to 20 times by 2021. To keep pace with the increasing number of UAS operations and to pave the way for fully enabling operations beyond line of sight, the FAA is working with NASA and industry to develop the requirements for NASA's UAS traffic management system.

Additionally, based on our success working with the aviation community through the NAC, we launched the Drone Advisory Committee (DAC). The DAC works to build industry consensus around key drone integration challenges and provides the FAA with advice on how to prioritize improvements. Committee members include chief executives who represent a wide variety of UAS stakeholders.

PARTNERING AND COLLABORATING

We cannot transform the NAS alone. NextGen is a team effort. It took some time to build the infrastructure that now enables us to install powerful new tools in the airspace system.

We could never have made it this far without strong and lasting support from the aviation community.

Close coordination with our partners in the aviation industry has enabled us to respond to the changing needs of the airspace system with flexibility and refine our path with a more targeted scope. Collaboration has allowed us to successfully modernize our foundational infrastructure, begin adding advanced capabilities and reap greater benefits every year.

NEXTGEN ADVISORY COMMITTEE

The NAC has been our primary vehicle for collaborating with airspace users. Chaired by an airline CEO, the committee consists of representatives of all major stakeholder groups, including airlines, airports, general aviation and other government agencies, as well as pilots and air traffic controllers.

Through the NAC, we work with the aviation community to identify NextGen priorities and opportunities. Working closely with industry, the committee identified Improved Surface Operations and Data Sharing, Performance Based Navigation, Data Comm and Multiple Runway Operations as high-priority, high-readiness operational NextGen focus areas.

In implementing these priorities, the results speak for themselves. As of the end of Fiscal Year 2017, we have completed 157 of 161 planned commitments together, delivering a multitude of capabilities and benefits to NAS users across the country.

The Department of Transportation Office of Inspector General recommended adding more risk management rigor to the collaborative NextGen Priorities process, and the FAA did so in the updated NextGen Joint Implementation Plan oversight process that focuses on the ability to deliver benefits.

This collaboration has helped us ensure that we continue to build tools that stakeholders need and are willing to use. For example, the aviation industry made it clear that Data Comm was a priority technology. In response, the FAA expedited its deployment at dozens of airports years ahead of schedule.

OTHER AGENCIES

The FAA is also collaborating with NASA to develop advanced automation concepts and tools that provide air traffic controllers, pilots and other airspace users more accurate, near-real-time information about weather, routing and traffic in the airspace system. In conjunction with other partner agencies, including the departments of Defense, Commerce and Homeland Security, we work to address issues such as equipage, cybersecurity, weather and national security, just as we maintain resiliency with alternative navigation and surveillance in the event of GPS disruptions.

We also work closely with our global counterparts to ensure that NextGen's benefits extend beyond our borders. Through the International Civil Aviation Organization, we are working with our worldwide partners to develop a globally connected, seamless air traffic management system by ensuring we are all using compatible data exchange standards, as well as other uniform operational and technical standards, procedures, avionics capabilities, agreed-upon timelines and implementation methodologies. Additionally, the FAA collaborates with key nations around the world on modernization issues, including joint research and development programs. Through these agreements, the FAA engages partners to help ensure U.S. standards are accepted as global standards.

PUBLIC INVOLVEMENT

As the FAA carries out its mission to provide the safest, most efficient airspace system in the world, it is accountable to the public. The views of communities — including residents around airports, the flying public, and stakeholders — are important to the FAA as we work to improve safety and efficiency in the skies.

The FAA is committed to informing and involving the public and engaging with airports, communities and other key stakeholders to give meaningful consideration to community concerns and views as we make aviation decisions that affect them.

We regularly hold community meetings across the country where NextGen technologies and procedures are being implemented. Our goal is to inform communities about NextGen and how new procedures might impact them, address concerns and provide an opportunity for residents to offer feedback to FAA employees.

CHALLENGES

We have come a long way, but we still face many challenges to achieve all our NextGen goals. Industry and the FAA need to invest to make progress, and the FAA needs adequate and stable funding. Air carriers and pilots need to continue to equip their aircraft to experience the full benefits of NextGen. Implementing TBO requires integration of multiple systems, as well as a culture change and training by the air traffic controllers and pilots. Accommodating new entrants into the NAS, mitigating environment impacts – particularly community noise complaints about new navigation procedures – and cybersecurity also may inhibit the path to full NAS modernization.

LOOKING AHEAD

AIR TRAFFIC CONTROL REFORM

In June 2017, the Administration announced priority principles that support moving U.S. air traffic control from the government to a not-for-profit, independent entity managed by a professional board of directors. In addition to improving operational efficiency, this would provide funding stability and acquisition flexibility to more quickly modernize our airspace. As this reform proposal works its way through Congress, we remain committed to working with all airspace users to develop the necessary tools to meet the aviation demands of the future.

Aviation stakeholders and oversight bodies continue to push for quicker and more widespread NextGen benefits. We are working collaboratively with the aviation industry through the NAC to resolve concerns and align government and industry initiatives. The FAA continues to assess stakeholder feedback and update implementation plans. Implementation of the Administration's air traffic control reform principles should achieve a safer and more efficient system by guaranteeing a stable environment for the modernization of operations in the NAS.