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A NextGen Update

While the Next Generation Air Transportation System progresses slowly, big plans are underway to secure a better ATC environment.

■ By Jon Hedblom | *Ascend* Contributor

It's no surprise that programs as complex and impactful as the U.S. Federal Aviation Administration's NextGen air transportation system don't move quickly or smoothly.

Today, we often focus on what is happening month-to-month, day-to-day and minute-to-minute. So it's no revelation that we lose track of programs that won't be fully implemented for 10 years. But these programs are going to impact our industry in a significant manner. Therefore, it's important to remain updated and informed on the progress and the issues associated with the programs.

The focus on NextGen during the past year has been on determining which companies would be awarded NextGen contracts and continuing to focus on the mid-term (2018) implementation plan.

Last year, the FAA awarded umbrella contracts totaling more than US\$6 billion to demonstrate the commitment of the U.S. government to the NextGen initiative. The contracts were awarded under an umbrella portfolio called System Engineering 2020 (SE-2020).

SE-2020 has a ceiling of US\$6.5 billion covering 10 years, making it the largest set of awards in the FAA's history. Companies with the best and brightest aviation and systems engineering experts were awarded the contracts.

The NextGen program cannot be accomplished solely by the government. Rather, it needs to be a collaborative effort between government and the aviation industry. This is required to successfully join emerging technologies with new policies and procedures into operational reality. Several companies were awarded SE-2020 contracts.

Boeing

Boeing was awarded up to US\$1.7 billion. It will focus on:

- Air traffic management modeling and simulation,
- Integration of ground and airborne technologies,
- Operations for all vehicle types (commercial and military aircraft, general aviation, unmanned aerial systems, and rotorcraft).

Boeing will perform work to demonstrate NextGen procedures in real time on a large scale within the current air traffic system.

General Dynamics

General Dynamics was awarded up to US\$1.2 billion. It will perform mission-analysis support in areas such as:

- Air traffic management automation,
- Airplane design and analysis,
- Avionics systems operations and maintenance,
- Cost-benefit analysis,
- National Airspace System security,
- Large-scale demonstrations and NAS air-traffic facility certification.

The company will provide systems integration, development and operations expertise, modeling and simulation, and ground and air-based information and communications systems upgrades.

ITT Corp.

ITT Corp. was awarded up to US\$1.4 billion. It will conduct leading-edge concept development work across all dimensions of air traffic control including:

- Ground systems,
- Avionics,
- Aircraft equipage,
- Air traffic control rules and procedures,
- Human factors,
- Safety and security,
- Environmental,
- Safety and security standards.

Metron Aviation

Metron Aviation was awarded US\$1.15 billion. The work performed by Metron Aviation will complement the work of Boeing, General Dynamics and ITT under their SE-2020 contracts. The collective organizations will conduct large-scale demonstrations to see how NextGen concepts, procedures and technologies integrate into the current system.

Booz Allen Hamilton

Booz Allen Hamilton was awarded US\$700 million. It will evaluate emerging procedures and technologies and perform systems engineering to determine the best way to deploy NextGen initiatives on a wide scale. It plans to bring to the program a broad range of:

- Systems engineering;
- Investment and business-case analysis;
- Planning;
- Forecasting;
- Business, financial and information management support services.

CSSI

CSSI was awarded US\$280 million. CSSI and Flatirons Solutions will provide similar services as Booz Allen Hamilton.

FAA Administrator Randy Babbitt voiced his support of the industry participation in the program.

"Partnership is absolutely critical to our success in NextGen," he said. "With these [contract] awards, we're partnering with some of the most qualified companies in the aviation community."

Work performed under the SE-2020 umbrella will complement NextGen programs that are already in full deployment such as Automatic Dependent Surveillance Broadcast (ADS-B). Satellite-based system controllers use ADS-B to monitor and separate aircraft in the skies over certain parts of the country. It will be deployed nationwide in 2013.

Companies awarded contracts under SE-2020 will research emerging procedures and technologies and perform systems engineering to determine the best way to deploy the NextGen initiatives on a wide scale. It is apparent that significant benefits, such as safety, performance and efficiency, can be gained through the implementation of NextGen.

In the area of efficiency, performance-based navigation (PBN) operations will bring "green" efficiencies to the overall system. This is achieved by permitting more direct routing and closer spacing



ATC Progress The FAA awarded umbrella contracts of more than US\$6 billion to show the U.S. government's devotion to the NextGen program.

between aircraft and more optimized landing and take-off paths.

According to experts who gathered at a recent global PBN summit, PBN objectives include:

- A 3 percent to 10 percent increase in airport capacity,
- A 10 percent reduction in delays,
- 8 percent to 10 percent reduction in fuel burn,
- Up to a 30 percent decrease in overall noise patterns.

These efficiencies should spill over into the area of airport planning and capacity management, according to Dan Elwell, former assistant FAA administrator and current vice president of civil aviation for the Aerospace Industries Association.

"The implementation of more precise flight operations should reduce the need to continue to add costly airport capacity," he said.

However, for that to occur, aircraft operators must be ready and willing to equip their aircraft with the new, certified avionics necessary to realize the planned benefits.

The FAA and operators understand the importance of having NextGen equipment on the aircraft to reap the desired benefits. Herein lies one of the many conundrums that currently exist within the NextGen implementation plan. The FAA maintains that the 2009 governing principles for accelerating NextGen equipage remain in effect.

However, there is no defined direct government assistance coming to the operators, and business case development is in its infancy. One of these principles that Babbitt continues

to stress is the concept of "best equipped, best served."

This concept is in place to encourage early adoption of the equipment to support NextGen by incentivizing those aircraft with priority in the NAS. The best-equipped aircraft will receive priority routing and handling by FAA air traffic controllers. How this will work given the mix of equipped and non-equipped aircraft, especially in the highest traffic areas, is still a work in progress.

How well the incentives are working is questionable at this point, but the FAA remains steadfast in support of it. The FAA has even recently encouraged the airline community to invest through some unique financing methods.

"We are working very hard to come up with ideas to really speed up the implementation of NextGen," said John L. Mica, the new U.S. House of Representatives aviation subcommittee chairman.

He said the House is considering "loan guarantees and other ways" to help airlines finance equipage in the latest version of FAA reauthorization legislation under development. In addition, the FAA recently announced it would spend US\$4.2 million to equip 35 JetBlue aircraft with certain onboard equipment. This is part of a program designed to convince other carriers that day-to-day operational savings justify such investments.

Also, an investment group led by ITT Corp. has developed a novel funding mechanism aimed at supporting airlines in buying and installing NextGen avionics beginning next year. The funding mechanism, involving a mix of commercial borrowing and private equity in excess of US\$1 billion, would finance new avionics for up to 5,600 Part 121 aircraft, the majority of the United States fleet.

The equipment would be leased to air carriers. Repayments would be based on the FAA reaching agreed milestones for supporting ground infrastructure. The commercial financing solution, in the works for more than a year, comes as other options are being discussed to fund NextGen equipage, mainly involving federal dollars.

The Aerospace Industries Association has proposed a "Cash for Carbon" program that would see government grants or government-backed loans issued in exchange for a commitment by airlines to achieve carbon-neutral growth from 2020 onward.

The business-case generation will not be straightforward. It will initially require several assumptions to be made as well as having the systems engineering component firm up requirements. Simulations and human-in-the-loop experiments will be necessary to build sufficient business cases for operators to invest in the necessary upgrades.

In addition, solutions providers will need to modify their current flight planning applications to take into account new parameters. Solution providers, such as Sabre Airline Solutions®, with an extensive solutions portfolio and knowledge of the industry can benefit airline operators by using a combination of current solutions along with new algorithms associated with NextGen to:

- Estimate optimal flight plans by user class (major airline, regional airline, business general aviation),
- Compute optimal flight plans for new best-equipped, best-served scenarios (such as unconstrained flight plans),
- Visualize best-equipped, best-served benefits mechanisms using Sabre® AirCentre™ Flight Explorer,

- Provide data access for modeling and analysis.

The FAA Office of Inspector General noted in a report late last year that FAA's policy challenges include adopting the best-equipped, best-served policy. The FAA currently requires aircraft to be cleared for landing on a first-come, first-served basis regardless of equipage.

The best-equipped, best-served policy would give priority to users equipped with new systems, which would encourage airspace users to equip their aircraft with advanced avionics and thereby advance NextGen. Extensive analyses will determine if the policy can be safely implemented. This would include addressing concerns about mixed equipage as aircraft transition to the NextGen system.

In addition, solution providers need to work in tandem with airlines and the NextGen program to ensure legacy flight planning applications are updated with new parameters and algorithms. Once the aircraft completes the optimized flight profile, the airport and ground handling support must be linked into the ground-based communications systems to complete the full cycle of efficiency.

Full benefits of optimizing flight profiles cannot be achieved if the same efficiencies are not planned for and implemented in the cockpit and airline operations control centers. The most efficient, best-planned ATC system will not achieve the stated objectives if the system breaks down once the aircraft lands and cannot get to the gate and offload passengers efficiently.

A holistic approach will require that airline operations centers are upgraded. Solutions providers will need to be involved in the planning and implementation of the NextGen program. With the awarding of the umbrella contracts in 2010, the industry should

begin to see detailed development and implementation plans from the companies and the FAA during the next few months.

This activity is critical to the goal of keeping the overall mid-term implementation plan on track for the benefits expected by 2018. Key providers and officials continue to worry that the programs will bog down due to a lack of integration among the programs and the FAA leadership.

All of this activity is further clouded by the fact that the leadership in the U.S. Congress has been passed from long-time committee chairman Jim Oberstar to John Mica.

Finding a clear path forward for the operators and their solutions providers remains a difficult but necessary task to support the future generation of global air traffic systems and to realize the savings in dollars, air quality and time that NextGen offers. ■



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+count it up

43,300+

The approximate combined number of daily departures by oneworld, SkyTeam and Star alliance members. Members for the three global alliances carry approximately 1.4 billion passengers a year.

1,200 tons

The amount of roses Lufthansa Cargo transported for delivery on Feb. 14, equivalent to 34 million roses or 14 fully booked MD-11Fs.

0.2

The percentage of cancelled flights in 2010 by U.S. carrier Hawaiian Airlines. The carrier held the lowest percentage of canceled flights for the year, followed by Frontier Airlines with 0.6 percent and Alaska Airlines with 0.8 percent, according to the U.S. Department of Transportation's Bureau of Transportation Statistics.