

# On the same wavelength

NextGen promises to revolutionise air traffic management in the US but it is a complex and expensive programme. The Federal Aviation Administration's **Mike Romanowski** tells Ian Duncan what the benefits to airports will be and how delivery is progressing.

## Mike Romanowski

Mike Romanowski is the director of the Federal Aviation Administration's NextGen integration and implementation office, which ensures the application, planning, programming and budgeting of the NextGen portfolio and manages its integration and execution across all FAA lines of business. He has also served as vice-president of civil aviation at the Aerospace Industries Association.

**T**he US might have started overhauling its air traffic management later than the EU, but it has ambitious plans for replacing the ageing National Airspace System. The current platform makes inefficient use of ground infrastructure and faces an inability to cope with more traffic. The problems are getting so bad that the government is worried about the creaking setup having a negative impact on economic growth.

The so-called Next Generation Air Transport System (NextGen) offers the prospect of greatly improved capacity. At the heart of the programme is the implementation of GPS-based tracking technology and the development of improved operational procedures, enabling aircraft to fly more direct routes and more closely together in poor visibility conditions. Other systems will enable data-based communication and better weather information. Providing pilots and air traffic controllers with improved situational awareness should increase safety, reduce costs and limit the environmental impact of aviation.

In March 2010 the Federal Aviation Administration (FAA) published its NextGen implementation plan, outlining its progress to date and aims up to 2018. Although no specific figures for capacity growth are spelled out in the document, it notes that cumulative savings should top \$22 billion, delays will be reduced by 21% and 1.4 billion fewer gallons of fuel will be used, equating to a 14 million-ton reduction in CO<sub>2</sub> emissions. The hope is to have the whole system installed by 2025.

Leading the charge is Mike Romanowski, director of the NextGen implementation and integration office at the FAA. "What you see in the US is the need to have upgraded aviation infrastructure," he says. "The system we have today is effective but it is based on technologies that don't have the growth potential they need. It relies on outmoded infrastructure capabilities and old computer frameworks."

## Adaptation

The technologies underpinning NextGen are not new. GPS has long

been used by motorists and is a common feature in mobile phones. Many private pilots use the system in an advisory capacity, but entrusting it with the safety of commercial air operations requires considerable additional research and development, and the creation of robust standards.

"The demands on applications in the commercial aviation environment are several orders of magnitude higher," Romanowski explains.

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So wide-ranging is the plan that the FAA cannot hope to act independently and drive through change unilaterally. The regulator relies heavily on input from the Radio Technical Commission for Aeronautics (RTCA), which represents interested parties from across the aviation community including airlines, jet manufacturers, pilots and air traffic controllers, who will all be impacted by the changes. In September 2009,

the RTCA published its recommendations for the programme.

“It brings a shared consensus on the targets for where we need to go and the strategies on how to get there,” Romanowski explains. “We are following up on those recommendations and have embedded them fully into our NextGen plan. We will be working closely with all the stakeholders as we move forward with deployment and the follow-on

that of the private sector. Although the FAA has significant resources available to invest in infrastructure, airports and airlines face a major burden installing new equipment. “Right now there are no plans for financial incentives,” Romanowski says, “but the industry is requesting some assistance. There’s an active discussion with Congress and the administration but right now, no firm decision has been made.”

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activities with industry are going to be equally critical.”

The ongoing support of the industry is important because the government’s approach to funding upgrades differs from

The regulator has to tread carefully as some airlines, hoping to see early competitive advantage, have already invested in technology that is not yet fully supported by the FAA. Despite



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these teething problems, Romanowski is optimistic and believes there is “a clear business case” for all operators to push ahead. “Ideally we’d like to see everyone jumping in,” he adds.

The backbone of the platform is automatic dependent surveillance-broadcast (ADS-B), a satellite-based system for tracking the location of aircraft in flight. The technology has been deployed in the Gulf of Mexico, Louisville and Alaska, and nationwide coverage should be in place by 2013, marking a major milestone in NextGen’s rollout. By providing more accurate detail about the location of planes, traditional flight paths can be scrapped in favour of more direct routes, saving time and fuel.

NextGen will also have a major impact on ground operations. The Future Airport Capacity Task (FACT) group is responsible for assessing the capacity needs of the country’s major metropolitan areas. It is scheduled to follow up on its 2007 report in 2011, providing further insight on how airports can make the best use of emerging technologies.

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The implementation of NextGen will involve a blurring of the boundaries between airports, aircraft and air traffic control, Romanowski says. All the elements still retain their distinct role but information is able to flow between them more easily, enabling better decision-making and fundamentally affecting the way airports are designed and run.

On the ground, ADS-B contributes to airport surface-detection equipment X data, building a picture of where aircraft are located on runways and taxiways. The information is shared between controllers, pilots and airport operators, reducing the risk of a runway incursion and cutting delays through more effective releasing of aircraft from the terminal. Tests at Memphis

International and John F Kennedy International in New York have show average delays cut between 1.5 and 4.5 minutes, and when they do occur it is at the terminal when engines are not running, reducing fuel burn.

Performance-based navigation procedures based on required navigation performance (RNP) and area navigation concepts have been shown to offer more direct approaches to many airports. Seattle-based Alaska Airlines has been working on techniques for RNP-enabled approaches since the mid-1990s. In July it performed a demonstration landing that burned less fuel and reduced CO<sub>2</sub> emissions by 35%. The company estimates that it could cut its annual fuel consumption by 2.1 million gallons, leading to a 22,000t-reduction of CO<sub>2</sub> emissions.

Some major US cities have two airports that cannot operate independently in certain weather conditions. Arrivals have to be staggered, creating significant

delays, but by following more direct approaches planes will be able to land safely under all conditions.

The same benefits apply to closely spaced, parallel approaches. In instrument meteorological conditions aircraft can only simultaneously land on runways up to 4,300ft apart. The FAA has long been looking for ways to reduce this figure and has made moves using traditional technology, but with ADS-B it could be brought down to 700-800ft, the distance between San Francisco International’s runways and equal to what is permitted for visual approaches.

Other NextGen technology features will boost the capabilities of smaller airports. For example, wide-area augmentations systems will give them access to instrument landing system

techniques without the requisite traditional infrastructure, again improving safety and accessibility.

New tower concepts will allow smaller airports to create virtual control centres in existing facilities and the idea is set to be tested in shadow mode at Dallas-Fort Worth soon.

### Gradual growth

In the short term, NextGen will enable airports to handle more traffic using existing resources, but capital investment will remain important. “There’s going to be a need to map out new configurations to take better advantage of runways,” Romanowski says. “So an airfield development plan is still a major part of how we’re moving forward.”

Although there will be major milestones such as the national roll-out of ADS-B, the programme is moving forward. Research and development work continues with the FAA’s partners and while landmark events might be useful for gaining Congressional approval, it is this gradual work that will deliver real change.

The FAA is also working closely with international organisations, and in late June the European Commission issued a statement announcing a preliminary agreement to integrate NextGen with the EU’s SESAR programme. The UN’s International Civil Aviation Organisation will also play a role in standardising procedures. “We’re very committed to the interoperability of systems,” Romanowski says. “That doesn’t mean they will be identical, but we’re learning from each other, and planes equipped to fly in US airspace could fly in Europe and vice-versa. The equipment the aircraft has and the information it relays will be equivalent standards.”

Some sceptics remain to be convinced that the FAA has the will to push through every element of its programme, but persuading the industry of the benefits should create enough momentum to keep the project rolling forward. Although NextGen is still some way off, the positive effects are already being felt, and these will only multiply in years to come. ■