

Better tracking and management

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The global airline industry continued to grow in 2014, with profits projected to expand from \$12.9 billion in 2013 to \$18.7 billion by the end of this year. Key factors driving this increase include continued improvement in overall economic conditions, greater air cargo volumes and stable fuel prices. However, the razor-thin profit margin of 2.5 percent is susceptible to various risks, including the possibility of higher fuel prices due to political crises around the world. In addition, new orders for Airbus and Boeing aircraft are expected to be half of the nearly 3,000 ordered in 2013.

Australia saw the world's first **Automatic Dependent Surveillance-Broadcast** mandates come into effect. ADS-B is a satellite-based technology that enables aircraft to be accurately and reliably tracked by air traffic controllers and other pilots without conventional radar. Australia's network of 61 ADS-B ground stations improves operational efficiency, especially in non-radar airspace that comprises the majority of continental Australia. ADS-B is now required for aircraft flying at or above 29,000 feet in Australian airspace. Further- more, all new aircraft registrations must be ADS-B capable to operate under instrument flight rules.

In the United States, the integration and implementation of **NextGen** technologies, concepts and procedures continues. The deployment of the 634 ground stations that comprise the nation's ADS-B ground infrastructure was completed in March. In addition, the En Route Automation Modernization system that enables many NextGen capabilities is planned to be fully operational at all 20 centers in the National Airspace System by mid-2015.

NASA has been collaborating with the FAA and industry partners to develop advanced automation tools to enable safer, more reliable and more efficient arrival operations. In July, NASA transferred to the FAA its **Terminal Sequencing and Spacing** tool. TSS will help air traffic controllers manage the spacing between aircraft as they perform more efficient, performance-based navigation arrival procedures. TSS was validated in a series of large-scale, high-fidelity, human-in-the-loop simulations performed jointly by NASA, FAA and MITRE's Center for Advanced Aviation System Development.

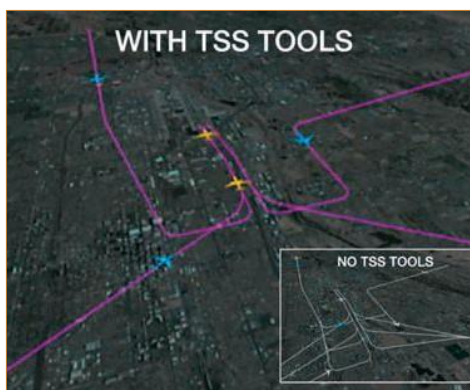
This year saw significant attention toward **unmanned aircraft** operations in the National Airspace System. The FAA approved all six proposed test sites, which are conducting two-year research programs to collect data on technologies and operations required to safely integrate unmanned aircraft into the NAS. Separately, a group of government and industry partners is working under the Radio Technical Commission for Aeronautics to develop performance standards for detect-and-avoid systems and command- and-control datalinks for larger unmanned aircraft flying outside of busy terminal areas expected by July. In addition, the long-

awaited draft rule for small unmanned aircraft operations should be released by the end of 2014. Lastly, the first approved private, domestic, commercial unmanned aircraft are now operating in specially designated areas of the Arctic.

In March, **Malaysia Airlines flight 370** vanished en route from Kuala Lumpur to Beijing. An analysis by British satellite telecommunications company Inmarsat, corroborated by various international organizations, concluded that the Boeing 777 turned west and then south. Its fate remains a mystery as the search continues in the southern Indian Ocean. The disappearance of such a large aircraft without a trace is unprecedented, and an international effort is underway to mandate that all airline flights be tracked continuously regardless of their location. Meanwhile, starting in 2015, Virginia-based **Iridium** Communications will launch a new constellation of communications satellites with ADS-B receivers that will enable tracking of ADS-B-equipped aircraft in oceanic airspace.



NOAA



NASA