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More satcom for jets

by Ann Heinke

The Digital Avionics Technical Committee advances the development and application of communications, navigation and surveillance systems used by military and commercial aircraft.

This year brought important developments in the aviation community's ongoing shift toward satellite communications for the vital data links between commercial aircraft and air traffic controllers.

In September, the FAA issued a supplemental type certificate to corporate-jet operator **Chicago Jet Group LLC**, allowing the company to equip its Falcon 50 jets to communicate Controller-Pilot Data Link Communications and Automatic Dependent Surveillance-Contract messages with air traffic control sites via the **Iridium** constellation. The certificate marked a significant milestone for aviation modernization. Commercial airliners have for years relied on satellite data links to plug into the internationally approved Future Air Navigation System, or FANS, network, but corporate jet operators have not done so at the same level.

FANS provides controllers with updated location information for aircraft and allows them to reduce separations between equipped aircraft. The FANS-equipped planes are given more efficient routes as an incentive to equip. The FANS messages have traditionally been passed over data links established by Inmarsat satellites, but in 2011 the FAA approved **Iridium** as a FANS data link provider too. In 2013, Inmarsat took steps to provide FANS service over its new, higher-throughput Swiftbroadband service. A proposal by Inmarsat to standardize avionics for its **Swiftbroadband** service was advanced this year by the not-for-profit Radio Technical Commission for Aeronautics organization, which works with aviation authorities to modernize air travel.

To make a jet FANS capable, a suite of avionics software is installed in the plane's flight management computer, communications management unit, or flight deck displays. In addition, data link transceiver hardware (SATCOM and VHF data radio) and other flight deck updates are made, depending on the original equipment aboard the aircraft. FANS 1/A or FANS 1/A+ are product names for the suites on

Boeing and Airbus jets. They provide applications for Automatic Dependent Surveillance-Contract and Air Traffic Services Facilities Notifications. Controller-Pilot Data Link Communications provides messages for the controller and pilot to exchange clearances, reports and other information. Automatic Dependent Surveillance-Contract provides a reporting agreement that is formed in near-real time when an aircraft enters an authority's airspace. The contracts spell out how often planes must report their positions and other data as requested by the air traffic control authority.

FANS provides nearly instantaneous location reporting, compared to the slow, third-party high-frequency radio communications that airliner crews once relied on as the sole means of communication over oceanic routes. Controllers have been able to shrink the minimum separation among airliners from 100 n.mi. to 30 n.mi. or less, saving the airlines millions of dollars in fuel costs each year.

The global aviation community is gravitating toward making FANS a mandate. Since February, planners of the **North Atlantic Track System**, or NATS, have identified two preferred tracks for FANS aircraft crossing the Atlantic at altitudes of 36,000-39,000 feet. Operators wishing to fly these preferred tracks must be FANS-equipped. When the next mandate goes into effect in 2015, jets will have to have FANS equipment aboard to fly Minimum Navigational Performance Specification tracks. Commercial airliners that routinely cross the Atlantic nearly all carry FANS equipment because of the cost-savings the equipment provides. Details for the 2015 mandate are still under negotiations, but it is likely that the entire North Atlantic airspace, including flight levels above the tracks, eventually will require FANS technology.

Taken together, the FAA approval of FANS-over-Iridium and the recent 2013 FANS mandate over the North Atlantic have spurred a new interest in FANS 1/A by numerous business jet operators. Aircraft manufacturers **Bombardier**, **Gulfstream**, and **Embraer** have been fitting new aircraft with FANS 1/A+ avionics that use Inmarsat communications.

Iridium announced in October that the blueprint for its second-generation Iridium NEXT satellite network passed its critical design review. The company says it is on track to launch the first of these new satellites in 2015. ▲

ICG's NxtLink ICS-220A Iridium Communications System combines data modem and dual voice/data transceivers. Credit: ICG.

