

Plane talk

The 'digital airline' instantly transforms information into action

By Mike Barber



You're on the red-eye, a Boeing 777-300ER (Extended Range) flying overnight from Toronto to Hong Kong, which has just reached cruising altitude.

As weary passengers settle in for a long flight, in the darkened cabin a few laptops open, some ear buds pop in and, here and there, an overhead seat light flickers off as insomnia fades. Through the cabin, except for the occasional movement of a watchful flight attendant, the night grows quiet.

Yet as passengers slumber, an energetic conversation is under way. From the engines through the airframe and onto the flight deck, the airplane itself is talking.

Unheard by passengers, this important conversation in a world of electronic signals and nanosensors is the result of Boeing innovations that enable the "digital airline."

A significant addition to situational awareness and decision-making, the digital airline walks its talk, instantly transforming information generated during flight, on the

ground and in the hangar into quick, informed action that enables airlines to make decisions and fly at peak safety, reliability and efficiency.

"The most significant and exciting advances in commercial aviation come from the strategic application of information technology to airline operations," said Per Norén, vice president of Information Services, a business unit of Commercial Aviation Services launched in 2011 to answer increased customer demand.

"The Boeing Digital Airline initiative builds on the most advanced analytics and airplane technology to take our customers and the industry's operational efficiency to the next level."

Key is delivery of secure, detailed operational and maintenance information to people who need it most, when they need it most, allowing airline customers to make the best possible decisions, Norén said.

This information translates into cost-savings for customers.

Boeing has conservatively estimated actual costs to an airline of an airplane-on-ground delay lasting one or two hours to be at least \$10,000, and as high as \$150,000, depending on the airplane model and operator.

Since its inception in 2003, the technology behind Boeing's digital airline has evolved into four main components:

- Airplane Health Management
- Electronic Flight Bag
- Maintenance Performance Toolbox
- MyBoeingFleet.com

PHOTOS: (Right) The 787 Operations Control Center in Everett, Wash., receives digital signals from airplanes to address customer needs. GAIL HANUSA/BOEING; 787: BOEING



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– Dave Kinney, product manager,
Boeing Airplane Health Management



Using monitored information to diagnose an airplane part or system and interactively troubleshoot it while an airplane is en route was once an industrial dream. Now, knowing when a part or system will fail and replacing it before it does is common across airline control centers that use Boeing's Airplane Health Management.

“It's not an experiment; this is real,” said Dave Kinney, product manager, Boeing Airplane Health Management. “We have a complex system in place that makes it easy for maintenance troubleshooters to interact with embedded aircraft systems in real time to support diagnosis and prognosis.”

Using data from onboard sensors in the engines, auxiliaries and airframe, the airplane's system can analyze information in flight, ranging from fuel mileage and oil performance, to hydraulic fluid or tire pressure. Upon arrival at the gate, technicians, parts and tools can be ready to quickly make any necessary repairs.

Working in tandem with that system is the troubleshooting Maintenance Performance Toolbox. Available by subscription on MyBoeingFleet.com, it contains all the technical information ever compiled about an airplane type. That includes procedures, parts lists, 3-D graphics, records of an individual airplane's previous repairs and alternative courses of action.

Beyond information sent by the airplane, pilot observations are collected using the Electronic Logbook application, part of Boeing subsidiary Jeppesen's Electronic Flight Bag.

Coupled with the Airplane Health Management, the Electronic Flight Bag eliminates paperwork by providing pilots with digital information, including fingertip access to up-to-date air navigation charts, documents, real-time performance calculations, taxiway positioning and flight-deck entryway video surveillance.

Access to both flows through MyBoeingFleet.com, a password-protected business-to-business Web portal. The easy-to-use system is accessible to Boeing's registered

customers—flight crews, flight operations and maintenance managers, planners, trainers and regulators—from any device with a connection to the Internet.

Commercial Aviation Services developed MyBoeingFleet.com to tap into Boeing's vast libraries of proprietary and essential customer information. The regularly updated portal makes available everything from engineering drawings to technical manuals and warranties.

The aviation industry is moving quickly to adopt new technology to improve its operational performance. The 787 Dreamliner, which entered service in October, is considered the world's first fully e-enabled airplane, generating and capturing more data than any airplane in Boeing's history.

“We see a clear need to expand our support capabilities to provide even more strategic insight to our operators, and we are doing just that,” said John Maggiore, director of Airline Performance Management for Commercial Aviation Services.

As technology matures, future flights will host more silent electronic conversations. The airplane, for example, might communicate with gate scheduling personnel, allowing automatic assignments that won't require labor-intensive schedule juggling.

Meanwhile, on board the digital airplane today, passengers can nap soundly knowing important electronic conversations about their airplane are taking place—and that Boeing has been hard at work so they will arrive safely, reliably and worry-free. ■

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PHOTOS: (Above left) A Boeing 777 in flight. BOEING
(Above right) Tracking flight operations in Everett, Wash.
GAIL HANUSA/BOEING