E-Enabled Capabilities of the 787 Dreamliner

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The 787 Dreamliner, the world's first e-Enabled commercial airplane, combines the power of integrated information and communications systems to drive operational efficiency, enhance revenue, and streamline airplane maintenance.

The e-Enabled tools on the 787 will be a dramatic change from any other commercial airplane previously operated (see fig. 1). These tools promise to change the flow of information and create a new level of situational awareness that airlines can use to improve operations. At the same time, the extensive e-Enabling on the 787 increases the need for network connectivity, hardware and software improvements, and systems management practices (see fig. 2).
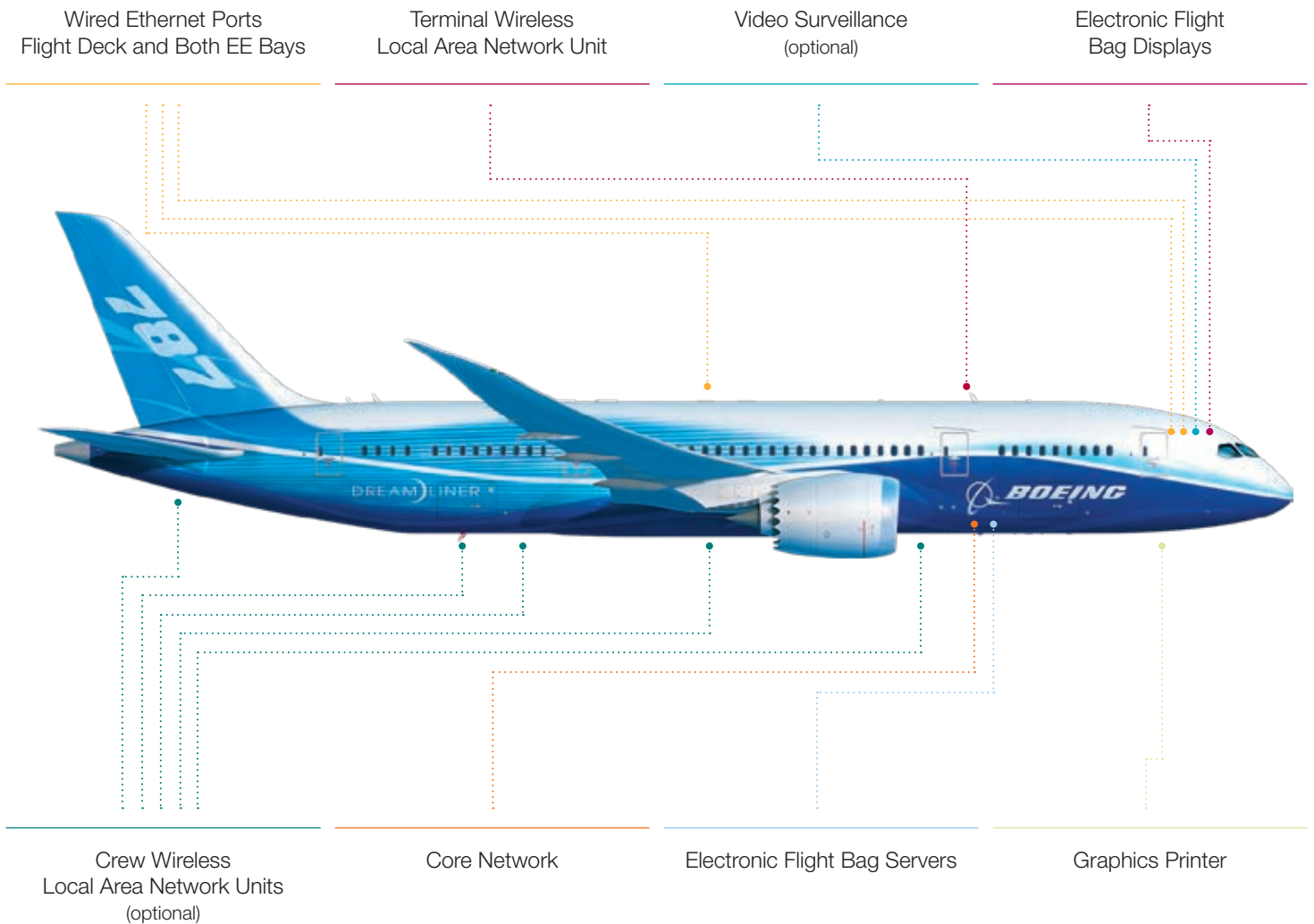
BENEFITS OF 787 E-ENABLED CAPABILITIES

Airlines benefit from the e-Enabling features of the 787 in a number of ways:

- E-Enabling eliminates time-consuming and awkward physical software data-loading via wireless data distribution and medialess software loading.
- It provides flight operations and maintenance personnel with data in digital formats to streamline the updating process, reduce errors, and eliminate the costs associated with shipping, handling, revising, and maintaining paper documents.

- It ensures compliance with new U.S. Federal Aviation Administration security requirements within heavily networked airplane environments.
- It enables near real-time data transactions both on- and off-board the airplane and provides the ability to access much of this data during flight to enable airlines to make timelier, informed maintenance and other operational decisions.
- It allows airlines to easily customize many aspects of their airplanes to fit their specific operations; for example, fuel can be displayed in pounds or kilograms.

Figure 1: 787 e-Enabling equipment locations
The 787 incorporates a number of e-Enabled systems, many of which are being implemented for the first time on a commercial airplane.

| Wired Ethernet Ports Flight Deck and Both EE Bays | Terminal Wireless Local Area Network Unit | Video Surveillance (optional) | Electronic Flight Bag Displays |

| Crew Wireless Local Area Network Units (optional) | Core Network | Electronic Flight Bag Servers | Graphics Printer |

IMPROVED MAINTENANCE EFFICIENCY

The e-Enabling equipment on the 787 will be highly integrated with the onboard maintenance, data-load, and crew information systems, offering airlines opportunities to reduce maintenance costs. Airlines have the option to include a wireless network for maintenance access, enabling airline back-office teams to remotely deploy software, parts, data, charts, and manuals to airplanes with minimal hands-on mechanic involvement.

Airline engineers and maintenance planners will be able to directly receive large data files from every airplane in the fleet without having to send the mechanic out to download or retrieve discs.

Also, maintenance laptops will save airlines time and give them access to quality information faster than in today's environment. Mechanics will use these portable computers to access onboard maintenance data, initiate tests, and review maintenance documents.

TRAINING EFFECTIVENESS

Because the 787 is e-Enabled, Boeing is focused on providing training via the Web portal MyBoeingFleet.com at the point of use. Boeing is targeting a Web-managed, distance-learning capability that brings training to the trainee in a paperless training environment.

Communications
- Terminal Wireless Local Area Network Unit (Basic)
- Crew Wireless Local Area Network Units (Optional)
- Aircraft Communications Addressing and Reporting System (ACARS) and Very High Frequency (VHF) Data Link Mode 2 (Basic)
- Provisions for Broadband Satellite Communications

Advanced Technology Flight Deck
- Fewer Line Replaceable Units
- More Software
- Upgradeable
- Configurable

Class 3 Electronic Flight Bag Applications (Basic)
- Electronic Logbook
- Onboard Performance Tool
- Electronic Document Browser

Video Surveillance (Optional)

Wireless Capabilities
- Wireless Software (Loadable Software Airplane Part) Staging
- Wireless Downlinks (e.g., Engine Health Monitoring, Airplane Condition Monitoring, Continuous Parameter Logging, Configuration Management, etc.)
- Wireless Maintenance Access

Core Network (Basic)

E-Enabled Systems in the Air

Equivalent Systems on the Ground
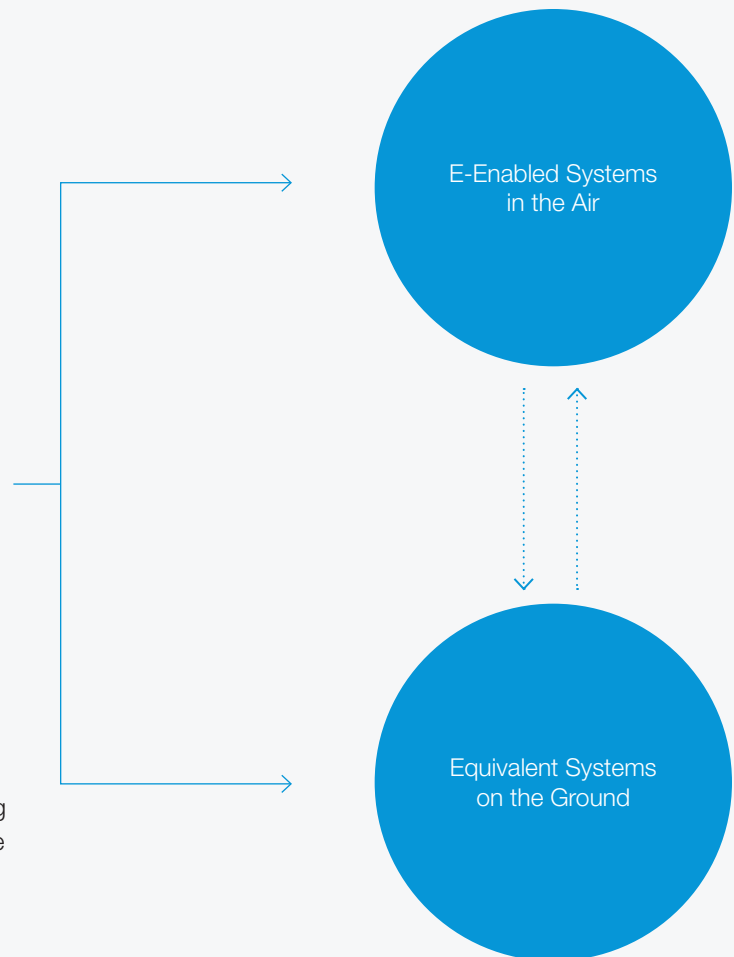
Enhanced technical data for flight training will include linkable features in the flight crew operating manual and flight crew training manual. The ground systems also provide mechanics access to near real-time maintenance information via MyBoeingFleet.com, or cached locally on a maintenance laptop.

ENTRY INTO SERVICE

Airlines interested in implementing full utilization of the e-Enabled capabilities should start the integration into their ground operations centers about six to nine months before entering service with new 787 airplanes. Boeing will send a deployment team to the airline's location to install, test, and verify the e-Enabled environment; provide assistance in connecting to a wired or wireless system; demonstrate ground-based systems; test wireless connections; and review network security.

SUMMARY

The e-Enabled tools on board the 787 will provide flight crews, cabin crews, and ground personnel with quicker access to quality information. In order to prepare for the new 787 e-Enabled airborne systems, airlines will set up equivalent e-Enabled systems on the ground with Boeing assistance. The resulting e-Enabled airline will be more capable of more efficient operations and enhanced revenue.

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