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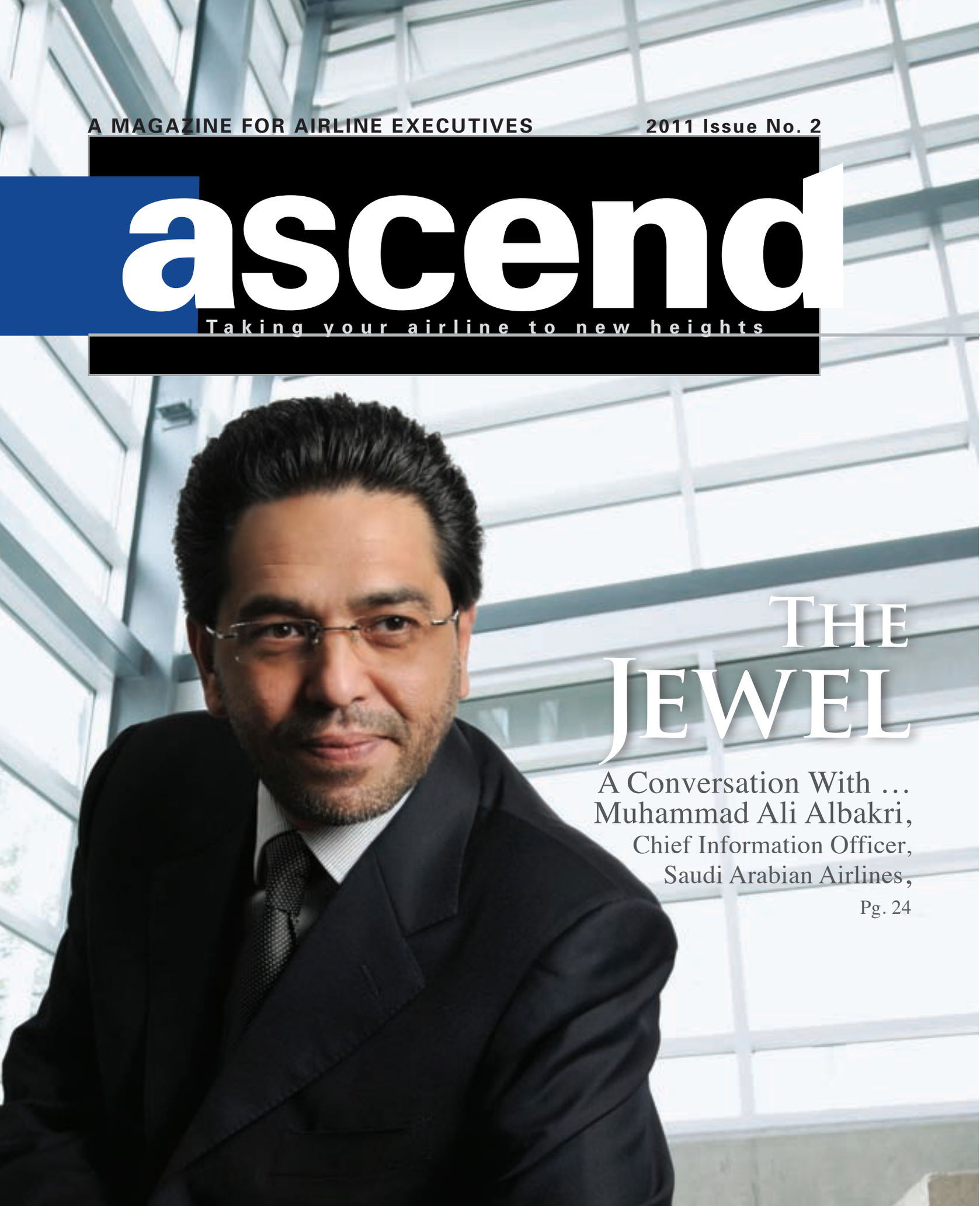
Taking your airline to new heights



The Jewel

A Conversation With … Muhammad Ali Albakri, Chief Information Officer, Saudi Arabian Airlines,

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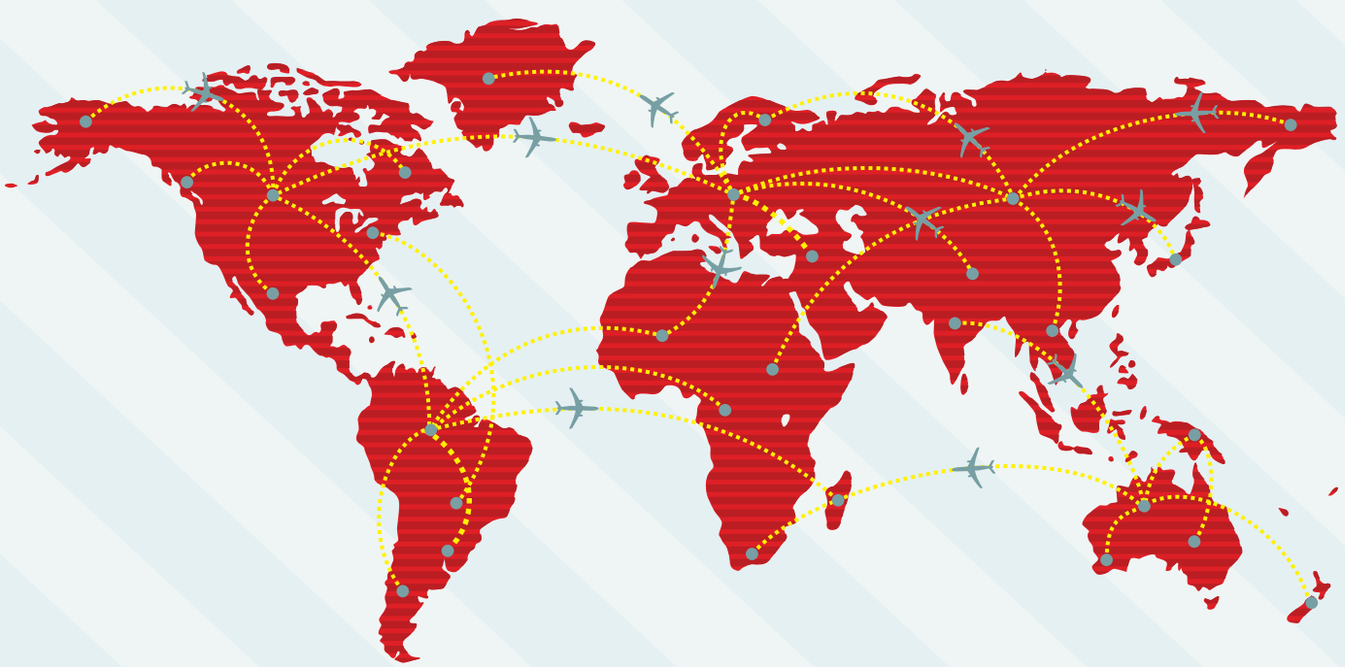
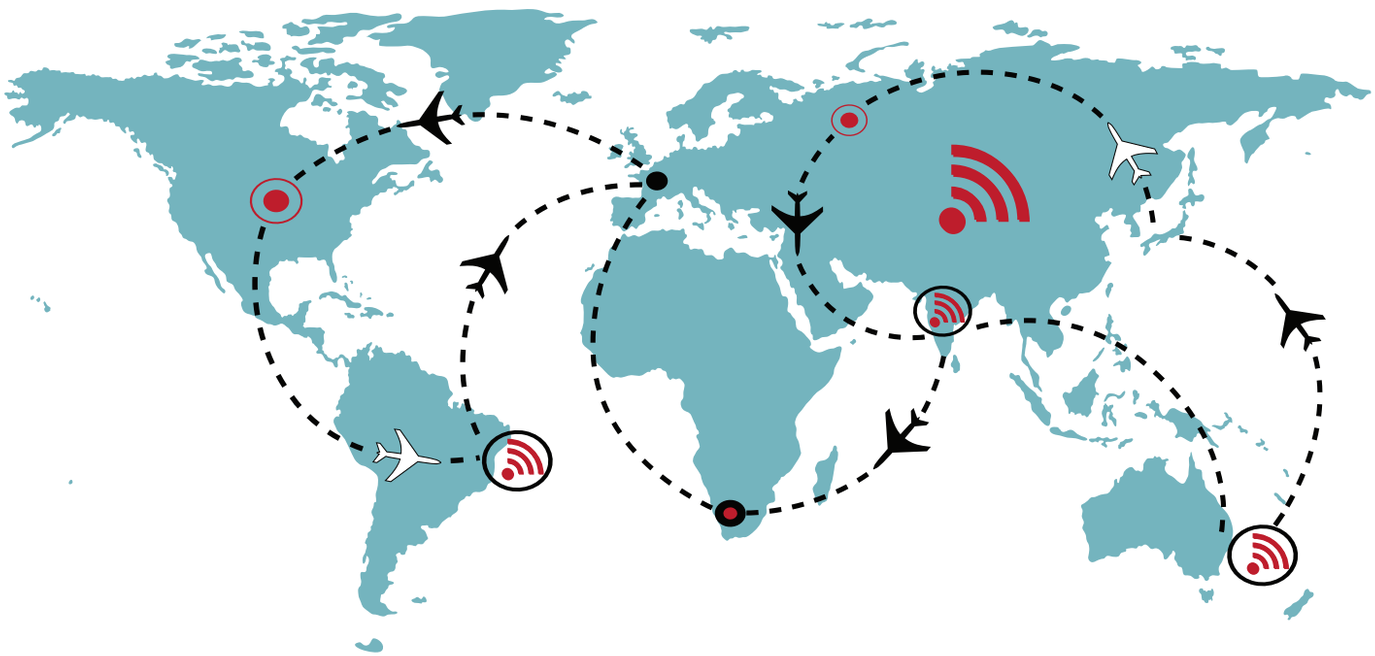
SPECIAL SECTION



THE CONNECTED AIRLINE



THE CONNECTED AIRCRAFT

A progressive airline industry calls for greater aircraft connectivity

Advanced aircraft communications play an integral role as airlines seek to achieve end-to-end connectivity across their entire organization.

By Lauren Lovelady, *Ascend* Staff

Since the first airplane flight by the Wright Brothers in December 1903, the primary purpose of an aircraft has been to transport passengers and/or goods from point A to point B. This premise has not changed over the decades. What has changed is the complexity by which this is done.

An airline's fleet has never been designed or considered to be part of its IT infrastructure. However, many in the aviation industry are discovering that the aircraft itself can be a rich source of data for virtually every aspect of an airline's operation. So is it time to rethink airline processes and consider the aircraft as another node on an airline's network?

If so, the connected aircraft is an integral element of the IT infrastructure.

"We have it backwards today," explains Walt Akerley, technical director of airline systems for FLYHT, an automated data collection and delivery service for commercial aviation. "Airline technology should be aircraft centric rather than airport centric. Right now, airlines must work within the limitations of airport systems, and there are many ways they can operate more efficiently with an open pipe to and from the aircraft."

Flying Solo

High in the air and miles away from any airport or maintenance base, aircraft seem isolated, even disconnected, from the rest of the airline. Until recently, they've had only basic connectivity with ground operations, utilizing voice communications and ACARS, the primary mode of text-based communication to and from the cockpit.

Introduced in 1978, ACARS' original intent was to report simple aircraft movements. It has grown into a valuable tool utilized in several important airline and air traffic control processes. But the rapidly increasing complexity of airline operations coupled with the expanding volume and sophistication of data are pushing this basic tool to its limits.

Airlines have made significant strides to correct this situation for ground-based operations systems. Data is shared readily among these systems, and this seamless flow of information has enhanced ground operations during the past few years.

The challenge then is to effectively link the potentially data-rich aircraft directly to an airline's IT network and core ground systems. In addition, critical information from ground systems must be consolidated and transmitted in a timely manner to the cockpit in an easy-to-access, easy-to-use format.

Making The Connection

The introduction of the electronic flight bag (EFB) into the cockpit has been an important step toward achieving this connectivity, which further opens the door to the integration of new systems, applications and automation from not only the cockpit but the cabin as well. EFBs have the potential to streamline processes and operations, including:

- Cabin procedures,
- Aircraft turnarounds,
- Ground services,
- Post-flight maintenance,
- Passenger services,
- Data distribution,
- Crew management,
- Fuel reconciliation.

HIGHlight

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In The Cockpit

Originally intended as a replacement for satchels routinely carried by flight crews as a requirement for commercial operations, the EFB is an electronic device that digitally stores charts, manuals and other operational documents. EFBs reduce the possibility of work-related crew injuries incurred by carrying 30- to 40-pound physical flight bags as well as the costs associated with the paper, printing and distribution of hardcopies. They are an efficient means of retrieving and receiving dynamic as well as static data.

EFBs provide robust automation and processing power, but without secure integration with an airline's ground systems, their full potential cannot be realized. They have the potential to be multi-functional devices that support a wide array of applications, including cabin surveillance, surface moving maps, electronic messaging and real-time weather displays.

As carriers, aircraft manufacturers and the industry continue to find new and better ways to utilize EFBs, it appears they will deliver far greater benefits than originally promised, providing the missing link in a carrier's IT network.

In The Cabin

Early on, air travel was a novelty few had access to and even fewer could afford. Over the years, carriers vied for the attention and finances of the flying public by offering meal and drink services beginning in the 1930s, pianos in the lounges of Boeing 747s in the 1970s and now flat beds on long-haul jumbo jets.

As operating costs began to rise, most airlines realized they were unable to survive and still offer the same passenger-service levels as before. Predictably, many carriers eliminated amenities, added additional aircraft seats and engaged in aggressive price wars to capture more revenues. Passengers were often lost in the shuffle.

Connectivity allows airlines to focus more attention on passengers and their in-flight experience, as communication between the aircraft and the ground is no longer limited to flight operations and crew issues. In most cases, passengers are way ahead of the game technology wise, with connectivity being part of their daily routines.

Instead of desiring three-course meals and piano lounges, consumers are now looking for onboard WiFi connectivity, real-time credit card authorization for in-flight sales and personalized media content delivered directly to their seats.

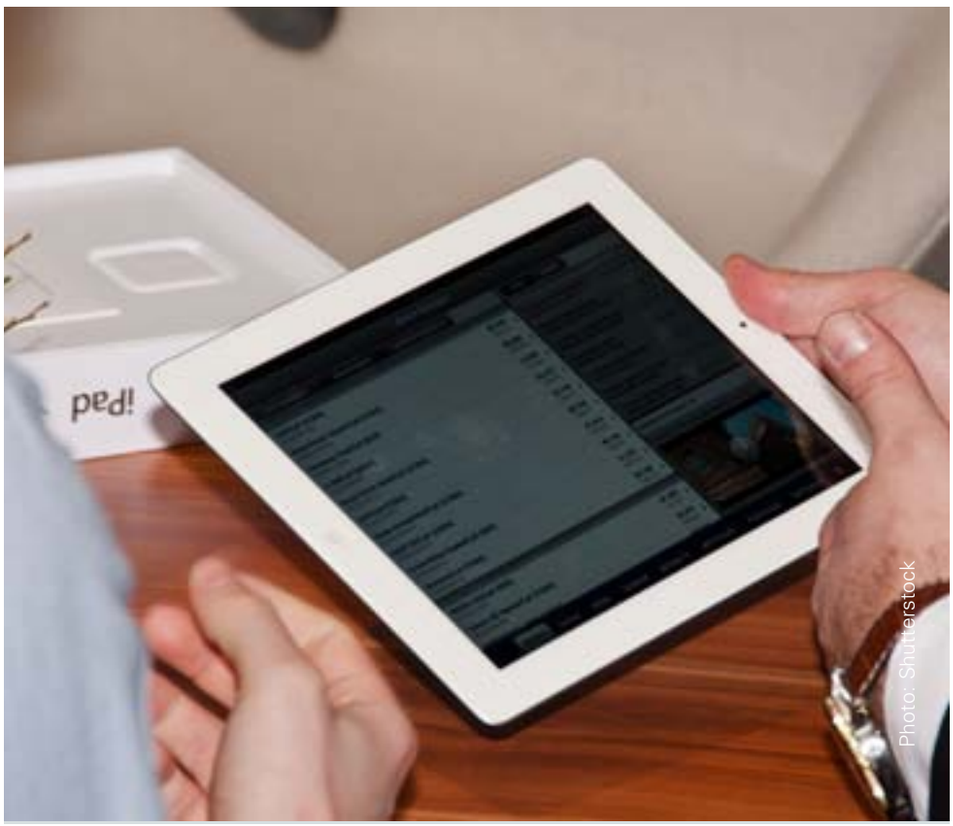
They want to know when there is a change to their itineraries and how they will be impacted and reaccommodated. Travelers desire and expect to be connected. In the future, both passengers and crewmembers will have continual access to high-speed communications during an entire flight anywhere in the world.

Classes Of EFBs

In an attempt to get their arms around this rapidly developing electronic tool, regulatory authorities have categorized EFBs by hardware types and software applications that support EFB systems.

EFB Hardware

- Class 1 — Primarily, commercial off-the-shelf equipment that includes laptops and handheld electronic devices. These



iPad In The Cockpit The range and capabilities of electronic flight bags and other areas of aircraft connectivity are constantly increasing. The introduction of tablet computers, such as the iPad, for use as low-cost Class 1 devices is becoming popular in the airline industry.

devices are not attached to the aircraft and must not be used during certain segments of a flight. A Class 1 EFB may connect to aircraft power.

- Class 2 — Also includes commercial off-the-shelf equipment and portable electronic devices as well as computer systems specifically designed for cockpit and in-flight usage. They are normally affixed to the aircraft via a mounting device or docking station, and the EFB display can be seen by the crew throughout the flight. These systems connect to aircraft power and data sources using interfaces such as ARINC 429. A major advantage of this class is that it may have multi-directional communication capabilities to send and receive data between the air and the ground.
- Class 3 — An onboard hardware system that is developed as part of the avionics system with the components in the avionics bay. It is subject to type certification just like other onboard systems. Airbus and Boeing are leading the development of Class 3, IT-enabled aircraft with the launch of the Airbus A380 and variants of the Boeing 777, respectively, as well as the Airbus A350 and Boeing 787 in the future. These aircraft can communicate at rates several hundred times faster than those equipped solely with ACARS.

EFB Software

- Type A
  1. May be hosted on any hardware class
  2. Supports static applications, such as document viewer (PDF, HTML and XML formats)
  3. Offers electronic checklists
  4. Eliminates the need for flight crew operating manuals and other printed documents such as weather and NOTAM information
- Type B
  1. May be hosted on any hardware class
  2. Generally uses MS Windows operating system
  3. Applications intended for use during critical phases of flight include electronic approach charts, take off/landing performance calculations, weather data, video surveillance and maintenance discrepancy logs
- Type C
  1. Must run on Class 2 or Class 3 hardware
  2. Operates on certified operating system (reference RTCA/DO-178)
  3. Requires certification design approval (i.e. supplemental type certification)
  4. Common applications include enroute ownership and ADS-B traffic.

Opportunities And Obstacles

While the connected aircraft holds great opportunity for airlines to streamline and upgrade operations, there are some realities that are holding back its rapid deployment throughout the industry.

Currently, there are more than 20,000 aircraft in commercial operation worldwide, and most carriers rarely have the finances available to retire these and purchase new, IT-enabled aircraft. In addition, the cost and time involved with retrofitting existing fleets may simply be more than the older aircraft models themselves are worth — a short-term fix with little value in the long term.

Additionally, today's connected aircraft have the ability to generate much greater volumes and types of information than standard ACARS-equipped airplanes. Currently, most airline processes are built around the information received from ACARS.

With the addition of passenger connectivity and live television, a significant increase in bandwidth is necessary, but at a cost. The challenge for airlines then is to rethink and rebuild their processes to manage data more efficiently and implement tools to help control how, where and with whom information is exchanged.

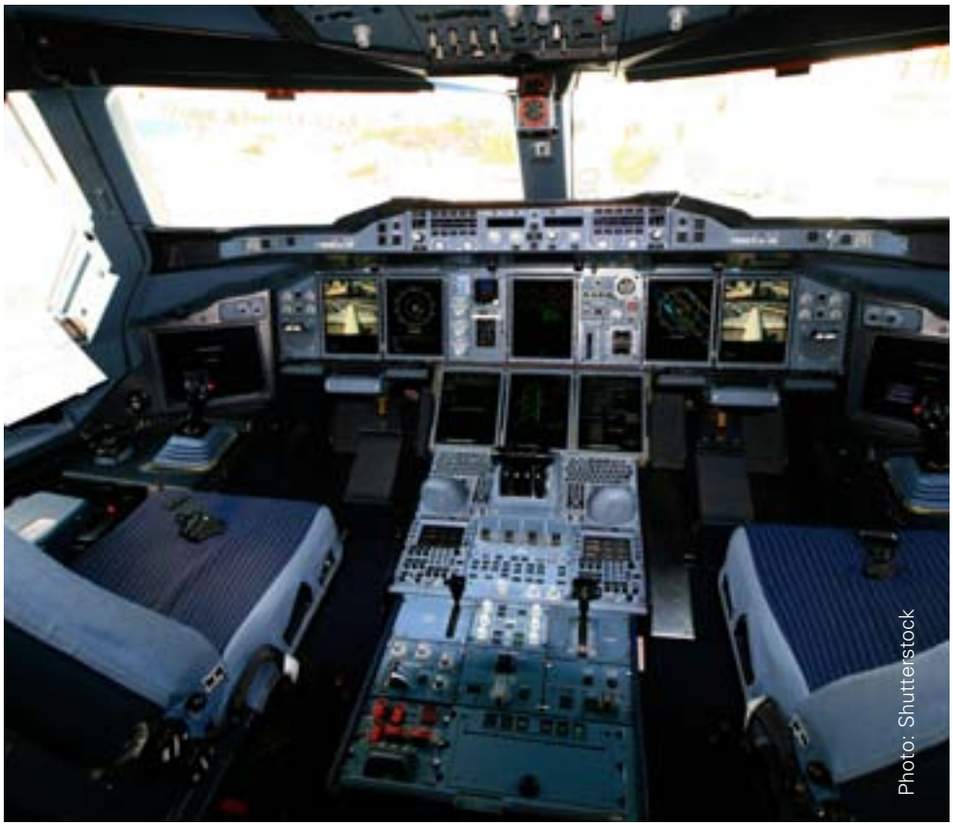
Conversely, although flight and cabin crews rely on accurate data to make decisions, inundating them with all types of information — more than can be realistically processed — is certainly not beneficial to the decision-making process.

"A big part of the connectivity piece is listening and customizing," said Matt Bradley, vice president of business development for FLYHT. "Each airline's priorities are different in terms of what data they want to see, when they want to see it and how they want to see it.

"The key questions are: what are you going to use the data for and what decisions will you make as a result of the data? It's critical to deliver data in a way that it can be used. If utilized properly, data is incredibly powerful."

Finally, paramount to the realization of any truly connected airline environment is the issue of safety. With an open line to and from the cockpit, secure communications between aircraft and an airline's core IT systems are of utmost importance.

Security measures must be put into place, allowing passenger cabin applications and ground-based IT systems to share information and a common IT infrastructure while being segregated from critical airline operations communications. Ensuring



Class 3 EFB Hardware Airbus, along with Boeing, is leading the development of Class 3, IT-enabled aircraft with the introduction of the Airbus A380 and variants of the Boeing 777 as well as the Airbus A350 and Boeing 787. These aircraft can communicate at a pace several hundred times faster than those equipped solely with ACARS.

secure communications between aircraft and ground systems is a critical challenge.

Data integrity is an absolute necessity. Until this time, the aviation industry has not had a lot of experience with standard technologies nor has it been exposed to significant malicious electronic threats. As a result, new and stronger rules and guidelines must be developed by aviation authorities to govern this developing area.

Experiencing The Benefits

With so much at stake operationally and financially, airlines are increasingly turning to resources with expertise sorting through the various EFB options and assisting with tasks, such as:

- Identifying and reviewing current airline processes,
- Determining areas and processes needing improvement,
- Matching EFB solutions and airline processes,
- Designing appropriate infrastructure for integrating solutions,
- Building an understanding of data management,
- Identifying differences between current processes and future electronic processes,
- Evaluating ROI impact of applying new processes.

Sabre Airline Solutions® recently launched a new technology called *Sabre® AirCentre™ eFlight Manager*. This comprehensive approach works with a carrier's personnel using the technology company's expertise in consultative processes, industry affiliations and project management to provide a complete EFB solution for an airline.

When integrated and utilized to the full potential, EFBs enable airlines to measure, manage and empower a culture of constant improvement. Several software and hardware providers have conducted studies with commercial airlines based on process improvements enabled by their products.

Results indicate a substantial cost savings of US$100,000 to US$200,000 annually per aircraft in just 18 months utilizing EFBs. Actual savings depend on the applications selected for a carrier's EFB solution and the method selected to manage the data. Other variables include the size and type of an airline's operation and the markets in which it operates.

Other benefits include, but are certainly not limited to:

- Standardization of processes for greater efficiency and consistency,
- Greater resources for real-time decision making,
- More detailed analysis of the health of a fleet,
- A reduction in injuries for crew and passengers with advanced warning of potentially dangerous developing weather situations,
- Advanced planning for airline delays as well as passenger reaccommodation,
- A reduction in fuel burn and expense,
- Faster resolution of maintenance issues reported in flight,
- Improved brand recognition and customer loyalty,
- Additional revenue sources by offering personalized amenities.

Future Of Connected Aircraft

The scope and capabilities of EFBs and other areas of aircraft connectivity are expanding daily. The introduction of tablet computers, such as the ipad, for use as low-cost Class 1 devices is garnering a great deal of attention within the aviation industry worldwide.

Although various elements of EFBs have been available for a number of years, the complete program now exhibits a consistent investment return that warrants further exploration and conversation.

With NextGen and SESAR on the horizon, the promise of and requirements for participation in a modernized air traffic management system is encouraging airlines to reach for new levels of connectivity. The evolution of aircraft connectivity will continue. As it does, regulations and guidelines governing the technology and communication of data will do so as well.

The challenge is to balance aircraft manufacturers' and regulatory agencies' vision for the future of the industry with airlines' demands for immediate cost savings and revenue returns.

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