

package that is designed to meet airline operations support requirements, specifically in the areas of data organization and management, while reducing overall costs. Over several years, concepts of a system to organize data have emerged, with ideas ranging from replicating the existing processes electronically, to a fully integrated, digital, friction-free operating system. After studying various concepts, ADF has found that the real benefit and cost reduction lies in the application and distribution of the data.

### System architecture

ADF offers a fully integrated solution that allows airline companies to create, manage and distribute their mission-critical information. The authoring system is the digital backbone that makes the ADF solution stand out, and is needed to support the Electronic

and presents the information on a common viewer for approval.

Once approved, information is distributed electronically to all end users, thereby increasing the airlines' operating efficiencies by reducing the time and labor required to manage these processes. The end users will get their information through the aircraft EFB as well as their own personal EFB.

With a digital distribution system, revisions of information are instantaneous. When a change is made the airline can be certain of compliance by way of instantaneous digital confirmation. The issue of safety and efficiency is critical. With this system, human error factors are reduced or removed, both in the revision process and in the cockpit. All data that is retrieved by the pilot is all standardized to one common form regardless of the type of aircraft flown.

# Competitive advantage

In the current economic climate, and with severe competition in the airline industry, commercial carriers need all the competitive advantage they can get

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Since deregulation of the airline industry in the USA in the late 1970s, airlines have implemented great changes in business practices to gain efficiencies and reduce costs. Most of these changes have dealt with core business areas that affect customer attraction and retention or yield rates. Security, intense competition and continued rising costs of fuel, labor and infrastructure, have airlines seeking additional cost-reduction measures in other business areas. Because airlines still use relatively antiquated systems to support their daily operations, the management and distribution of data is one area that presents a sizable opportunity for cost reductions.

Aircraft Data Fusion (ADF) has developed an automated solutions

Flight Bag (EFB) operations concept and facilitate value-added applications.

Streamlined business processes using integration and automation create the customer value necessary to justify the system. ADF's strategy is to provide a data and distribution system based totally on a digital operating environment.

ADF has developed business processes for the compilation of checklists, manuals, procedures, charts and other pertinent information from specific airlines, aircraft and system manufacturers, and the FAA into a single database. From this database the information is formatted to each airline specification using software from leading manufacturers. As changes are received, ADF automatically formats the revision to the airline specifications

### Electronic Flight Bag

ADF has used an industry-developed 'operations concept' in developing its core product, the EFB. This EFB is the foundation for the retrieval of information by pilots for the services that ADF offers to airline companies. The strategy for this system is to provide a data management and distribution system based solely on a digital operating environment, featuring hardware units installed at each pilot workstation in the flight deck and one portable unit for each user. The flight deck units are linked by means of Ethernet and a file server. This allows information entered on one unit to be displayed on both EFBs, increasing the situational awareness of both pilots. The portable unit is designed to be carried by each individual pilot and is an exact replica of the

aircraft units, yet offers greater functionality at a fraction of the cost.

### Task management

The EFB is a task-management and decision-support tool to aid pilots in organizing, prioritizing and executing their required duties. With it, users are able to access normal and emergency checklists, performance calculations, aircraft manuals, Minimum Equipment Lists (MEL), and airline operation manuals, as needed to complete each assigned task. All information is linked by a key word, specific system, related topics or a description. Custom enhancements that can be added later include airport surface maps, customized approach charts, up-to-date weather depiction charts, and aircraft position information. A security device can also be added that allows crews to monitor activity in the main cabin. All the information available through the EFB is designed to aid the pilots as a decision-support tool.

With the EFB, pilots electronically check off each checklist item as it is performed. When proceeding through an emergency situation, items are checked off, but when encountering a decision-making point, the checklist asks the appropriate questions and after receiving the answer it allows only the relevant information to appear on the screen. All information that is not pertinent is removed, eliminating the potential for error. This design was chosen to enhance situational awareness and consistency. Performance calculations are automatic after weights are entered by individuals or sent via ACARS.

The EFB is able to retrieve information regarding specific problems by electronically accessing the aircraft operating manual, the aircraft maintenance manual and the airline operating manual. This allows the pilot to make an informed decision regarding the airworthiness of the aircraft. If the mechanical item shows has a MEL associated with it, the EFB directs to the MEL and offers all pertinent information including procedures to MEL the item.

Paper approach and airport charts should be a thing of the past. The EFB can display arrival and departure information as well as the approach and airport diagrams. ADF enhances these charts by giving pilots the ability to organize and customize the chart information to their specific operational

needs. By doing this, ADF feels that it can reduce the complexity of the chart, remove non-essential information and reduce the possibility of pilot misinterpretation or error.

Weather charts, previously only available on computers, are now available in real time on the flight deck. Pilots are able to plan a flight path that best circumnavigates weather along a proposed route and alter it as the weather moves and changes. Safety is enhanced with a moving map of the aircraft and its proposed path in comparison to the real-time weather chart with information from the aircraft's navigation or ground proximity system.

With intensified security measures the order of the day, ADF has added safety features to its product. Cameras throughout the cabin allow pilots to monitor any activity in the cabin of the aircraft, and flight attendants are able to trigger sensors located throughout the cabin that signal the EFB, alerting pilots to a potential threat situation. The camera that has the best view of the triggered area automatically sends a live picture feed to the flight deck. The pilots can toggle between the other cameras to assess the situation and allow them to make an informed decision on whether to immediately divert and notify ATC of an imminent situation. This system can be installed without costly changes to the aircraft.

### Summary

The authoring system envisioned by ADF will offer complete business solutions to assist airline operators in managing their daily flight operations. This includes not only the EFB hardware and applications, but also the entire infrastructure to support it. By using Open Systems architecture, applications and services can be customized to meet each airline's needs. Risk management and cost control is managed by using mature technologies and economies of scale.

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