

Electronic Flight Bags - Creating More Efficiencies For Airlines?

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In the past few years, commercial aviation has really started to embrace EFB technology. Commercial airplane manufacturers (Boeing, Airbus, Embraer and others) are now offering Class 2 and Class 3 hardware solutions as factory-installed options or even standard equipment. And almost every commercial airline around the world has some kind of Electronic Flight Bag initiative in-place to evaluate the business impact this deployed technology could bring to their own operation.

Yet while the idea of a paperless cockpit sounds good "on paper", what are the real-world truths of EFB? For those airlines that have moved to deploying and utilizing this new technology, is it working? Have the investments paid off?

Let's start with a little refresher. In 2003, Boeing, in conjunction with its business partner Jeppesen and hardware provider Astronautics Corp. of America, took a giant step forward towards a paperless cockpit with the deployment of a solution that was launched by KLM on their B777. This trio developed the first Federal Aviation Administration-certified, permanently installed, Class 3 electronic flight bag (EFB) that replaced up to 77 pounds (35 kg) of manuals on-board the B777s (maintenance logs not included), plus another 20 to 40 pounds (9 to 18 kg) of paper carried on board in pilot flight bags. In short, it replaced nearly 9,000 pages of paper.

These three companies clearly showed that an EFB solution can increase airline operational efficiency, reduce flight deck workload, and provide a way to add new tools for safety and situational awareness. Obviously they were on to something. As starting next year, all B787's will roll-off the assembly line with a fully integrated Class 3 EFB installed. On this aircraft, the EFB is not an option... it is standard equipment.

This is all fine and good for operators who are taking-on new aircraft like the B787. These new sophisticated airliners will provide airlines with built-in tools to help them even further increase their efficiency.

But what about the 20,000+ commercial transport aircraft flying today? Why can't they also realize the benefits of EFB technology for better situational awareness and increased operational performance that can help operators save money today?

Manufacturers like Boeing and Airbus are making retrofit kits available for certain models. But the cost from these OEM's is breaking the bank of operators who want to execute an EFB initiative but can simply not get the OEM's prices to work within their return-on-investment business case. Unless an EFB solution can be found that is financially feasible and can be paid-back within a finite period (usually less than 3 years), the economics for implementing an EFB program simply cannot justify the expense.

In today's economic conditions, airlines appear to be favoring an "after market" EFB solution. Rather than realizing expensive panel modifications to use primary flight displays for presenting aeronautical charting, airline operational information and other applications, they are adopting OEM retrofit side-panel installations. These after-market solutions provide a cost-saving option that basically provide the same functionality as the OEM offerings and can be installed with significantly less cost and with less aircraft down-time.

Most of these after-market solutions feature 10.4-inch (diagonal) EFB displays mounted on or near the outboard window frame assembly adjacent to each pilot. Currently, several manufacturers offer EFB hardware that has received FAA and EASA certification which allow for the installation of their hardware on commercial transport

aircraft. Today, navAero is leading the pack with STCs now available for B737-NG and B737-300/400/500, A319/320/321, MD-10/MD-11, MD-80 and the A300/310. Ultimately, numerous suppliers will have solutions available for a wide variety of commercial transport airframes that meet both FAA and EASA standards because the marketplace will demand it.

Not A New Idea

The concept of EFBs for airlines is not new. The move toward paperless flight decks began a number of years ago. Activities by forward-thinking technology innovators such as FedEx, Jet Blue and others have showed the top-line benefits of implementing incremental solutions of deploying EFBs for accessing and using maintenance logs, weight & balance and performance software, aircraft documentation manuals and even charting. What everyone is wanting today is the implementation of an integrated solution that is expandable to accommodate new technologies as their needs change.

While Class 3 EFBs are being promoted as the ultimate solution, the cost differential between Class 2 and Class 3 EFB hardware is substantial. Yet, the functionality differences between these two classes of devices is not nearly as large as the cost delta would suggest. Both can be used for displaying Type A and Type B software such as airport charts and other documentation. They can also be configured to allow for a wide variety of communications options such as ACARS, Satcom as well as WiFi and even GPRS or CDMA telephony on the ground. Yet, Class 3 does have a special niche in being able to host a wider range of functionalities afforded by Type C software such as the ability to depict ownership position as well as have full two-way intergration with on-board avionics systems like the FMS. The question is... how much is this added functionality worth to an operator?

Today, the market is definitely aligned with implementing aftermarket Class 2 EFB hardware because of its affordability, easy cost justification and simplicity of the installation procedures. But operators are also keeping an eye to the future. Those who are getting into EFB technology solutions today with a Class 2 deployment want the ability to potentially "grow" their deployment into a Class 3 solution tomorrow. As such, several manufacturers are providing a path that will allow a user to "upgrade" from a Class II EFB to a Class III device to realize enhanced

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Operators using the B777, like KLM, benefit from values added by the paperless cockpit concept

functionality when the time comes that it makes sense to do so in line with their business plan and strategic business objectives. Again, navAero is leading the way with a technology approach that can grow in capabilities from Class II to Class III.

Real World Experience

The first airline to truly test the waters for a Class 2 EFB initiative was Miami Air – a North-American based non-scheduled Part 121 airline operating a fleet of B737-NGs. Miami Air became a true Class 2 pioneer when they launched their EFB program in 2005 with the installation of the navAero EFB hardware and Jeppesen Class 1 / Class 2 EFB software charting application. This airline has now successfully completed through their 6-month FAA operational approval period which means they will be allowed to off-load their paper documentation which now resides on the EFB.

Taking their EFB initiative to the next level, Miami Air is now in the process of deploying an even more detailed technology architecture on their aircraft. This next phase will have the navAero EFB connected to a wireless data transfer system for their Flight Data Monitoring programs. By being able to execute a wireless transfer of data to-and-from the aircraft, all the costs and delays of moving traditional aircraft media such as paper documentation, optical disks, PCMCIA cards and QAR magnetic tapes is eliminated. The system establishes an authenticated and encrypted log-on automatically whenever the aircraft enters the system's wireless network. Within moments, it communicates with the Airside Local Area Network to transmit and receive all information without human intervention, minimizing both labor and material costs and eliminating the possibility of misplaced media and lost data.

This enhanced system will also allow for connectivity with an Iridium Satcom solution which will eliminate the need for this carrier to use ACARS - which will substantially reduce operational costs. Given Miami Air's expansive and varied operations throughout the world, transporting everything from sports teams to military personnel, the carrier needed a cost effective world-wide communications platform. With the Satcom on their EFB, they can send and receive data anywhere around the world and never be out of touch or have documentation that is out of date.

When you add all the elements together - the ability to remove paper charts, eliminating paper reporting and the labor-intensive task of manually updating aircraft documentation, and having a low-cost worldwide communication solutions as an alternative to ACARS - Miami Air has more than justified the initial cost it realized for the installation of a Class 2 EFB solution.

The carrier's next goal is to implement the Boeing Performance Tool application onto the navAero EFB platform. This software will allow the carrier to make weight-and-balance and takeoff performance calculations "on-demand" to determine precise aircraft speeds and engine settings for take-off. Factoring in airport and runway conditions due to weather, this application will provide the pilot with the optimum trim set and thrust settings, V speeds, and minimum flap retraction altitude, as well as determine landing field and climb performance. This will allow Miami Air's B737's to take off with reduced thrust and realize significant fuel savings and reduced engine wear.

Another airline that also operates worldwide as a non-scheduled 121 carrier, stated that their migration from paper charting documentation to the equivalent

"electronic" version of this same information is saving them more than \$11,000 USD per year per aircraft. Simply put...this adds-up real quick as direct bottom-line cost savings.

What Else Is Possible

With the continuing concerns for aircraft safety and security of the flight deck, an EFB platform can also be used for displaying video images from an on-board camera surveillance system. Pilots can view the flight deck door area from a seated position directly on the EFB display. Flight crews can look at screen images from multiple camera locations in the cabin or cargo compartments to verify situations. And options exist to record images during flight for later retrieval and even download those images via data link or Satcom.

Electronic logbook and technical logbook (eTechLog) applications can also be hosted on an EFB and be used as a conduit to provide instant reporting of aircraft faults and offer quick referrals to reference materials. These applications provide a "fault finder" approach that allows the flight crew to record a fault, select panels where the fault occurred, or review previous faults. By entering information in a common format, maintenance crew members don't have to interpret a pilot's handwriting. And according to industry studies, the inability to read or interpret pilot handwriting renders some 30 percent of the pilot reports inaccurate. And with a Satcom or datalink connection to the EFB, faults can be sent to the airline's operation center to allow for scheduling repairs or corrections to be made as soon as the aircraft is parked – thereby reducing aircraft downtime and increasing operational efficiency.

Other Opportunities

For those parts of the world where service



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is available, near real-time weather information also can be graphically depicted on the EFB display, depending on the type of connectivity that is aboard the aircraft. This data can give flight crews a true and accurate depiction of what is happening out-in-front of what they see from the on-board aircraft radar picture. Not only will this technology provide the airline with the obvious better flight performance, fewer course changes and reduced fuel burn, it also gives the added bonus of providing passengers with a smoother and more comfortable ride.

And other innovative new ideas like the NUP2+ Continuous Descent Approach (Green Approach) initiative are coming into play with key components being hosted on the aircraft's EFB platform - providing even more tangible proof for the use of technology to let the operator save money and help the environment

at the same time.

EFB technology is also providing operators with the ability to gather data on aircraft and crew performance that is simply not available today in a usable format. By collecting detailed data on each flight electronically, operators are able to execute detailed analysis on the information and look for areas of further cost savings and ways to optimize operations practices such as accurate capture of OOOI times.

What Does The Future Hold For EFB? It is truly up to aviation regulatory agencies and airline operators to work together more closely to make good business decisions on how far EFB technology can go in providing airlines with better and easier ways to implement technology tools that will let them run their businesses with more efficiency.

Naturally, safety of flight will always be

the number one concern of the world's aviation marketplace and the regulatory agencies that control the industry. Authorities need to be more open and receptive to evaluating innovative out-of-the-box thinking that can help operators save money, enhance situational awareness and increase operational efficiency when it is clearly shown that these new ideas have no negative impact on safety of flight. And operators need to be more willing to embrace new technology and new ideas in aircraft electronics systems that are different from the way things have always been done. When technology changes, it impacts virtually every business paradigm. Those who embrace change will prosper through it. Those who do not, will be left behind. Because if you always do what you have always done, you will always get what you have always got. ■

Africa Needs More Aircraft

Mr. Janty Nel, Vice President, Sales & Marketing, GE Commercial Aviation Services believes there is sufficient room for more aircraft in Africa, even as safety and security challenges are beginning to be tackled by some States.

Excerpts:

Market prospects in Africa

We are very positive on the outlook in Africa, and there are signs that governments are doing what is necessary to address, from the regulatory sides, the obstacles to leasing and financing.

We are very positive about Africa. We are looking to grow aircraft investments subsequently in the next two or three years.

Products' Growth

Our main business is aircraft leasing. We have a large portfolio of owned and managed aircraft; about 3000 aircraft overall that we release on operating lease basis to airlines around the world. We have the opportunity to grow our successes in Africa. We might even in another four years see at some point that the investment in Africa is up to about 100 aircraft.



Mr. Janty Nel

Challenges And Priority In Africa

Most of the challenges have been related to safety regulations and operational regulations. But we see that, for instance, Nigeria in particular has taken positive steps towards improving security and safety because this will offer a lot of benefits as it has done in Ethiopia and is being done in South Africa and Kenya. The biggest issue is that there is a huge scarcity of aircraft, and this is being driven by growth in demand in recent years. In the past, this growth has been outside of Africa predominantly.

The growth is big in Africa; the world aviation industry is also experiencing large growth in passenger numbers especially outside the US, and that's prompting the scarcity or inadequacy of aircraft. The main challenge right now basically is finding available aircraft structured for Africa. ■