EFBs: A Changing Vision

L-3 Communications' CrewMate Class 2 electronic flight bag is a portable electronic device that stores and displays data commonly required by pilots and usually carried onboard in paper format.

BY TONY BAILEY

In October 2005, I wrote an article for *Avionics News* called "Electronic Flight Bags: A World of Their Own." It was an introduction into a world few understood at the time. Little did I know then the electronic flight bag (EFB) would evolve in such dramatic ways.

No longer are EFBs simply secondary systems. Today, EFBs are fully functional components of a safety-enhanced cockpit capable of increased situational awareness and improved emergency management.

So, what has changed since then? It would be easier to identify what hasn't changed.

One of the biggest changes is the classification not associated with the regulations. Today, the terms "PED" (personal electronic device), "avionics grade," "tactical" and "integrated" enter the conversations of EFB purveyors. These terms are in addition to the Class 1, Class 2 and Class 3 rankings cited in FAA Advisory Circular 120-76A. All these different "terms" can cause confusion.

New guidance is now emerging from the FAA that further changes the way the Agency looks at this easy, yet complex addition to the aircraft.

What does it all mean? From an avionics-installation standpoint, it is really fairly easy:

• If you carry an EFB onto the aircraft and it doesn't connect or mount

to the aircraft, it is considered a Class 1 system.

• If an EFB is mounted to the aircraft in some way and is interfaced to the aircraft but is not approved as a multi-function display, it is a Class 2 system. Class 2 EFB systems can be connected to non-essential data buses, file servers, printers, routers, etc.

• If an EFB system is interfaced with the aircraft cockpit display system and can be utilized as an MFD, it is a Class 3 system. Class 3 EFB systems can be used for other aircraft data communications applications and sub-networks that interface with the EFB, and can be connected to an essential data bus.

As a rule, any data connectivity or use of mounting devices for EFBs used in a Class 1 or Class 2 system integrated to the aircraft need to be installed in accordance with a supplemental type certificate, type certificate or amended type certificate.

For the avionics management team selling these devices, there are some general rules of thumb:

• An EFB referred to as a PED is usually an inexpensive, carry-on tablet personal computer considered to be a Class 1 type device. These are great for holding checklists and charts, but they don't usually have the stability or reliability of an avionics-grade EFB. Keyword: "usually." Some manufacturers are working on improved reliability.

• An "avionics-grade" EFB can be subjective. In my world, it means a unit built from the ground up with the intent of being installed in an aircraft. The keypads match the commercial flight management system layout with the "alphabetical order" keypad; the case is metal and durable; and the components are all solid-state and not prone to mechanical failure. They also are more expensive than a PED and, almost always, they are a Class 2 device. And they almost always have testing and support documentation that helps substantiate the unit as safe in the aircraft environment, which is huge in the STC development world.

• Integrated EFBs are Class 3 components that get mounted in the instrument panel and cannot be removed from the cockpit under normal operations. They are an integral part of the cockpit.

• The tactical EFB is the new player on the block and it has some very specific functionality. It is rugged and reliable, like an avionics-grade EFB, with a similar metal casing, but it also has functionality to support the tactical environment, such as night vision goggle compatibility, gloved-hand use adaptability, joint precision air drop system and a "qwerty" keyboard layout similar to an actual computer keyboard. These EFBs also can integrate with tactical servers and they have upgraded security features necessary for military use.

It is important to note Class 1 and Class 2 devices, whether or not they are PEDs or avionics grade, can be removed from the aircraft for updating and other off-aircraft uses. This is convenient for pilots who, for example can go back to a hotel after a flight and update their charts at their leisure.

Pretty simple, right? Not so fast. EFBs now perform vital roles and can no longer be an inexpensive, one-size-fits-all solution. Things like software, reliability and connectivity enter the picture as primary requirements, which were not as significant in the past.

The original purpose of allowing an

Continued on following page

NavAero markets its t•Bag C2² EFB system as one of the "most cost-effective, robust and purposefully built Class 2 EFB systems available today."

This King Air 350 has Universal Avionics' dual Class 3 application server units electronic flight bags, which display JeppView charts, checklists, video and WSI InFlight weather.

ELECTRONIC FLIGHT BAGS

Continued from page 39

operator to fly in the "paperless" environment (using electronic charts instead of paper) still exists; however, added functionality — such as weather, tactical situation charts, checklists, operational manuals, enhanced vision system integration, security video display, weight and balance, network-centric data-link communications display, satellite communications, embedded training, sensor imagery and aircraft performance monitoring — further add to the capabilities of an EFB.

Some OEMs already are looking to add additional functionalities like traffic awareness and synthetic vision to the EFB toolbox — and who knows what else will be added in the future.

New regulations are coming out and they change the requirements, adding safety and detail to the process. Draft AC 120-76B is similar to its predecessor AC-120-76A, but it dives into the physical mounting, integration and human factors elements with clear and precise limitations and requirements.

Also in the draft stage is FAA Order 8900.1, CHG EFB2, which gives FAA principal inspectors specific guidance for the approval of EFB systems. One

FAA Publishes Draft Policy Memorandum for EFB Class 1 and 2 System Architecture, Aircraft Connectivity

The FAA published a draft policy memorandum last month for electronic flight bag Class 1 and Class 2 system architecture and aircraft connectivity.

The memorandum provides policy and guidance for EFB Class 1 and 2 system architecture, such as portable modules, lithium batteries, charging circuitry and rapid depressurization, and for aircraft connectivity, such as aircraft power, data buses and mounting brackets.

The memorandum is applicable to all operators conducting flight operations under 14 CFR, Parts 91, 121, 125, 129 and 135, to obtain airworthiness and suitability of operations approval. Comments on the draft were due last month; however, they can still be made.

According to Ric Peri, vice president of government & industry affairs for AEA, this is an important policy for those who manufacture and install EFBs. He said it places new limitations on installation and adds a significant administrative burden to the installing agency. ❑

of the interesting points contained in the order is a specific requirement for rapid decompression testing in pressurized aircraft.

The jest is, if you are going to use an EFB for your sole source of charts, the EFB must be tested to the testing standards of the Radio Technical Commission for Aeronautics (RTCA) Document DO-160, "Environmental Conditions and Test Procedures for Airborne Equipment," up to the maximum operating altitude of the aircraft in which the EFB is to be used. The obvious reason is to address rapid decompression in a pressurized cockpit.

The draft regulations attempt to set a standard for the software used for these systems and regulate how it is applied. In the EFB world, this poses huge challenges because the systems usually are operated from a Microsoft Windows or open-source operating systems, which allows for almost any type of software to be added to the unit. This is a major issue when a virus can manipulate a system or something else inadvertently added that could potentially get back to the aircraft (the primarily concern is with Class 2 and 3 systems) as EFBs connect to the aircraft navigation system in most cases.

So, which type is best for your customers? It really depends on their budgets and missions.

If an EFB is going to be the sole source of charts, an avionics-grade or integrated system is the way to go.

If a budget doesn't allow for an avionics-grade EFB, a PED should work, but it should not be counted on as a sole source of charts.

If a customer has lots of money to invest, integrated is great. If you fly a C-130 headed into harm's way, good luck —tactical is the only way to go.

Keep in mind, no matter which system you install, if flown under Part 91, 121 or 135 rules, the operational requirements can be daunting and long-term. Of course, that is an operations' issue and not usually the worry of the avionics team.

EFBs are, and will continue to be, a growing part of the enhanced cockpit of the future. Even George Jetson will be impressed. ❑

If you have comments or questions about this article, send e-mails to avionicsnews@aea.net.

Some EFB Hardware Providers & Types of EFBs	PED	Avionics Grade	Integrated	Tactical
Advanced Data Research	√			
Astronautics Corp. of America	√	√	√	
Bendix/King	√	√		
BJAC Services	√	√		
Boeing			√	
CMC Electronics	√	√		√
DAC International Inc.	√	√	√	
Exalit	√	√	√	
Flight Deck Resources	√	√		
FlightPrep	√			
Goodrich	√	√		
Honeywell (VistaNav)	√	√		
L-3 Communications	√	√		
NavAero	√	√		
Teledyne Controls	√	√	√	
Universal Avionics Systems			√	