



DIGITAL BRIEFING

Now let's see . . . we have categories. Category I, II, and III for how close you can get to the runway without seeing it. Category A, B, C, D, and E for defining the different stall speeds of airplanes with respect to landing minimums. And we also have classes. Class A, B, C, D, E, and G for airspace definitions. And now we have yet another group of classes. As you now begin to use electronic charts in your airplane, the requirements are broken down into Classes 1, 2, and 3. The FAA has issued Advisory Circular 120-76, which specifies the different classes of Electronic Flight Bags (EFB). Electronic charts are but part of the larger group of digital information comprising any EFB.

What is an Electronic Flight Bag?

An EFB is an electronic display system consisting of the display, software, and data which were initially meant to replace all the paper carried around in those 30+ pound flight bags, but EFBs actually do much more. We, as pilots, have long recognized the benefits of adapting portable computing devices, such as laptop computers and personal digital assistants (PDAs), to perform a variety of functions traditionally served by paper. These portable electronic devices (PEDs) are now being used to replace the hard copy chart information contained in our flight bags. Thus, the term Electronic Flight Bag has entered into our vernacular.

EFB applications being deployed today do even more than the paper they are replacing. Not only do they deliver more information, they do so in a robust, integrated fashion that further enhances situational awareness and safety in all phases of flight, both in the air and on the ground.

Each of the three classes defined by the Advisory Circular allows for different functions; however, it should be noted that, with the exception of Subpart F—which applies to operators of large and turbine-powered, multi-engine

JEPPESEN ELECTRONIC CHART CLINIC SEVENTH IN A SERIES

BY JAMES E. TERPSTRA
SR. CORPORATE VICE PRESIDENT, JEPPESEN

airplanes—the Advisory Circular does not apply to FAR Part 91 operators.

The “lowest” of the three classes might be considered Class 1 since it covers electronic equipment that is completely portable. The next higher class, which allows more capability, is Class 2. It covers PEDs that are mounted to the aircraft in a docking station or cradle that has received a supplemental type certificate (STC). The highest class, with the most capability, is Class 3. It covers EFBs that are installed avionics systems that may have *all* EFB functions.

Class 1 Requirements

Class 1 consists of laptops, PDAs, or any electronic computing device that generally includes commercial-off-the-shelf (COTS) computer operating systems. They can be used for a number of “things”, including non-interactive performance calculations, the hosting of Flight Operations Manuals or Airplane Flight Manuals, flight logs, FARs, weight and balance calculations, etc. Class 1 EFB systems are not attached to an aircraft-mounting device and do not require an administrative control process (a logbook entry) for use in your aircraft.

You may replace many documents with a Class 1 device, but the device cannot be used for takeoff or landing and cannot be connected to a GPS. Also, it cannot be “hardwired” to your aircraft’s power, but it may be connected to recharge the battery.

In summary, the requirements for Class 1 EFB systems are:

- May be used on the ground and during flight as a source of *supplemental information*.
- Must be battery powered and must not be connected to your aircraft’s power during normal use.
- Batteries may be recharged onboard the aircraft when not in use.
- May not provide a data link connectivity to other aircraft systems during flight.
- May not use a GPS source.
- The EFB, including the charger, must be stowed for takeoff and landing.

The most common question is, “Do I still need paper?” The AC says the Class 1 EFB is for “supplemental use only” and goes on to say, “the operator must have paper onboard at all times.” These statements apply to FAR Part 91, Subpart F operators, and may not apply to other Part 91 operations.



For use under FAR Parts 121, 125, and 135, the principal operations inspector (POI) needs to evaluate and accept the data as presented. Additionally, for operators under FAR Part 121 and 135, training is required as appropriate.

Class 2 Requirements

Class 2 consists of PEDs that are connected to an aircraft mounting device during normal operation and require an administrative control process for use in the aircraft. A Class 2 EFB may use the aircraft’s power and have data link connectivity. The mounting devices for the EFB require aircraft evaluation group (AEG) evaluation and certification approval from the FAA certification branch.

One of the big advantages of Class 2 over Class 1 is that the EFB can read (but not send) data from the aircraft busses, that includes the GPS, as long as it can be proven that there is no interference. In Class 2, the mounting device for the EFB must be a structural cradle that can be proven crashworthy.

Class 2 devices can do everything that Class 1 devices can. Additionally they can also be used for reference materials and checklists using pre-composed information, approach charts, navigation charts, and performance calculations. One of the best features of Class 2 is the ability to have dynamic interactive electronic aeronautical charts (e.g., enroute, area, and airport surface maps) using a moving map display that includes centering and rotating the chart; although Class 2 does not allow the display of your own aircraft’s position on the chart. The FAA believes that placing your airplane on the display of a moving electronic chart would be so compelling that it would be very tempting to use it for primary navigation. In order to provide a system that includes navigation, a higher level of integrity for the software is required.

In summary, the requirements for Class 2 EFB systems are:

- When a POI is involved, the POI should document the EFB Class 2 compliance for performing its intended function. This is primarily related to COTS electronic equipment such as pen tablet computers.
- Mounting in a crashworthy cradle.
- EFB data link ports require FAA certification approval to ensure non-interference and isolation from aircraft systems.
- Operators must determine non-interference with existing flight systems for all phases of flight.
- Class 2 EFB systems are portable equipment and may be removed from the aircraft through an administrative control process (logbook entry).
- For a Class 2 paperless cockpit, each flight crew member must have an independent EFB system.
- A Class 2 "reduced paper" cockpit requires a single reliable EFB system and one complete paper set of all applicable data.
- Paper can be removed from the flight deck for a Class 2 system by FAA approval after proving the reliability of the system for a 6-month period and filing a report. For air carriers, the authorization must be granted via issuance of OpsSpec A025. For the six-month operational evaluation period, both the EFB and paper copies are required.
- The FAA Certification Branch evaluation and design approval for class 2 devices is limited to airworthiness approval of the cradle (crashworthiness), data link connectivity, and the EFB power connection.
- Reference material, checklists, performance calculations, and navigation charts, such as approach charts, need to be pre-composed. This means they cannot be generated "on the fly" from a database and cannot use software to compute aircraft performance. The pages of information have to be created on the ground and then loaded in the EFB in the airplane.

Class 3 Requirements

Class 3 EFB systems are considered installed equipment and require a Supplemental Type Certificate (STC) or certification design approval that includes, but is not limited to, conducting a functional hazard assessment and compliance with RTCA document DO-178B. DO-178B is the document used by the FAA to certify software in aircraft systems such as autopilots, FMSSs, and many other computer-based systems in modern aircraft.

The Class 3 EFB system certification requirements may enable additional functionality (e.g., GPS, or Automatic Dependent Surveillance-Broadcast



paper OR plastic?

IFR Chart Services

Jeppesen brings nearly 70 years of **experience** to IFR charting, more than anyone else in the world. Today, we are building on that experience by offering **more choices** in chart services than ever before. From the legendary **Airway Manual**® service trusted by pilots the world over, to **JeppView**® electronic chart services that deliver Jeppesen quality with ease, Jeppesen is sure to have the right IFR chart service for you.

All Jeppesen chart service types are available in many coverage areas to align with your flying needs. Whether you want a classic Airway Manual service that **goes wherever you go** or a state-of-the-art JeppView service, complete with software applications that make it easy to use **on the ground and in the air**, let us help you find the service that's right for you!



Cockpit display courtesy of Universal Avionics Systems, Inc.
Chart graphics technology copyright Marinvent Corporation.



For more information about our **IFR Chart Services**, visit us on the internet at www.jeppesen.com

or call us:

+1-800-621-5377
or 303-799-9090
(Western Hemisphere)

+49 6102 5070
(Eastern Hemisphere)

+61 3 9706 0022 (Australasia)



(ADS-B), that can provide moving maps suitable for situational awareness or navigation).

Class 3 systems are the most sophisticated of the three, because they are the systems which are installed in the aircraft panel and integrated with the other avionics in the airplane. Because of this level of sophistication and integration, the FAA will be involved in the certification of the system.

What about Currently Installed Systems?

There are EFB systems in the field which have obtained Operational Approval. They are still OK. *Since the Advisory Circular describes just one means of certification and is not new rulemaking, any currently operational systems are valid.*

After reading through the Advisory Circular, it becomes apparent that the FAA wants to facilitate the move to a

paperless cockpit. They are, however, reluctant to approve everything that comes to them just because it will relieve a lot of effort and provide many new safety features (situational awareness, as an example). The FAA wants to walk before they run to ensure the new systems provide all the reliability necessary to keep the aeronautical information in front of us at all times. This is obviously important when operating in IMC.

In the next article, we will continue by exploring electronic approach charts, SIDs (DPs), STARs, and the other terminal charts. ☒

Jim Terpstra is senior corporate vice president, flight information technology at Jeppesen. His ratings include ATP, single and multi-engine, airplane and instrument flight instructor. His 6,000+ hours include 3,200 instructing. For comments, please Email: jim.terpstra@jeppesen.com

