



# Electronic Flight Bag (EFB)

## EQUIPMENT SPECIFICATIONS

There is no specific technical standard or order specification for electronic flight bags. However, Advisory Circulars 91-78 and 120-76 provide an acceptable method of compliance for the certification, airworthiness and the operational approval of both portable and installed EFB aircraft computing devices.

## DISCUSSION

An electronic flight bag is an electronic display system intended primarily for flight-deck use and includes the hardware and software needed to support an intended function. EFB devices can display a variety of aviation data or perform basic calculations, such as performance data and fuel calculations. In the past, some of these functions were traditionally accomplished using paper references. The scope of the EFB system functionality may also include various other hosted databases and applications.

There are three elements to a typical EFB: the hardware, software and aircraft interface. Each is governed by separate criterion.

Electronic flight bag hardware is classified as Class 1, 2 or 3.

Class 1 EFB hardware are portable commercial off-the-shelf (COTS)-based computers, tablet computers or smartphones considered to be portable electronic devices with no Federal Aviation Administration design, production or installation approval for the device and its internal components.

Class 2 EFB hardware is similar to Class 1 EFB hardware with the addition that Class 2 EFBs are attached or secured to a permanently installed aircraft mount during use. Class 2 EFBs must be capable of being easily removed from or secured to their mounts by flightcrew personnel. Class 2 EFBs may connect to aircraft power, data ports or installed antennas, provided the connections are installed in accordance with applicable airworthiness regulations.

Class 3 EFB hardware is considered an aircraft component and is installed in accordance with applicable airworthiness regulations.

The FAA defines the EFB software as Type A, B or C.

Type A software applications are those applications intended for use on the ground

or during noncritical phases of flight. Type A applications do not include aeronautical information required for flight operations. Class A applications are typically non-interactive copies (PDF) of paper documents, such as the pilot operating handbook or weight and balance charts.

Type B software applications provide aeronautical information required to be accessible for each flight at the pilot station. Type B applications include interactive applications, such as weight and balance calculators and master flight planning/updates.

Type C software applications are approved by the FAA using RTCA/DO-178B compliance or other acceptable means. Type C applications for W&B and/or performance are those applications approved by the FAA for a specific aircraft and are approved as part of the airplane flight manual or AFM supplement. FAA-evaluated software applications will have an FAA-approved flight manual supplement.

Type A and B applications are approved by the owner/operator, while Type C software is approved by the FAA. Operators must determine non-interference with existing aircraft systems for all flight phases and ensure the system performs the intended function.

All portable electronic devices, including EFBs, should be properly secured during the takeoff and landing phases of flight by way of an aircraft mount or a knee-pad style device. It must be recognized that the potential for personal injury to the pilot and passengers is a paramount consideration.

Class 1 EFBs that have Type B applications for aeronautical charts, approach charts or electronic checklists must be secured and viewable during critical phases of flight and must not interfere with flight control movement. An EFB attached to the pilot's leg (kneeboard type) may still be considered a Class 1 EFB, because it is not attached to the aircraft.

Caution should be exercised in the use of tablet/smartphone-based applications for aviation purposes. There are hundreds of apps available for a variety of aviation functions. Most of these apps would be classified as Type A or Type B applications, while a few might contain functions that would rise to the level of Type C applications requiring explicit FAA approval. Very few apps have any level of FAA approval. In all cases, it is the owner/operator

who should assure the accuracy of the app before making a safety-of-flight decision based on the information contained or derived from the app.

## REGULATIONS

14 CFR Part 43 – Maintenance, Preventive Maintenance, Rebuilding and Alteration provides for the installation and maintenance of all installed elements (mounting, electrical and stowage) of Class 2 and 3 EFBs.

14 CFR Part 91, Section 91.21 provides that except as provided in paragraph (b) of section 91.21, no person may operate, nor may any operator or pilot in command of an aircraft allow the operation of any portable electronic device on any aircraft operated by a holder of an air-carrier operating certificate or an operating certificate; or any other aircraft while it is operated under IFR.

Paragraph (b) allows the use of any portable electronic device the operator of the aircraft has determined will not cause interference with the navigation or communication system of the aircraft on which it is to be used. In the case of an aircraft operated by an air carrier operating certificate or an operating certificate, the determination shall be made by each specific air carrier. In the case of other aircraft, the determination may be made by the pilot in command of the aircraft.

AC 91-78 provides aircraft owners, operators and pilots operating aircraft under Part 91 with information for removal of paper aeronautical charts and other documentation from the cockpit through the use of either portable or installed cockpit displays (electronic flight bags).

Small, single-engine aircraft operating under Part 91 do not require any specific authorization or aircraft certification design approval for EFB operations, provided the EFB does not replace any system or equipment required by the regulations.

AC 120-76 provides an acceptable means for operators conducting flight operations under 14 CFR Part 91, 121, 125, 129 or 135 to obtain both certification and approval for the operational use of EFBs. The guidance material also applies to operators of large and turbine-powered multi-engine aircraft operating under 14 CFR Part 91 where the operating regulations require specific functionality and/or equipage.

## REFERENCES:

- Federal Aviation Regulations Section 91-21.
- Federal Aviation Regulations Part 43 – Maintenance, Preventive Maintenance, Rebuilding and Alteration.
- Advisory Circular (AC) 91-21.1B: Use of Portable Electronic Devices Aboard Aircraft.
- Advisory Circular (AC) 91-78: Use of Class 1 or Class 2 Electronic Flight Bag.
- Advisory Circular (AC) 120-76: Guidelines for the Certification, Airworthiness and Operational Use of Electronic Flight Bags.
- RTCA/DO-178: Software Considerations in Airborne Systems and Equipment Certification.