

“Papers, I don’t need no stinking [approach/enroute charts] papers”. Or do I?

By John Morris

The navigation/information equipment available for general aviation just keeps getting more useful and powerful. The only limitations to use of this equipment are cost and physical location in the cockpit. So one of the solutions is a Multi-Function Display (MFD) and/or an Electronic Flight Bag (EFB). The PC12 has always had an MFD installed as standard equipment.

As the PC12 has evolved so have the available MFDs. Part of the evolution of the MFD is the availability to include electronic chart information. With this [electronic chart] inclusion the idea was/is to no longer have on-board those annoying paper approach plates and enroute charts. Why paperless? They take up valuable space, cost too much, access, and oh yes-those fun revisions!

So are we allowed to *not* have those stinking papers on-board?

The answer is YES, there is nothing in the FAR’s that require us, as Part 91, non- Subpart F--Large and Turbine-Powered Multiengine Airplanes and Fractional Ownership Program Aircraft, to carry *any* approach or enroute charts while operating an aircraft-apparently. And this is not including the advent of MFD’s.

I say apparently because, as other folks have written about this subject, it may be how the FAA, or we interpret the regulations. Example: Sec. 91.103, Preflight action appears to imply possible inclusion of paper, but not specifically.

With my (and yours too, I hope) natural paranoia towards the FAA and due to proper initial VFR/IFR training, we still want to have the approach and en-route charts available. So how do we eliminate the paper but still operate according to our own interpreted regulations. Answer: the MFD and the Electronic Flight Bag (EFB).

What's the difference between a MFD and an EFB? Generally it is that the EFB is portable and the MFD is permanently mounted into the cockpit instrument paneling. However EFB's can be semi-permanent mounted as well.

The following information is excerpted from Advisory Circular [AC 91-78]
Subject: Use of Class 1 or Class 2 Electronic Flight Bag (EFB), Issued 7/20/07-

(Abbreviated) provides aircraft owners, operators, and pilots operating aircraft under Title 14 of the Code of Federal Regulations (14 CFR) 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 (EFB)).

4. DEFINITIONS. The following definitions are specific to this AC and may differ with those definitions contained in other published references.

a. Electronic Flight Bag (EFB). An electronic display system intended primarily for cockpit or cabin use. EFB devices can display a variety of aviation data (e.g., checklists, navigation charts, pilot's operating handbook (POH)) or perform basic calculations (e.g., performance data, fuel calculations). The scope of the EFB system functionality may also include various other hosted databases and applications. Physical EFB displays may be portable (Class 1), attached to a mounting device (Class 2), or built into the aircraft (Class 3).

b. Electronic Chart Display (ECD). A display device that presents a comprehensive depiction of interactive information and/or precomposed information that is the functional equivalent of a paper aeronautical chart. An ECD may be a device installed in the instrument panel of an aircraft or a portable device. (ICAO, Annex 4, Chapter 20.) An ECD is not a multi-function display (MFD) that is permanently installed into an aircraft that is designed under a technical standard order (TSO). However an MFD may incorporate databases that depict checklists, navigation charts, POH, etc.

6. REMOVAL OF PAPER FROM THE COCKPIT FOR OPERATIONS UNDER PART 91.

a. EFBs/ECDs can be used during all phases of flight operations in lieu of paper reference material when the information displayed meets the following criteria:

(1) The components or systems onboard the aircraft, which display precomposed or interactive information, are the functional equivalent of the paper reference material.

(2) The interactive or precomposed information being used for navigation or performance planning is current, up-to-date, and valid.

NOTE: Supporting reference material such as legends, glossaries, abbreviations, and other information is available to the pilot but is not required in the cockpit during operation.

b. The in-flight use of an EFB/ECD in lieu of paper reference material is the decision of the aircraft operator and the pilot in command. Any Type A or Type B EFB application, as defined in AC 120-76A may be substituted for the paper equivalent. It requires no formal operational approval as long as the guidelines of this AC are followed.

c. It is suggested that a secondary or back up source of aeronautical information necessary for the flight be available to the pilot in the aircraft. The secondary or backup information may be either traditional paper-based material or displayed electronically.

It is clear from the abbreviated AC above that we can go paperless with an MFD (with the appropriate data available) on-board, right?

Before I answer that question I want to give another opinion about the whole idea surrounding this concept, as it at least applies to the PC12. I feel that unless the electronic data, with that data being approach plates, is within my primary instrument scanning view, then I still have to have the paper, either attached to the yoke or on my kneeboard. Over the years I have seen numerous MFD/EFB installations and carry-ons in the PC12. In almost all cases, with the exception of a yoke mounted EFB or the STC'd mount near the DV window, the data available is outside of what is considered, by Part 23 [23.1321], as in the primary field of view. That view includes the Basic "T" instruments and primary powerplant instruments. This view is meant to limit head movement during critical phases of flight in both the horizontal

and vertical axis. Generally, all of the MFD/EFB installations fall outside of that requirement.

Now, to answer the question regarding the Advisory Circular. It sounds good about using what is already available except that the AC also advises to have back up either by paper or an EFB, since we may already have an approved MFD that can have the electronic data available. Why a backup? Answer: redundancy. What if the unit (Display) fails? No info available but not required by Part 91. Are our MFD's dual electrically powered? No, not required by Part 91. Part 135 and Part 121 operators are required to have better redundancy, including in most cases a second pilot, to allow for the greater possibility of a paperless cockpit. I have read of a large fractional jet operator successfully going paperless, using the guidelines from the Advisory Circular. I have to believe that a large part of that success has to do with dual pilots and the location of EFB's.

As a backup an EFB is definitely less of a load, paper wise, if you want to have the entire US approach and enroute database available. The manufacturer of the MFD/EFB is required by TSO to maintain the databases to currency but it is up to the pilot to load the current database into the units. *Note: Pilatus Master Minimum Equipment List (MMEL) requires current Aeronautical Charts if navigation databases are out of currency. With the Internet we cannot use the excuse of availability for why our information is not current. An EFB, if a carry-on, is not that small or light. Compared to paper, it needs internal battery power or powered via the aircraft (carry-on cords or hard wired) and probably an antenna for GPS/Weather. Are you mounting it or is it on your knee?

Conclusion: Yes we can be paperless in the PC12 according to Part 91. But why should we treat ourselves as anything less than Part 135 or 121 with regards to this issue. Isn't the safety of yourself and your passengers as important as a paying passenger? In most cases the PC12 is flown as a single pilot operation. That immediately negates, to me, using the installed MFD as the source of information for conducting an IFR approach due to its location in the cockpit. Even the 'NG Multi-Mode Display (Flight Management Window) falls outside of the guidelines for primary field of view. The only way to safely go paperless is to have an approved data storage MFD *and* a removable EFB mounted to the yoke (position that will not interfere with your flight instrument visibility), or mounted near the DV Window, or securely on your knee. **It should be noted that I did not mention enroute charts very much. Personally, I definitely like having them loaded into the units since at times it is quite convenient to access an intersection or airway when ATC changes a route assignment. However, I

would recommend to continue to carry the paper High / Low Altitude enroute charts since you can see the “big” picture, the renewal dates are longer, and normally to see the airways and intersections on an MFD/EFB you have to scale down to a small cross-section due to display characters.

“A Safe Pilot is Always Learning”

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