

Spring 2023 FPAW R20 Challenges

From the FAR 121 Airline Management and Line Pilot Perspectives
Electronic Flight Bag (EFB) Approval and Use

Capt. David Strand (ret)

MITRE Corporation

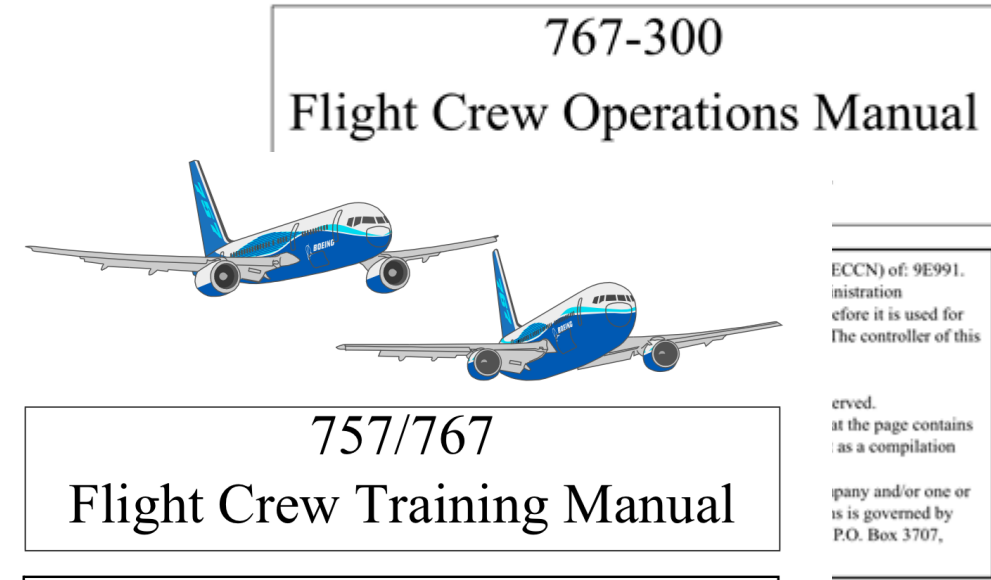
May 17, 2023

Kansas City, MO

NOAA Aviation Weather Center

Electronic Flight Bag (EFB)

- Traditional FAR 121 Pilot Kitbag
 - 40-50 pounds
 - Hundreds of pages in about a dozen manuals, not including flight procedure manuals
 - 3-4 pilots
 - To be carried by regulation:
 - Aircraft Operating Manuals (2 volumes)
 - Aircraft Emergency and Non-Normal Procedures Quick Reference Handbook
 - Aircraft Performance Manual
 - Aircraft Minimum Equipment List
 - Airline Flight Operations Manual
 - Configuration Deviation List Manual
 - Enroute Navigation Charts
 - Flight Approach and Departure Procedure Charts



767 Flight Crew Operations Manual

767
Quick Reference Handbook

Quick Action Index

Aborted Engine Start.....	7.1
Airspeed Unreliable.....	10.1
APU FIRE	8.1
CABIN ALTITUDE.....	2.1
Dual Engine Failure	
ENGINE FIRE...	
Engine Limit or	
Engine Severe	
Engine Tailpipe	
Evacuation	
Rapid Depre	
Smoke, Fire	



U.S. Department of Transportation
Federal Aviation Administration
Washington, DC

Master Minimum Equipment List (MMEL)

Revision: 2
Date: XX/XX/XXXX

Electronic Flight Bag (EFB)

- Advisory Circular (AC) 120-76
 - Issued July 2002
 - GUIDELINES FOR THE CERTIFICATION, AIRWORTHINESS, AND OPERATIONAL APPROVAL OF ELECTRONIC FLIGHT BAG COMPUTING DEVICES
 - Essentially permanently installed system or laptop
 - Portable Electronic Devices (PEDs)
 - Use Limitations during flight
 - Electromagnetic Interference (EMI Studies)
 - Data Connectivity Limitations
 - Durability
 - Weight
 - Cost



U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

Subject: GUIDELINES FOR THE
CERTIFICATION, AIRWORTHINESS,
AND OPERATIONAL APPROVAL OF
ELECTRONIC FLIGHT BAG
COMPUTING DEVICES

Date: 7/9/02
Initiated By: AFS-400

AC No: 120-76
Change:

1. PURPOSE. This joint Flight Standards Service (AFS) and Aircraft Certification Service (AIR) advisory circular (AC) provides an acceptable method of compliance for the certification, airworthiness, and the operational approval of both portable and installed Electronic Flight Bag (EFB) aircraft computing devices. This AC does not constitute a regulation but sets forth an acceptable means, but not the only means, for operators conducting flight operations under Title 14 of the Code of Federal Regulations (14 CFR) Part 91, 121, 125, 129, or 135, to obtain both certification and approval for the operational use of EFBs. This 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 equipment. Other Part 91 operations 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.

Electronic Flight Bag (EFB)

- Cost vs. Benefit in 2002

- 24 months

- **USA Today:**

- 8000 pilots = \$28M
- **9.6 pounds** plus spare battery (up to 2.5 hours of battery life)



2002

- **Notable computer:** Toshiba Satellite 1955
- **Price tag:** \$2,499
- **Inflation adjusted price:** \$3,495

With its Pentium 4 processing power and detachable keyboard, the Toshiba Satellite 1955 was one of many advanced notebooks that heralded the public adoption of laptop computing.

Electronic Flight Bag (EFB)

- What we needed:
 - More Durable
 - Lighter Weight
 - Less Expensive



Apple co-founder and CEO [Steve Jobs](#) said in a 1983 speech: "What we want to do is we want to put an incredibly great computer in a book that you can carry around with you and learn how to use in 20 minutes ... and we really want to do it with a radio link in it so you don't have to hook up to anything and you're in communication with all of these larger databases and other computers".^[8]

Electronic Flight Bag (EFB)

- Cost vs. Benefit in 2010

- 8000 pilots = \$4M
- **1.5 pounds** plus spare battery (up to 10 hours of battery life)
- 2 pilots: about 150 pounds weight savings per aircraft
ROM \$200K/year per aircraft.

Assumptions:
737NG –
8 hours/day
\$4/gallon
250 days/year

- **USA Today:**



2010

- **Notable computer:** iPad
- **Price tag:** \$499
- **Inflation adjusted price:** \$576

Tablet sales amounted to less than 2 million units in the year before the iPad's release. When the iPad was released in 2010, tablet sales shot up to 19.7 million. By 2016, tablet sales reached 207.1 million. The iPad combined the most popular features of the iPhone on a 9 inch screen, and gave a platform to thousands of new programs and applications.



Advisory Circular

Subject: Use of Class 1 or Class 2 Electronic Flight Bag (EFB)

Date: 07/20/07
Initiated by: AFS-800

AC No: 91-78

1. **PURPOSE.** This advisory circular (AC) 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)).

2. **APPLICABILITY.** This AC is applicable to instrument flight rules (IFR) or visual flight rules (VFR), preflight, flight, and post flight operations conducted under part 91, unless prohibited by a specific section of 14 CFR chapter I.

3. **TITLE 14 CFR REFERENCES AND RELATED READING MATERIALS (current editions).**

a. Part 91.

Electronic Flight Bag (EFB)



- FAR Part 91
- AC 91-78
- PED
- Pilots:

- I now have an iPad for my Piper Cherokee.

Why can't I use it on the B777?

What are the rules for GA pilots?

FAR Part 91 VFR & IFR

Advisory Circular 91-78

- Class 1 Electronic Flight Bag (EFB)
- Functional equivalent of paper reference
(apps like ForeFlight, Garmin & WingX)
- Backup Source recommended, not required
(Paper or a 2nd EFB)
- NO FAA APPROVAL REQUIRED



Electronic Flight Bag (EFB)

- FAR 121 (and 135) Program Approval Management Challenges
- AC 120-76D – Authorization for Use of EFBs
- AC 20-173 – Installation of EFB Components

Advisory Circular 120-76D

- Requires backup aviation data
- EFB must be secured for critical phases of flight
- Establish and document useful battery life
- Complete training program on the use of EFBs
- FAA APPROVAL REQUIRED (121, 135)



Subject: Authorization for Use of Electronic Flight Bags

Date: 10/27/17
Initiated by: AFS-400

AC No: 120-76D
Change:

- PURPOSE OF THIS ADVISORY CIRCULAR (AC).** This Flight Standards Service AC contains guidance on the operational use of Electronic Flight Bags (EFB). It is intended for all operators conducting flight operations under Title 14 of the Code of Federal Regulations (14 CFR) part 91 subpart K (part 91K), 121, 125, or 135 who want to replace required paper information or utilize other select applications as part of EFB functionality. This AC sets forth an acceptable means, but not the only means, to obtain Federal Aviation Administration (FAA) authorization for the operational use of EFBs utilizing both portable devices or installed equipment evaluated by the operator as their means to display operating information with an equivalent level of accessibility, usability, and reliability to the means they replace. This AC will assist operators in starting and managing the required elements of an EFB program as a means to support their authorization for use. In this AC, "installed equipment" indicates equipment or EFB components, which are installation approved under aircraft type design. For guidance on the installation of EFB components, refer to AC 20-173, Installation of Electronic Flight Bag Components.
 - EFB Program.** Operators seeking authorization under part 91K, 121, 125, or 135 will utilize the language within this AC to develop an EFB program. The program specifics (e.g., operating procedures, pertinent training modules, checklists, operations manuals, training manuals, maintenance programs, minimum equipment lists (MEL), other pertinent documents, and reporting procedures) are developed and incorporated into the FAA grants authorization.

Subject: Installation of Electronic Flight Bag Components

Date: 09/27/11
AC No: 20-173
Initiated by: AIR-130

- Purpose.**
 - This advisory circular (AC) provides guidance material on the installation of electronic flight bag (EFB) components including aircraft connectivity provisions. In it, the Federal Aviation Administration (FAA) describes certification considerations for individual EFB components and for installing EFB aircraft connectivity provisions by addressing the principal elements, or "components," which comprise a typical EFB device or system.
 - This AC describes an acceptable means, but not the only means, to comply with Title 14 of the Code of Federal Regulations (14 CFR) part 23, 25, 27, or 29. This AC is not mandatory and does not constitute a regulation. However, if you use the means described in this AC, you must follow it entirely. The term "must" is used to indicate mandatory requirements when following the guidance in this AC. The terms "should" and "recommend" are used when following the guidance is recommended but not required to comply with this AC.

Electronic Flight Bag (EFB)

- FAR 121 (and 135) Program Approval Management Challenges
- Operations Specification A061 - Use of Electronic Flight Bag
- FAA Order 8900.1 – Flight Standards Information Management System (FSIMS)
- Volume 4 Chapter 15 Section 1 – Evaluation and Authorization

6/6/22 8900.1 CHG 791

VOLUME 4 AIRCRAFT EQUIPMENT AND OPERATIONAL AUTHORIZATIONS

CHAPTER 15 ELECTRONIC FLIGHT BAG PROGRAM EVALUATION AND AUTHORIZATION

Section 1 Evaluation and Authorization

4-1641 REPORTING SYSTEMS. Use the Safety Assurance System (SAS) to record Electronic Flight Bag (EFB)-related oversight activities.

A. SAS Activity Recording (AR). For Title 14 of the Code of Federal Regulations (14 CFR) parts 91 subpart K (part 91K) and 125, use activity codes 1443, 3443, and 5443.

B. SAS. For 14 CFR parts 121 and 135 operations, the principal inspector (PI) or aviation safety inspector (ASI) will utilize this guidance related to SAS Elements 2.1.1 (OP) Training of Flight Crewmembers, 2.2.1 (OP) Airmen Duties/Flight Deck Procedures, 2.3.1 (OP) Appropriate Operational Equipment, 4.6.1 (AW) Avionic Systems/Programs, 5.1.1 (OP) Training of Flight Attendants, and 5.2.1 (OP) Crewmember Duties/Cabin Procedures. A Custom Data Collection Tool (C DCT) may be used to report the EFB oversight activities in SAS.

4-1642 PURPOSE. This section provides references, information, and guidance to be used to evaluate an operator's initial application for operations specification (OpSpec)/management specification (MSpec)/Letter of Authorization (LOA) A061 or to evaluate a significant modification to an existing EFB program.

4-1643 APPLICABILITY. This guidance applies to parts 91K, 121, 125, and 135 PIs in coordination with the appropriate cabin safety inspector (CSI) and dispatch safety inspector (DSI), if applicable.

4-1644 BACKGROUND.

A. EFB Program. An EFB is any device, or combination of devices, running EFB software applications. Operators seeking EFB program authorization may utilize the language within Advisory Circular (AC) 120-76, Authorization for Use of Electronic Flight Bags, to develop an EFB program. The program specifics (i.e., operating procedures, pertinent training modules, checklists, operations manuals, training manuals, maintenance programs, minimum

U.S. Department of Transportation Federal Aviation Administration					
Operations Specifications					
A061 . Use of Electronic Flight Bag				HQ Control: 03/14/2011	
				HQ Revision: 010	
<p>a. The certificate holder is authorized to conduct operations using an Electronic Flight Bag (EFB) in accordance with the limitations and provisions of this operations specification.</p> <p>b. <u>Class 1 Devices.</u> The certificate holder is authorized to use Class 1 EFB devices with the associated Type B software as listed in Table 1.</p> <p>c. <u>Class 2 Devices.</u> The certificate holder is authorized to use Class 2 EFB devices with the associated types of software as listed in Table 1. The aircraft must have the proper airworthiness approvals for any power, data connectivity, or mounting in the aircraft.</p> <p>d. <u>Class 3 Devices.</u> The certificate holder is authorized to use the Class 3 EFB devices with the Type C software revision number and, if applicable, the name of the associated Type A or B software as listed in Table 1.</p>					
Table 1 - Authorized Use of EFB and Applicable Software Revision					
Aircraft M/M/S	Hardware Class	Hardware Manufacturer, and Model	EFB Software Type	EFB Software Source, Version#	Restrictions and Limitations
A-319-112	Class 2	Cockpit EFB: Apple iPad Air II or 9.7 inch iPad Pro ; spare battery Brand/model, Hyperjuice MBP-060 series.	Type B	1. Apple IOS (v. 10.2.1 and updates) 2. Apple eBooks (v. 10.0.0 and updates) 3. MyMobile 365, PDF/XML document reader program (v. 2.8.3 and updates) 4. Mobile CCI (v. 2.21 and updates) 5. Jeppesen FD Pro (v. 3.0.0 and updates) 6. WSI PilotBrief Optima (v. 2.11.0 and updates) 7. U.S. DOT-D.G Emergency Response Guide Application ERG 2016 (v.2.0.3 and updates) 8. HOTS 2017-18 (v.1.5.0 and updates) 9. A320 Land Performance Application (v. 1.0.5	EFB software applications will be used following the restrictions and limitations outlined in Flight Manual Part I.

Electronic Flight Bag (EFB)

- FAR 121 (and 135) Program Approval Management Challenges
 - But Wait, there's more!
 - Volume 4 Chapter 15 Section 2 – EFB Program Checklist - **247 items**
 - iPad Test Program
 - Platform - iOS vs. Android or Windows
 - Aviation Consumer – June 2020
 - Aviation - 76% iOS; 16% Android, 8% both
 - Non-Aviation – 67% Android, 27% iOS, 6% Windows
 - Apps – pdf reader, Jeppesen FD Pro, De-icing Hold Over Time (HOT), Aircraft Performance, etc.

VOLUME 4 AIRCRAFT EQUIPMENT AND OPERATIONAL AUTHORIZATIONS

CHAPTER 15 ELECTRONIC FLIGHT BAG PROGRAM EVALUATION AND AUTHORIZATION

Section 2 Electronic Flight Bag (EFB) Program Checklist

4-1653 REPORTING SYSTEM(S). Use the Safety Assurance System (SAS) to record Electronic Flight Bag (EFB)-related oversight activities.

A. SAS Activity Recording (AR). For Title 14 of the Code of Federal Regulations (14 CFR) parts 91 subpart K (part 91K) and 125, use activity codes: 1443, 3443, and 5443.

B. SAS. For 14 CFR parts 121 and 135 operations, the principal inspector (PI) or aviation safety inspector (ASI) will utilize this guidance related to SAS Elements 2.1.1 (OP) Training of Flight Crewmembers, 2.2.1 (OP) Airmen Duties/Flight Deck Procedures, 2.3.1 (OP) Appropriate Operational Equipment, 4.6.1 (AW) Avionic Systems/Programs, 5.1.1 (OP) Training of Flight Attendants, and 5.2.1 (OP) Crewmember Duties/Cabin Procedures. A Custom Data Collection Tool (C DCT) may be used to report the EFB oversight activities in SAS.

4-1654 GENERAL. This section contains questions for use by PIs to review an operator's EFB program. In general, these questions are designed for initial EFB program implementation. When an operator proposes changes to their EFB program, these questions may also be referenced, when applicable.

Figure 4-80. Checklist 1—Electronic Flight Bag (EFB) Hardware & Software Evaluation

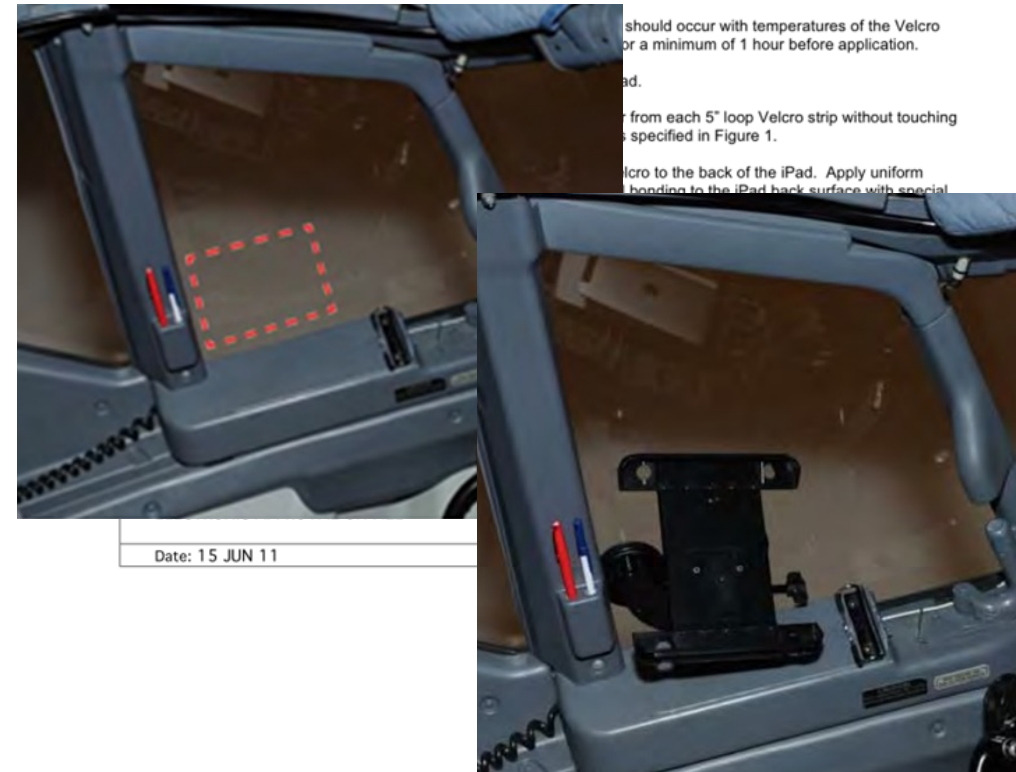
NOTE: Checklist 1 contains a list of questions for PIs to use during a tabletop evaluation of the EFB focusing on the EFB hardware and software applications. The checklist starts with EFB hardware questions, then presents general user interface questions, and ends with specific EFB software application questions (if applicable). The checklist is designed so any question answered as "No" requires a comment, and in some cases that comment may be "Not Applicable."

Electronic Flight Bag (EFB) Hardware

1. Are the display brightness and contrast adjustable?	<input type="checkbox"/> No	<input type="checkbox"/> Yes
2. Is the display brightness acceptable when it adjusts automatically?	<input type="checkbox"/> No	<input type="checkbox"/> Yes
3. Are there any display artifacts, such as jagged lines, impairing functionality?	<input type="checkbox"/> No	<input type="checkbox"/> Yes
4. Are controls labeled appropriately to describe their intended function?	<input type="checkbox"/> No	<input type="checkbox"/> Yes
5. Is the display readable under all flight deck illumination conditions?	<input type="checkbox"/> No	<input type="checkbox"/> Yes
6. Are touch-sensitive areas clearly indicated on the touch screen?	<input type="checkbox"/> No	<input type="checkbox"/> Yes
7. Can EFB inputs be made quickly and accurately in any operational environment (e.g., in turbulence)?	<input type="checkbox"/> No	<input type="checkbox"/> Yes

Electronic Flight Bag (EFB)

- FAR 121 (and 135) Program Approval Management Challenges
- And more!
- Mounts – FAR 25 Compliant
 - Maintenance Manuals
 - Engineering Change Order (ECO)
 - Velcro Refresh (B777)
- Back-up Manuals
 - Loaner iPads
 - Pilot paper QRH
 - On-aircraft “brick” for Jeppesen publications
- In-flight Connectivity – Driven by Cabin
 - GoGo Inflight Internet
 - Intelsat
 - INMARSAT
 - ViaSat



AA American Airlines American Airlines, Inc. Flight and Engineering Division	Install Guide 001	REV 5	
		Sheet 1 OF 4	
Title Class I Electronic Flight Bag (EFB) Device Velcro Installation		Orig. Issue Date 15 JUN 11	Last Rev. Date 15 JUN 12
Company American Airlines	Fleet 777	Serial No. NA	EFB Model iPad – All Models

1. GENERAL

Installation Overview

This Installation places two 2"x5" strips (20 sq. in.) of 3M SJ3518FR Black Velcro Pressure Sensitive Adhesive Back Loop Tape on the back side of the Flight Crewmember's Class I EFB tablet device. The Apple iPad will be utilized as a 777 Class I EFB used in all phases of flight. Three 2"x6" strips (forming a 36 sq. in. square) of 3M SJ3519FR Black Velcro Pressure Sensitive Adhesive Back Hook Tape are installed on both the LH and RH Forward Chart Holders in the 777.

The velcro is intended to allow the Class I EFB device to be secured and viewable on the LH and RH Forward Chart Holders for use during all phases of flight. The prescribed Velcro amount has been calculated to meet FAR 25.561 G loading requirements and cycle life considerations. It is also conforms to FAR 25.853 flammability requirements.

Approved Velcro for your iPad can be acquired at your Base Flight Office, or the Publications Department at the Flight Academy. Use only approved Velcro on your iPad. "Hardware store Velcro" is NOT approved.

2. INSTALLATION PROCEDURES

iPad Class I EFB Device

should occur with temperatures of the Velcro for a minimum of 1 hour before application.

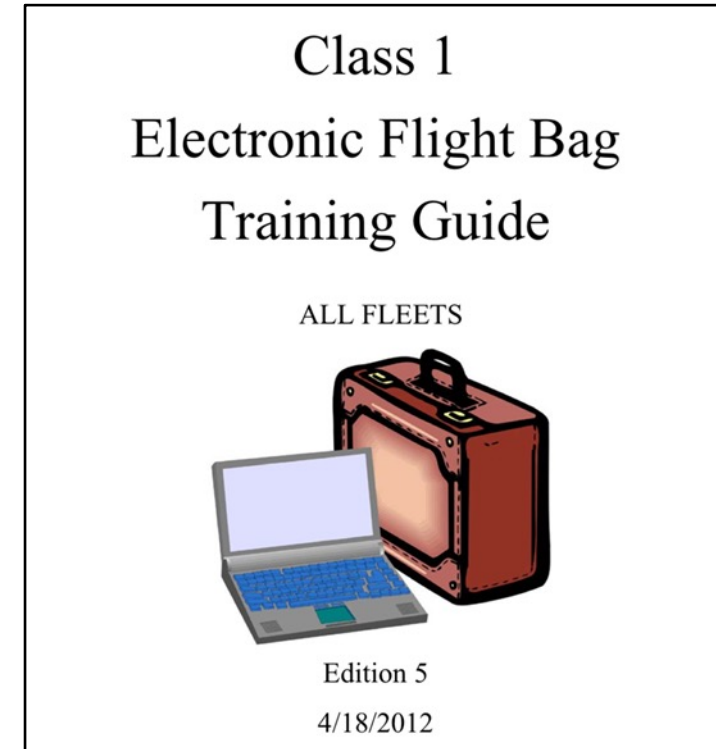
ad.
from each 5" loop Velcro strip without touching as specified in Figure 1.

icro to the back of the iPad. Apply uniform bonding to the iPad back surface with special

Date: 15 JUN 11

Electronic Flight Bag (EFB)

- FAR 121 (and 135) Program Approval Management Challenges
 - Pilot Training
 - Initial
 - New features – New Apps, Own-ship Position Authorization, etc.
 - Recurrent
 - Levels of Training = very different costs and timelines
 - Bulletin
 - Ops Manuals
 - Classroom
 - Desktop Trainer
 - Simulator
 - Hardware Refresh and software update management



carried in paper

er is not permitted to it necessary to conduct

Type A applications

restricted.

ircraft is stopped on the n FB or FC is on board, aircraft is moving.

d for use by anyone.

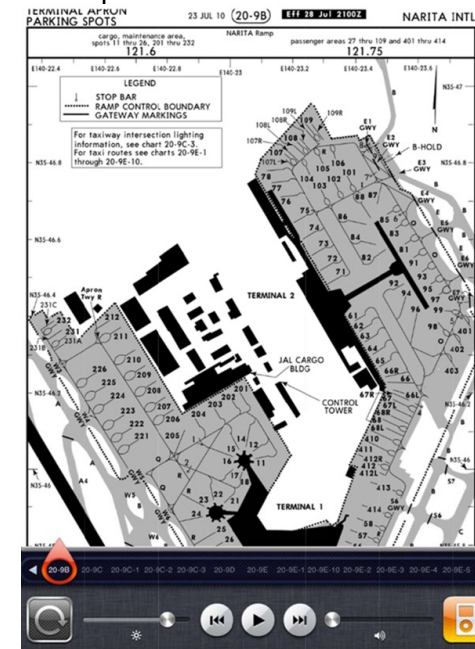
ns.

is required for the just as if the paper not in holding, Type A

appropriately trained Check program before being authorized ronic chart viewer during all aining module by signing the User

cription of an Apple iPad Class 1 p applications that are approved heory of operation and AA EFB dules for the JeppTC Pro and APilots.

understand the dependencies ation. FAA policy and regulations Modules. The pilot must be fully features prior to use on the flight



Training



the iPad operating system current nomenclature is noted as iOS, along with a trailing version number, e.g., iOS5.1.

The FAA requirement for operating system version control is strict:

- Do not jailbreak the iPad Operating System.
- Do not hack any features of the iPad Operating System.

Electronic Flight Bag (EFB)

- Be Careful What You Ask For!

HYPERJUICE

245W USB-C Battery Pack

Airline-safe and super portable, it's the world's first 27000mAh, 100 watt-hour, 245W USB-C battery pack.

\$ 249.99

spare battery
Brand/model, Hyperjuice
MBP-060 series.

Flight Gear Battery Backup

- 10,000 or 20,000 mAh capacity
- USB-A and USB-C charging ports
- Slim design for aviation



20,000 mAh
\$79.99



10,000 mAh
\$39.99

A061 . Use of Electronic Flight Bag

HQ Control: 03/14/2011

HQ Revision: 010

- a. The certificate holder is authorized to conduct operations using an Electronic Flight Bag (EFB) in accordance with the limitations and provisions of this operations specification.
- b. Class 1 Devices. The certificate holder is authorized to use Class 1 EFB devices with the associated Type B software as listed in Table 1.
- c. Class 2 Devices. The certificate holder is authorized to use Class 2 EFB devices with the associated types of software as listed in Table 1. The aircraft must have the proper airworthiness approvals for any power, data connectivity, or mounting in the aircraft.
- d. Class 3 Devices. The certificate holder is authorized to use the Class 3 EFB devices with the Type C software revision number and, if applicable, the name of the associated Type A or B software as listed in Table 1.

Table 1 - Authorized Use of EFB and Applicable Software Revision

Aircraft M/M/S	Hardware Class	Hardware Manufacturer, and Model	EFB Software Type	EFB Software Source, Version#	Restrictions and Limitations
A-319-112	Class 2	Cockpit EFB: Apple iPad Air II or 9.7 inch iPad Pro ; spare battery Brand/model, Hyperjuice MBP-060 series.	Type B	1. Apple IOS (v. 10.2.1 and updates) 2. Apple iBooks (v. 10.0.0 and updates) 3. MyMobile 365, PDF/XML document reader program (v. 2.8.3 and updates) 4. Mobile CCI (v. 2.21 and updates) 5. Jeppesen FD Pro (v. 3.0.0 and updates) 6. WSI PilotBrief Optima (v. 2.11.0 and updates) 7. U.S. DOT-D.G Emergency Response Guide Application ERG 2016 (v.2.0.3 and updates) 8. HOTS 2017-18 (v.1.5.0 and updates) 9. A320 Land Performance Application (v. 1.0.5)	EFB software applications will be used following the restrictions and limitations outlined in Flight Manual Part I.

Electronic Flight Bag (EFB)

- Line Pilot Challenges

- What can be done and when within FAR 121 environment
- Timeline and approvals required for new apps/features
- Lack of integration of some apps
 - E.G. – Weather without Navigation data vs. Navigation Apps without weather
- Education
- Managing pilot desires and expectations
 - FAR 91 vs FAR 121, 135, 91K ease of approvals
 - Maintaining situational awareness with electronic changes vs. manual paper revision process



Electronic Flight Bag (EFB)

- Summary
 - Program Cost/Benefit
 - Tablet made it possible
 - Software/App Management
 - Pilot Training
 - Type, Cost, Timeline Footprint
 - Refresh
 - Hardware, Mounts, Software Update Management
 - Ops Approval Management and Timeline
 - AC 120-76D, AC 20-173
 - Ops Specs A061
 - Managing pilot expectations/desires
 - FAR 91 vs FAR 121, 135, 91K approval process differences

Electronic Flight Bag (EFB)

- Backup References Slide

References

10/27/17	AC 120-76D Appendix C	10/27/17	AC 120-76D Appendix C	10/27/17	AC 120-76D Appendix C	10/27/17	AC 120-76D Appendix C
APPENDIX C. ADDITIONAL RESOURCES							
C.1 Related Reading Materials.							
C.1.1	Advisory Circulars (AC) (current editions). You can find ACs on the MyFAA employee website at https://my.faa.gov . Operators and the public may find this information at http://www.faa.gov/regulations_policies/advisory_circulars .						
	<ol style="list-style-type: none"> AC 00-45, Aviation Weather Services. AC 00-63, Use of Flight Deck Displays of Digital Weather and Aeronautical Information. AC 20-115, Airborne Software Assurance. AC 20-140, Guidelines for Design Approval of Aircraft Data Link Communication Systems Supporting Air Traffic Services (ATS). AC 20-164, Designing and Demonstrating Aircraft Tolerance to Portable Electronic Devices. AC 20-173, Installation of Electronic Flight Bag Components. AC 20-184, Guidance on Testing and Installation of Rechargeable Lithium Battery and Battery Systems on Aircraft. AC 21-40, Guide for Obtaining a Supplemental Type Certificate. AC 23-1309-1, System Safety Analysis and Assessment for Part 23 Airplanes. AC 23-1311-1, Installation of Electronic Display in Part 23 Airplanes. AC 25-11, Electronic Flight Displays. AC 25-16, Electrical Fault and Fire Prevention and Protection. AC 25-1523-1, Minimum Flightcrew. AC 25-1581-1, Airplane Flight Manual. AC 91-78, Use of Class 1 or Class 2 Electronic Flight Bag (EFB). AC 91-21-1, Use of Portable Electronic Devices Aboard Aircraft. AC 120-64, Operational Use and Modification of Electronic Checklists. AC 120-71, Standard Operating Procedures and Pilot Monitoring Duties for Flight Deck Crewmembers. AC 120-74, Parts 91, 121, 125, and 135 Flightcrew Procedures During Taxi Operations. AC 120-80, In-Flight Fires. 	<ol style="list-style-type: none"> Aerospace Recommended Practice (ARP4754), Guidelines for Development of Civil Aircraft and Systems. ARP4761, Guidelines and Methods for Conducting the Safety Assessment Process on Civil Airborne Systems and Equipment. ARP5289, Electronic Aeronautical Symbols. ARP5621, Electronic Display of Aeronautical Information (Charts). United Nations (UN) ST/SG/AC.10/11/Rev.5, Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria. UN ST/SG/AC.10/11/Rev.5/Amend.2, Amendments to the Fifth Revised Edition of the Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria. National Institute of Standards and Technology (NIST) Special Publication 800-30, Guide for Conducting Risk Assessments. 					
	C.1.2	FAA Orders, Policy Statements (PS), and Technical Standard Orders (TSO) (current editions). You can find orders, PSs, and TSOs on the MyFAA employee website at https://my.faa.gov . Inspectors can access orders and notices through the Flight Standards Information Management System (FSIMS) at http://fsims.avs.faa.gov . Operators and the	C.1.4	Additional Guidance.			
	<ol style="list-style-type: none"> FAA Order 8110.4, Type Certification. FAA Order 8150.1, Technical Standard Order Program. FAA Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS). FAA Order 8900.1. PS-ANM100-01-03A, Factors to Consider when Reviewing an Applicant's Proposed Human Factors Methods of Compliance for Flight Deck Certification. PS-ANM111-1999-99-2, Guidance for Reviewing Certification Plans to Address Human Factors for Certification of Transport Airplane Flight Decks. TSO-C113, Airborne Multipurpose Electronic Displays. TSO-C165, Electronic Map Display Equipment for Graphical Depiction of Aircraft Position (Own-Ship). 	<ol style="list-style-type: none"> DOT/FAA/TC-16/56, Human Factors Considerations in the Design and Evaluation of Flight Deck Displays and Controls, Version 2. Yeh, M.; Swider, C.; Donovan, C.; and Jo, Y.J., December 2016. The FAA and Industry Guide to Product Certification, Third Edition, May 2017. Available at https://www.faa.gov/aircraft/air_cert/design_approvals/media/CPI_guide_II.pdf. DOT/FAA/RD-93/5, Human Factors for Flight Deck Certification Personnel, July 1993. Available at https://ntl.bis.gov/lib/33000/33500/33543/33543.pdf. A Report from the Portable Electronic Devices Aviation Rulemaking Committee to the Federal Aviation Administration: Recommendations on Expanding the Use of Portable Electronic Devices During Flight, September 30, 2013. Available at http://www.faa.gov/about/initiatives/ped/media/ped_arc_final_report.pdf. International Civil Aviation Organization (ICAO) Doc 10020, Manual on Electronic Flight Bags (EFBs). ICAO Annex 6, Operation of Aircraft, Part I, International Commercial Air Transport—Aeroplanes. ICAO Annex 6, Operation of Aircraft, Part II, International General Aviation—Aeroplanes. ICAO Annex 6, Operation of Aircraft, Part III, International Operations—Helicopters. 	<ol style="list-style-type: none"> RTCA DO-257A, Minimum Operational Performance Standards for the Depiction of Navigational Information on Electronic Maps. RTCA DO-260, Minimum Operational Performance Standards for 1090 MHz Extended Squitter Automatic Dependent Surveillance-Broadcast (ADS-B) and Traffic Information Services-Broadcast (TIS-B). RTCA DO-264, Guidelines for Approval of the Provision and Use of Air Traffic Services Supported by Data Communications. RTCA DO-267, Minimum Aviation System Performance Standards (MASPS) for Flight Information Service-Broadcast (FIS-B) Data Link. RTCA DO-272, User Requirements for Aerodrome Mapping Information. RTCA DO-276, User Requirements for Terrain and Obstacle Data. RTCA DO-282, Minimum Operational Performance Standards for Universal Access Transceiver (UAT) Automatic Dependent Surveillance-Broadcast (ADS-B). RTCA DO-294, Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDS) on Aircraft. RTCA DO-307, Aircraft Design and Certification for Portable Electronic Device (PED) Tolerance. RTCA DO-311, Minimum Operational Performance Standards for Rechargeable Lithium Battery Systems. RTCA DO-363, Guidance for the Development of Portable Electronic Devices (PED) Tolerance for Civil Aircraft. ARINC 424, Navigation System Database. ARINC 653P(), Avionics Application Software Standard Interface. ARINC 653P1, Avionics Application Software Standard Interface Part 1 – Required Services. ARINC 653P2, Avionics Application Software Standard Interface Part 2 – Extended Services. ARINC 653P3, Avionics Application Software Standard Interface Part 3 – Conformity Test Specification for ARINC 653 Required Services. ARINC 660, CNS/ATM Avionics, Functional Allocation and Recommended Architectures. ARINC 661, Cockpit Display System Interfaces to User Systems. ARINC 828, Electronic Flight Bag (EFB) Standard Interface. ARINC 834, Aircraft Data Interface Function (ADIF). ARINC 840, Electronic Flight Bag (EFB) Application Control Interface (ACI) Standard. 	<p>public may find this information at http://www.faa.gov/regulations_policies/orders_notices.</p>			
	C.1.3	Industry Documents (current editions).					
	<ol style="list-style-type: none"> RTCA DO-160, Environmental Conditions and Test Procedures for Airborne Equipment. RTCA DO-178, Software Considerations in Airborne Systems and Equipment Certification. RTCA DO-199, Potential Interference to Aircraft Electronic Equipment from Devices Carried Aboard (Vol I and II). RTCA DO-200, Standards for Processing Aeronautical Data. RTCA DO-201, Standards for Aeronautical Information. RTCA DO-208, Minimum Operational Performance Standards for Airborne Supplemental Navigation Equipment Using Global Positioning System (GPS). RTCA DO-233, Portable Electronic Devices Carried Onboard Aircraft. RTCA DO-242, Minimum Aviation System Performance Standards for Automatic Dependent Surveillance Broadcast (ADS-B). RTCA DO-249, Development and Implementation Planning Guide for Automatic Dependent Surveillance Broadcast (ADS-B) Applications. RTCA DO-254, Design Assurance Guidance for Airborne Electronic Hardware. RTCA DO-255, Requirements Specification for Avionics Computer Resource (ACR). 						