Electronic Flight Bag (EFB) 2015 Industry Survey

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Volpe

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13. ABSTRACT (Maximum 200 words)
This document provides an overview of Electronic Flight Bag (EFB) hardware and software capabilities, including portable electronic devices (PEDs) used as EFBs, as of July 2015. This document updates and replaces the Volpe Center's previous EFB industry surveys. The information for this report was gathered through industry contacts, websites, and online product brochures. This report was conducted in support of the Federal Aviation Administration (FAA), but the information is intended to be of use to anyone interested in EFBs/PEDs. Nineteen manufacturers participated in this industry survey. Each provided a description of hardware components, supported software, functions and capabilities, as applicable. Participating Manufacturers were classified into three categories based on their products. Hardware manufacturers (without software) are those that provide an EFB/PED display platform and/or hardware components. Hardware/Software manufacturers (EFB software and hardware) are those manufacturers who develop physical hardware in addition to providing EFB software. Integrated and customizable software manufacturers (without hardware) are those who provide custom software that performs a specific function or integrates and/or manages EFB applications from other software providers. A list of 46 commercial off-the-shelf (COTS) software manufacturers offering COTS, standalone software is also provided in order to provide a snapshot of the types of standalone, COTS software applications currently available. These manufacturers provide specific applications that have not been integrated or customized. References include EFB regulatory and guidance material, Flight Standardization Board (FSB) reports, and other research reports.

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Electronic Flight Bag, EFB, industry review, flight deck technology, avionics, manufacturers, PED, Portable Electronic Device

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SI* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
		AREA		
in^2	square inches	645.2	square millimeters	mm^2
ft^2	square feet	0.093	square meters	m^2
yd^2	square yard	0.836	square meters	m^2
ac	acres	0.405	hectares	ha
mi^2	square miles	2.59	square kilometers	km^2
		VOLUME		
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
		NOTE: volumes greater than 1000 L shall be shown in m^3		
		MASS		
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
oz	ounces	28.35	grams	g
		TEMPERATURE (exact degrees)		
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C
		ILLUMINATION		
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	$candela/m^2$	cd/m^2
		FORCE and PRESSURE or STRESS		
lbf	poundforce	4.45	newtons	N
lbf/in^2	poundforce per square inch	6.89	kilopascals	kPa

APPROXIMATE CONVERSIONS FROM SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
		AREA		
mm^2	square millimeters	0.0016	square inches	in^2
m^2	square meters	10.764	square feet	ft^2
m^2	square meters	1.195	square yards	yd^2
ha	hectares	2.47	acres	ac
km^2	square kilometers	0.386	square miles	mi^2
		VOLUME		
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m^3	cubic meters	35.314	cubic feet	ft^3
m^3	cubic meters	1.307	cubic yards	yd^3
mL	milliliters	0.034	fluid ounces	fl oz
		MASS		
g	grams	0.035	ounces	oz
kg	kilograms	2.202	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
g	grams	0.035	ounces	oz
		TEMPERATURE (exact degrees)		
°C	Celsius	1.8C+32	Fahrenheit	°F
		ILLUMINATION		
lx	lux	0.0929	foot-candles	fc
cd/m^2	$candela/m^2$	0.2919	foot-Lamberts	fl
		FORCE and PRESSURE or STRESS		
N	newtons	0.225	poundforce	lbf
kPa	Kilopascals	0.145	poundforce per square inch	lbf/in^2

*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380. (Revised March 2003)

Acknowledgements

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Contents

List of Tables

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List of Acronyms

Acronym	Term
AC	Advisory Circular
ACARS	Aircraft Communications Addressing and Reporting System
ACAS	Airborne Collision and Avoidance System
ADS-B	Automatic Dependent Surveillance-Broadcast
AEG	Aircraft Evaluation Group
AID	Aircraft Interface Device
AMC	Acceptable Means of Compliance
AMLCD	Active-Matrix LCD
ASAS	Aircraft Surveillance Applications Systems
ATA	Air Transport Association
CCD	Cursor Control Device
CCP	Cursor Control Panel
CDTI	Cockpit Display of Traffic Information
CFR	Code of Federal Regulations
COTS	Commercial-off-the-shelf
EASA	European Aviation Safety Agency
EEMU	Enhanced Expansion Module Unit
EFB	Electronic Flight Bag
EFIS	Electronic Flight Information System
ERC	Ethernet Radio Controller
EVS	Enhanced Visual System
FAA	Federal Aviation Administration
FIMS	Flight Information Management System
FPDS	Flat Panel Display System
FMS	Flight Management System
FSB	Flight Standardization Board
GPS	Global Positioning System
ITP	In-Trail Procedure
LCD	Liquid Crystal Display
MEL	Minimum Equipment List
METAR	Meteorological Terminal Air Report
MFD	Multi-Function Display
MFRD	Multifunction Radar Display
MOPS	Minimum Operational Performance Standards
ND	Navigation Display
NOTAM	Notice To Airmen
PAL	Phase Alternating Line
PED	Portable Electronic Device
SATCOM	Satellite Communications
TAS	Traffic Alerting System
TAWS	Terrain Awareness and Warning System

Acronym	Term
TCAS	Traffic Alert and Collision Avoidance System
TFR	Temporary Flight Restriction
TIS-B	Traffic Information System – Broadcast
TSO	Technical Standard Order
US	United States

Executive Summary

This industry survey provides an overview of currently available Electronic Flight Bag (EFB) products, including portable electronic devices (PEDs) used as EFBs, as of July 2015. This report was conducted in support of the Federal Aviation Administration (FAA) but the information is intended to be of use to anyone interested in the EFB/PED market. Nineteen manufacturers participated in this industry survey. Each provided a description of hardware components, supported software, functions and capabilities, as applicable.

Participating manufacturers were classified into the following three categories based on their products:

- *Hardware manufacturers* (without software) are those that provide only an EFB/PED display platform and/or hardware components that integrate an off-the-shelf display device (e.g., tablet or laptop) into the flight deck for use as an EFB. Components may include aircraft interfaces and securing solutions. These manufacturers do not offer EFB software (4 manufacturers).
- *Hardware/software manufacturers* (EFB software and hardware) are those manufacturers who develop physical hardware for use as an EFB in addition to providing EFB software (10 manufacturers).
- *Integrated and customizable software manufacturers (without hardware)* are those who provide custom software that performs a specific function or integrates and/or manages EFB applications from other software providers (5 manufacturers).

Additionally, a summary of capabilities for 46 *Commercial off-the-shelf (COTS) software manufacturers* offering standalone COTS software is also provided in order to provide a snapshot of the types of standalone, COTS software applications currently available. These companies provide specific applications that have not been integrated or customized for a particular operator. Information about these products was collected via websites and online product brochures, as surveys were not distributed to manufacturers offering *only* COTS software applications. Note that some COTS manufacturers may overlap with hardware/software manufacturers and software integrators, as some manufacturers offer COTS software in addition to their other products. Surveys were provided to these manufacturers.

This industry survey is divided into several sections as follows:

- Section 1 provides a brief introduction to the industry survey, and lists FAA regulatory and guidance material related to EFBs/PEDs.
- Section 2 describes the method for the survey, and
- Section 3 provides an overview of products and capabilities offered by manufacturers. The remaining sections provide more detailed information about each manufacturer's products.
- Section 4 contains detailed information tables for manufacturers, and is organized into four subsections.
    - Section 4.1 provides detailed information tables for hardware manufacturers.
    - Section 4.2 provides detailed information tables for hardware/software manufacturers. Particular focus is given to the interface, including display characteristics, controls and compatible applications. FAA authorizations, received or in progress, are also included.

    - Section 4.3 provides a detailed picture of software manufacturers with integrated and customizable EFB software packages.
    - Section 4.4 provides a list of software manufacturers who provide COTS EFB software products, and a summary of capabilities.
- The References section lists FAA regulatory and guidance material, and industry documents included in the surveys.
- Appendix A provides a list of documentation related to EFB/PEDs in addition to those provided in the References section. These include additional FAA and international regulatory and guidance material, Flight Standardization Board (FSB) reports, operational evaluations, and human factors research publications.

1. Introduction

Both installed and portable Electronic Flight Bags (EFBs) may be authorized for use and utilized in a variety of aircraft operations to support many different functions, including but not limited to the following examples:

- Aircraft weight and balance, and flight performance calculations
- Checklists
- Aeronautical charts
- Documents and manuals

A wide variety of hardware is available that may be used as an EFB, ranging from displays installed in an aircraft, to commercial off-the-shelf (COTS) portable electronic devices (PEDs), such as tablets and laptops.

The Volpe Center provides support for the Federal Aviation Administration (FAA) in understanding the human factors issues in the design and evaluation of EFBs. As part of this support, the Volpe Center informs the FAA of industry trends through periodic industry surveys. This EFB/PED industry survey provides an overview of current EFB/PED hardware and software, capturing the state of the EFB/PED industry as of July 2015. This document is an update to *Electronic Flight Bag (EFB): Industry Survey 2010* (Gabree, Yeh & Jo, 2010). This report is provided in support of the FAA, but the information in this report is intended to be of use to anyone interested in the EFB/PED market, including other aviation or transportation authorities, customers, manufacturers, and researchers.

The FAA provides the following guidance materials related to installed and portable EFBs:

- Advisory Circular (AC) 120-76C, *Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags;*
- Order 8900.1, *Flight Standards Information Management System*, Volume 4, Chapter 15, Section 1, *Electronic Flight Bag Operational Authorization Process* (at http://fsims.faa.gov/);
- Advisory Circular (AC) 20-173, *Installation of Electronic Flight Bag Components;*
- Advisory Circular (AC) 91-78, *Use of Class 2 or Class 2 Electronic Flight Bag (EFB);*
- Policy Statement PS-ACE-23-01-R1, *Installation of Mounting Devices and Wiring Integration for Attachment of Portable Displays and Electronic Devices in Normal, Utility, and Acrobatic Category Airplane;*
- *Electromagnetic Compatibility Assessment Checklist – 08-22-2013* (at http://fsims.faa.gov/); and
- *Surface Ownship – Operator Checklist – FAA Job Aid – 02-14-2014* (at http://fsims.faa.gov/).

Additional FAA and industry guidance for depicting ownship on an airport moving map is provided in the following documents:

- Technical Standard Order (TSO)-C165a, *Electronic Map Display Equipment for Graphical Depiction of Aircraft Position;* and

- RTCA DO-257A, *Minimum Operational Performance Standards for the Depiction of Navigational Information on Electronic Maps.*

The FAA also provides guidance materials for flight deck displays and airborne equipment, which may be applicable to installed equipment that provides EFB functions in the following documents:

- Advisory Circular (AC) 23.1311-1C, *Installation of Electronic Display in Part 23 Airplanes*;
- Advisory Circular (AC) 25-11B, *Electronic Flight Displays;* and
- Technical Standard Order (TSO)-C113a, *Airborne Multipurpose Electronic Displays*.

FAA guidance regarding general PEDs is provided in the following documents:

- Advisory Circular (AC) 91-21.1C, *Use of Portable Electronic Devices Aboard Aircraft*;
- Information for Operators (InFO) 13010, *Expanding Use of Passenger Portable Electronic Devices (PED);* and
- Information for Operators (InFO) 13010 Supplement (SUP), *FAA Aid to Operators for the Expanded Use of Passenger PEDS*.

Industry documents regarding general PEDs, displays, and airborne equipment are provided in the following documents:

- RTCA DO-160G, *Environmental Conditions and Test Procedures for Airborne Equipment*;
- RTCA DO-178C, *Software Considerations in Airborne Systems and Equipment Certification*;
- RTCA DO-200B, *Standards for Processing Aeronautical Data;*
- RTCA DO-254, *Design Assurance Guidance for Airborne Electronic Hardware;*
- RTCA DO-294C, *Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDS) on Aircraft;* and
- SAE AS 8034B, *Minimum Performance Standard for Airborne Multipurpose Electronic Displays*.

Additional resources for EFB/PED materials include:

- FAA regulatory and guidance material is available on the FAA website at: www.faa.gov/regulations_policies/.
- If a Flight Standards Board (FSB) report is completed for a particular EFB/PED model, it can be found at: http://fsims.faa.gov/PICResults.aspx?mode=Publication&doctype=FSB%20Reports. FSB reports provide information about the operational suitability for particular EFB/PED models, as determined by the FAA Aircraft Evaluation Group (AEG).
- The Volpe Center website has a subsection dedicated to EFB-related documentation, which can be found at: www.volpe.dot.gov/coi/hfrsa/work/aviation/efb/index.html. The site contains research reports by the Volpe Center, including an earlier version of the current industry survey published in 2010, a list of current regulatory and guidance material, and news articles relating to EFBs and PEDs used as an EFB.

This remainder of this document is organized into several sections as follows:

- Section 2 describes the method for the survey.
- Section 3 provides an overview of products and capabilities offered by manufacturers.
- Section 4 contains detailed information tables for manufacturers, and is organized into four subsections.
    - Section 4.1 provides detailed information tables for hardware manufacturers.
    - Section 4.2 provides detailed information tables for hardware/software manufacturers. Particular focus is given to the interface, including display characteristics, controls and compatible applications. FAA authorizations, received or in progress, are also included.
    - Section 4.3 provides a detailed picture of software manufacturers with integrated and customizable EFB software packages.
    - Section 4.4 presents a snapshot of software manufacturers who provide COTS EFB software products currently available. A summary of product capabilities is also provided. Note that the information for COTS manufacturers was gathered via websites and online product brochures, as surveys were generally not distributed to COTS manufacturers.
- The References section lists FAA regulatory and guidance material, and industry documents included in the surveys.
- Appendix A provides a list of documentation related to EFB/PEDs in addition to those provided in the References section. These include additional FAA and international regulatory and guidance material, Flight Standardization Board (FSB) reports, operational evaluations, and human factors research publications.

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2. Technical Approach

2.1 Participants

Nineteen manufacturers participated in this industry survey. Although all efforts were made to be as comprehensive as possible, some manufacturers declined to participate or did not respond to the invitation. Participating manufacturers were classified into the following categories based on their products:

- *Hardware manufacturers* (without software) are those that provide an EFB/PED display platform and/or hardware components that integrate an off-the-shelf display device (e.g., tablet or laptop) into the flight deck for use as an EFB. Components may include aircraft interfaces and securing solutions. These manufacturers do not offer EFB software (4 manufacturers).
- *Hardware/software manufacturers* (EFB hardware and software) are those manufacturers who develop physical hardware for use as an EFB in addition to providing EFB software (10 manufacturers).
- *Integrated and customizable software manufacturers (without hardware)* are those who provide custom software that performs a specific function or integrates and/or manages EFB applications from other software providers (5 manufacturers).

Participating manufacturers are organized into three tables presented in this section. Company name, products, and website are listed for each manufacturer. Table 1 lists participating hardware manufacturers.

Table 1. Hardware Manufacturers

Hardware Manufacturer	Product	Website
Apple, Inc.	iPad Air 2 Wi-Fi, iPad Air 2 Wi-Fi + Cellular, iPad Mini 3 Wi-Fi, iPad mini 3 Wi-Fi + Cellular	www.apple.com
Microsoft	Surface 2, Surface Pro 3, Surface 3	www.microsoft.com
SAT-WAY	Installation and integration kits for portable EFBs	www.sat-way.com
Scandinavian Avionics	Data Integration Center DIC-600, Ethernet Radio Controller ERC-400 and ERC-400AP (Wireless EFB Access point), Control Panel, Tablet Cradles, Mounting provisions, Customized PED cables	http://www.scanav.com

Table 2 lists participating hardware/software manufacturers.

Table 2. Hardware/Software Manufacturers

Hardware/Software Manufacturer	Product	Website
Astronautics	Single and Dual Processor Electronic Flight Display systems, Class 3 NEXIS™ Flight Intelligence System	www.astronautics.com
AvMap	EKP V, EKP IV, EKP IV Pro	www.avmap.us/index.php
The Boeing Company	Class 3 EFB, EFB Documents Browser, Electronic Flight Folder, Electronic Logbook, Onboard Performance Tool, Interactive Quick Reference Handbook	www.boeing.com
CMC Electronics, Inc.	PilotView CMA-1100 Mk3, PilotView CMA-1108, PilotView CMA-1410, PilotView CMA-1612	www.esterline.com
DAC International	GEN-X EFB	www.dacint.com
FlightPrep, Inc.	ChartBook-3-EFB, Helm X650 Docking Electronic Flight Bag System and ChartCase applications	www.flightprep.com
Innovative Solutions and Support	Cockpit/IP® Flat Panel Display system (FPDS)	www.inovative-ss.com
navAero Ab	navAero iPad/Tablet/Slate Portable EFB Mounting Systems, t•Bag™ C2² EFB Computer System, t•Pad™ 1100, 1200, 1500 and 2000, and Universal Aircraft Interface Device (UAID), navAero t•Server™ Aircraft Server, navAero t•Com™ Communications Module, navAero t•Cam™ Aircraft Cockpit Door Surveillance System	www.navaero.com
Universal Avionics	EFI-1040, EFI-890R	www.uasc.com
UTC Aerospace Systems	G500 and G700 SmartDisplay® Electronic Flight Bag, Tablet Interface Module (TIM™), Aircraft Interface Device (AID)	utcaerospacesystems.com

Table 3 lists participating software manufacturers with integrated and customizable EFB software.

Table 3. Integrated and Customizable Software Manufacturers

Integrated and Customizable Software Manufacturer	Product	Website
Flightman™	eJourney Log, Electronic Flight Folder, eTechlog, Weight & Balance and Performance Calculations, Large Content Manager, Forms Designer, Passenger Relationship Management, Business Intelligence Tool, Ground Administrative Manager	www.flightman.com
Jeppesen	Jeppesen Applications for Boeing and Airbus EFBs, Jeppesen FliteDeck Pro, Jeppesen Mobile FliteDeck, Jeppesen Mobile FliteDeck VFR, JeppView FliteDeck, JeppView MFD	www.jeppesen.com
Lufthansa Systems	Lido mPilot, Lido eRouteManual, Lido Airport Moving Map, Lido Performance Tools (TakeOff, In Flight and Landing)	www.lhsystems.com
On-Board Data Systems (OBDS)	Aviation Docs™ and Electronic Checklist Update Service	www.obds.com
Skypaq	eLog	www.skypaq.com

2.2 Methods

To gather information for this industry survey, the Volpe Center worked with a representative from each of the participating manufacturers. The information collected was intended to highlight human factors and usability aspects of the interface (e.g., the information depicted and the user interface) rather than the technical aspects of implementation. Each participant was asked for the following information regarding their product(s):

- Product name
- Website(s) where more information can be found
- FAA authorizations/compliance received or in progress
- A brief overview of the product and images
- Characteristics of the hardware (i.e. size, battery information, securing solutions and controls)
- Operating System and aircraft connectivity
- EFB applications supported

A table containing this information for each participant was initially drafted by the Volpe Center based on previous information obtained from industry contacts, demonstrations, websites, and brochures. The draft table was sent to a representative at each participating company or research organization to

review and edit, as needed. This document reflects the results of this collaborative effort. Note that information about COTS software manufacturers was collected via company websites and online product brochures.

3. Industry Overview

Table 4 summarizes authorizations and compliance for each participating EFB manufacturer[1]. A filled circle (•) indicates that the manufacturer currently has authorization for use. An open circle (o) indicates that the manufacturer is in the process of obtaining authorization. The 12 documents listed below are included in Table 4:

FAA regulatory and guidance material:

- TSO-C113a, *Airborne Multipurpose Electronic Displays*
- TSO-C165a, *Electronic Map Display Equipment for Graphical Depiction of Aircraft Position (Own-Ship)*
- AC 20-173, *Installation of Electronic Flight Bag Components*
- AC 25-11B, *Electronic Flight Deck Displays*
- AC 120-76C, *Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags*
- Order 8900.1, *Electronic Flight Bag Authorization for Use*

Industry documents:

- RTCA DO-160G, *Environmental Conditions and Test Procedures for Airborne Equipment*
- RTCA DO-178C, *Software Considerations in Airborne Systems and Equipment Certification*
- RTCA DO-200B, *Standards for Processing Aeronautical Data*
- RTCA DO-254, *Design Assurance Guidance for Airborne Electronic Hardware*
- RTCA DO-257A, *MOPS for the Depiction of Navigation Information on Electronic Maps*
- RTCA DO-294C, *Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDS) on Aircraft*

[1] Apple, Inc., and Microsoft are not included in Table 4, as authorizations for the use of COTS PEDs as an EFB are obtained by operators rather than the manufacturer.

Table 4. Summary of Authorization/Compliance for Manufacturers

Manufacturer Products	EFB Type		Certificate			Authority			Technical Standard Orders (TSOs)			Advisory Circulars (ACs)				FAA Order	Industry Documents						
	Installed	Portable	TC	STC	Aircraft	FAA	EASA	Other	C113a	C165a	Other	20-173	25-11B	120-76C	Other	Order 8900.1	DO-160	DO-178	DO-200	DO-254	DO-257	DO-294	Other
Hardware Manufacturers																							
SAT-WAY Installation and integration kits for portable EFBs		•		•	Various Aircraft	•	•	Transport Canada				•	•	•			•				•	•	
Scandinavian Avionics Data Integration Center DIC-600, Ethernet Radio Controller ERC-400 and ERC-400AP (Wireless EFB Access point), Control Panel, Tablet Cradles, Mounting provisions, Customized PED cables	•	•		•	B737, A320, Dash-8Q2/400, A319-21, Bae ATP	•	•					•		•		•	•						
Hardware/Software Manufacturers																							
Astronautics Single and Dual Processor Electronic Flight Display systems, Class 3 NEXIS™ Flight Intelligence System	•		•	•	TC – 787, 777, 747, 737 STC – A319, 320, 321	•	•			•				•		•	•	•		•	•		
AvMap EKP V, EKP IV, EKP IV Pro		•																					

Table 4. Summary of Authorization/Compliance for Manufacturers (continued)

Manufacturer Products	EFB Type		Certificate			Authority			Technical Standard Orders (TSOs)			Advisory Circulars (ACs)				FAA Order	Industry Documents						
	Installed	Portable	TC	STC	Aircraft	FAA	EASA	Other	C113a	C165a	Other	20-173	25-11B	120-76C	Other	Order 8900.1	DO-160	DO-178	DO-200	DO-254	DO-257	DO-294	Other
Hardware/Software Manufacturers																							
The Boeing Company Class 3 EFB, EFB Documents Browser, Electronic Flight Folder, Electronic Logbook, Onboard Performance Tool, Interactive Quick Reference Handbook	•		•	•	Various Aircraft	•	•	Various international authorities						•				•					
CMC Electronics, Inc. PilotView CMA-1100 Mk3, PilotView CMA-1108, PilotView CMA-1410, PilotView CMA-1612	•	•	•	•	Various Aircraft	•	•			•				•		•	•			•			
DAC International GEN-X EFB	•	•		•	Various Aircraft	•								•			•	•					

Table 4. Summary of Authorization/Compliance for Manufacturers (continued)

Manufacturer Products	EFB Type		Certificate			Authority			Technical Standard Orders (TSOs)			Advisory Circulars (ACs)				FAA Order	Industry Documents						
	Installed	Portable	TC	STC	Aircraft	FAA	EASA	Other	C113a	C165a	Other	20-173	25-11B	120-76C	Other	Order 8900.1	DO-160	DO-178	DO-200	DO-254	DO-257	DO-294	Other
Hardware/Software Manufacturers																							
FlightPrep, Inc. ChartBook-3-EFB, Helm X650 Docking Electronic Flight Bag System and ChartCase applications		•				•								•	91-78	•		•					
Innovative Solutions and Support Cockpit/IP® Flat Panel Display system (FPDS)	•			•	PC-12, Citation, Eclipse 500/550	•			•	•				•			•	•		•			
navAero Ab navAero iPad/Tablet/Slate Portable EFB Mounting Systems, t•Bag™ C2[2] EFB Computer System, t•Pad™ 1100, 1200, 1500 and 2000, and UAID, navAero t•Server™, navAero t•Com™, navAero t•Cam™		•		•	Various Aircraft	•	•	ANAC, TCCA, DGCA, DCAA, GACA, DGCM						•			•							

Table 4. Summary of Authorization/Compliance for Manufacturers (continued)

Manufacturer Products	EFB Type		Certificate			Authority			Technical Standard Orders (TSOs)			Advisory Circulars (ACs)				FAA Order	Industry Documents						
	Installed	Portable	TC	STC	Aircraft	FAA	EASA	Other	C113a	C165a	Other	20-173	25-11B	120-76C	Other	Order 8900.1	DO-160	DO-178	DO-200	DO-254	DO-257	DO-294	Other
Hardware/Software Manufacturers																							
Universal Avionics EFI-1040, EFI-890R	•			•	Various Aircraft	•	EFI-890R only		•	•							•	•					
UTC Aerospace Systems G500 and G700 SmartDisplay® Electronic Flight Bag, Tablet Interface Module (TIM™), Aircraft Interface Device (AID)	•	•		•	Vairous Boeing and Airbus aircraft	•	•	CAAC				•		•		•	•	•		•			
Integrated and Customizable Software Manufacturers																							
Flightman™ eJourney Log, Electronic Flight Folder, eTechlog, Weight & Balance and Performance Calculations, Large Content Manager, Forms Designer, Passenger Relationship Management, Business Intelligence Tool, Ground Administrative Manager	•	•				•	•							•				•					

Table 4. Summary of Authorization/Compliance for Manufacturers (continued)

Manufacturer Products	EFB Type		Certificate			Authority			Technical Standard Orders (TSOs)			Advisory Circulars (ACs)				FAA Order	Industry Documents						
	Installed	Portable	TC	STC	Aircraft	FAA	EASA	Other	C113a	C165a	Other	20-173	25-11B	120-76C	Other	Order 8900.1	DO-160	DO-178	DO-200	DO-254	DO-257	DO-294	Other
Integrated and Customizable Software Manufacturers																							
Jeppesen Jeppesen Applications for Boeing and Airbus EFBs	•					•	•							•		•			•		•		DO-272
FliteDeck Pro, Mobile FlitetDeck, Mobile FliteDeck VFR, JeppView FliteDeck, JeppView MFD		•				•	•							•		•			•		•		DO-272
Lufthansa Systems Lido mPilot, Lido eRouteManual, Lido Airport Moving Map, Lido Performance Tools	•	•				•	•	Various countries		•			•	•	20-159			•	•		•		DO-272
OBDS Aviation Docs™ and Electronic Checklist Update Service	•													•	120-64				•				
Skypaq eLog							•																

Table 5 summarizes hardware characteristics of hardware and hardware/software manufacturers, including securing solutions, aircraft connectivity, power source, and battery type. Note that this table excludes manufacturers that only offer software.

Table 5. Summary of EFB/PED Hardware Characteristics

Manufacturer Products	EFB Type		Securing Solution		Aircraft Connectivity				Power Source				Battery Type					
	Installed	Portable	Permanently Attached	Not Permanently Attached	Transmit and Receive	Receive Only	Transmit Only	Other	Aircraft Power (no battery)	Internal Battery only (self-powered)	Aircraft power and internal battery	Other	Lithium ion secondary	Lithium polymer secondary	Lithium metal primary	Nickel metal hydride secondary	Nickel-cadmium secondary	Other
Hardware Manufacturers																		
Apple Inc. iPad Air 2 Wi-Fi, iPad Air 2 Wi-Fi + Cellular, iPad Mini 3 Wi-Fi, iPad mini 3 Wi-Fi + Cellular		•								•		Various power adapters	•					
Microsoft Surface 2, Surface Pro 3, Surface 3		•								•	•		•					
SAT-WAY Installation and integration kits for portable EFBs		•	•		•	•		To ground in-flight		•	•			•	•			
Scandinavian Avionics Data Integration Center DIC-600, Ethernet Radio Controller ERC-400 and ERC-400AP , Control Panel, Tablet Cradles, Mounting provisions, Customized PED cables	•	•	•	•	•	•					•		•					

Table 5. Summary of EFB/PED Hardware Characteristics (continued)

Manufacturer Products	EFB Type		Securing Solution		Aircraft Connectivity				Power Source				Battery Type					
	Installed	Portable	Permanently Attached	Not Permanently Attached	Transmit and Receive	Receive Only	Transmit Only	Other	Aircraft Power (no battery)	Internal Battery only (self-powered)	Aircraft power and internal battery	Other	Lithium ion secondary	Lithium polymer secondary	Lithium metal primary	Nickel metal hydride secondary	Nickel-cadmium secondary	Other
Hardware/Software Manufacturers																		
Astronautics Single and Dual Processor Electronic Flight Display systems, NEXIS™ Flight-Intelligence System	•		•						•									
AvMap EKP V		•		•	•				•	•	•		•					
EKP IV		•		•	•				•							•		
EKP IV Pro		•		•	•				•							•		
The Boeing Company Class 3 EFB, EFB Documents Browser, Electronic Flight Folder, Electronic Logbook, Onboard Performance Tool, Interactive Quick Reference Handbook	•		•		•	•	•	ONS services to the aircraft for data and offboard communication	•									
CMC Electronics, Inc. PilotView CMA-1100 Mk3, PilotView CMA-1108, PilotView CMA-1410, PilotView CMA-1612	•	•		•	•	•	•				•		•					

Table 5. Summary of EFB/PED Hardware Characteristics (continued)

Manufacturer Products	EFB Type		Securing Solution		Aircraft Connectivity				Power Source				Battery Type					
	Installed	Portable	Permanently Attached	Not Permanently Attached	Transmit and Receive	Receive Only	Transmit Only	Other	Aircraft Power (no battery)	Internal Battery only (self-powered)	Aircraft power and internal battery	Other	Lithium ion secondary	Lithium polymer secondary	Lithium metal primary	Nickel metal hydride secondary	Nickel-cadmium secondary	Other
Hardware/Software Manufacturers																		
DAC International GEN-X EFB	•	•	•	•	•	•					•					•		
FlightPrep, Inc. ChartBook-3-EFB		•		•							•			•				
Helm X650 Docking Electronic Flight Bag System		•		•					•									
Innovative Solutions and Support Cockpit/IP® Flat Panel Display system (FPDS)	•					•			•									
navAero Ab navAero iPad/Tablet/Slate Portable EFB Mounting Systems, t•Bag™ C2[2] EFB Computer System, t•Pad™ 1100, 1200, 1500 and 2000, and UAID, navAero t•Server™, navAero t•Com™, navAero t•Cam™		•		•	•	•	•				•		•			•		

Table 5. Summary of EFB/PED Hardware Characteristics (continued)

Manufacturer Products	EFB Type		Securing Solution		Aircraft Connectivity				Power Source				Battery Type					
	Installed	Portable	Permanently Attached	Not Permanently Attached	Transmit and Receive	Receive Only	Transmit Only	Other	Aircraft Power (no battery)	Internal Battery only (self-powered)	Aircraft power and internal battery	Other	Lithium ion secondary	Lithium polymer secondary	Lithium metal primary	Nickel metal hydride secondary	Nickel-cadmium secondary	Other
Hardware/Software Manufacturers																		
Universal Avionics EFI-1040, EFI-890R	•					•		RS-232 I/O to WSI (EFI-890R), Ethernet I/O to Data loader and printer	•									
UTC Aerospace Systems Tablet Interface Module (TIM™), Aircraft Interface Device (AID)		•		•	•				•									
G500 and G700 SmartDisplay®	•	•		•	•				•									

Table 6 provides a summary of the compatible operating systems and types of EFB applications supported for hardware/software manufacturers as well as integrated and customizable software manufacturers.

Table 6. Summary of EFB Software and Applications

Manufacturer Products	Operating System Compatibility						Applications Supported																
	Microsoft Windows	Linux	iOS	Android	Custom	Other	Data Link	Aeronautical Charts	Electronic Checklists	Electronic Documents	Enhanced Vision	Flight Performance Calculations	Flight Planning	GPS /Navigation Display	Logbook	Moving Map	Airport Moving Map	Synthetic Vision	Terrain Display	Traffic Surveillance	Video Surveillance	Voice Data Communications	Weather	Other
Hardware/Software Manufacturers																								
Astronautics Single and Dual Processor Electronic Flight Display systems, NEXIS™ Flight-Intelligence System	•	•					•	•	•	•		•		•	•	•	•		•	•	•	•	•	Various
AvMap EKP V	•				•			•	•				•	•		•	•		•	•	•		•	
EKP IV, EKP IV Pro	•				•			•	•				•	•		•			•	•			•	
The Boeing Company Class 3 EFB	•	•					•	•	•	•		•	•		•	•	•		•		•		•	
EFB Documents Browser	•		•							•														
Electronic Flight Folder	•		•																				•	Various
Electronic Logbook	•		•												•									
Onboard Performance Tool	•		•									•												

Table 6. Summary of EFB Software and Applications (continued)

Manufacturer Products	Operating System Compatibility						Applications Supported																
	Microsoft Windows	Linux	iOS	Android	Custom	Other	Data Link	Aeronautical Charts	Electronic Checklists	Electronic Documents	Enhanced Vision	Flight Performance Calculations	Flight Planning	GPS /Navigation Display	Logbook	Moving Map	Airport Moving Map	Synthetic Vision	Terrain Display	Traffic Surveillance	Video Surveillance	Voice Data Communications	Weather	Other
Hardware/Software Manufacturers																								
The Boeing Company Interactive Quick Reference Handbook	•		•						•															
CMC Electronics, Inc. PilotView CMA-1100 Mk3, PilotView CMA-1108, PilotView CMA-1410, PilotView 1612	•						•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	Various
DAC International GEN-X EFB	•						•	•	•	•	•	•	•		•		•				•		•	Calculator
FlightPrep, Inc. ChartBook-3-EFB, Helm X650 Docking Electronic Flight Bag System and ChartCase applications	•							•	•	•		•	•	•	•	•	•	•	•	•			•	Track building

Table 6. Summary of EFB Software and Applications (continued)

Manufacturer Products	Operating System Compatibility						Applications Supported																	
	Microsoft Windows	Linux	iOS	Android	Custom	Other	Data Link	Aeronautical Charts	Electronic Checklists	Electronic Documents	Enhanced Vision	Flight Performance Calculations	Flight Planning	GPS /Navigation Display	Logbook	Moving Map	Airport Moving Map	Synthetic Vision	Terrain Display	Traffic Surveillance	Video Surveillance	Voice Data Communications	Weather	Other
Hardware/Software Manufacturers																								
Innovative Solutions and Support Cockpit/IP®Flat Panel Display system (FPDS)					•		•	•	•		•	•		•		•	•	•	•	•	•		•	
navAero Ab navAero iPad/Tablet/Slate Portable EFB Mounting Systems, t•Bag™ C2[2] EFB Computer System, t•Pad™ 1100, 1200, 1500 and 2000, and UAID, navAero t•Server™, navAero t•Com™, navAero t•Cam™	•	•	•	•			•	•	•	•		•	•	•	•	•	•			•	•	•	•	

Table 6. Summary of EFB Software and Applications (continued)

Manufacturer Products	Operating System Compatibility						Applications Supported																
	Microsoft Windows	Linux	iOS	Android	Custom	Other	Data Link	Aeronautical Charts	Electronic Checklists	Electronic Documents	Enhanced Vision	Flight Performance Calculations	Flight Planning	GPS /Navigation Display	Logbook	Moving Map	Airport Moving Map	Synthetic Vision	Terrain Display	Traffic Surveillance	Video Surveillance	Voice Data Communications	Weather	Other
Hardware/Software Manufacturers																							
Universal Avionics EFI-1040						•		•			•					•	•	•	•		•			
EFI-890R	•							•	•	•	•					•	•	•	•		•		•	Printer support
UTC Aerospace Systems G500 and G700 SmartDisplay®	•				•		•	•	•	•		•	•		•	•	•			•	•		•	
Tablet Interface Module (TIM™),	•		•				•	•	•	•		•	•		•	•	•			•	•		•	
Aircraft Interface Device (AID)		•					•	•	•	•		•	•		•	•	•			•	•		•	

Table 6. Summary of EFB Software and Applications (continued)

Manufacturer Products	Operating System Compatibility						Applications Supported																	
	Microsoft Windows	Linux	iOS	Android	Custom	Other	Data Link	Aeronautical Charts	Electronic Checklists	Electronic Documents	Enhanced Vision	Flight Performance Calculations	Flight Planning	GPS /Navigation Display	Logbook	Moving Map	Airport Moving Map	Synthetic Vision	Terrain Display	Traffic Surveillance	Video Surveillance	Voice Data Communications	Weather	Other
Integrated and Customizable Software Manufacturers																								
Flightman™ eJourney Log, Electronic Flight Folder, eTechlog, Weight & Balance and Performance Calculations, Large Content Manager, Forms Designer, Passenger Relationship Management, Business Intelligence Tool, Ground Administrative Manager	•	•	•	•				•	•	•		•	•		•						•		•	Various

Table 6. Summary of EFB Software and Applications (continued)

Manufacturer Products	Operating System Compatibility						Applications Supported																	
	Microsoft Windows	Linux	iOS	Android	Custom	Other	Data Link	Aeronautical Charts	Electronic Checklists	Electronic Documents	Enhanced Vision	Flight Performance Calculations	Flight Planning	GPS /Navigation Display	Logbook	Moving Map	Airport Moving Map	Synthetic Vision	Terrain Display	Traffic Surveillance	Video Surveillance	Voice Data Communications	Weather	Other
Integrated and Customizable Software Manufacturers																								
Jeppesen Jeppesen Applications for Boeing and Airbus EFBs	•							•	•	•		•	•	•	•	•	•		•		•		•	
FliteDeck Pro, Mobile FliteDeck, Mobile FliteDeck VFR, JeppView FliteDeck, JeppView MFD	•		•					•		•			•	•		•	•		•				•	
OBDS Aviation Docs™ and Electronic Checklist Update Service	•		•						•	•			•											
Lufthansa Systems Lido mPilot, Lido eRouteManual, Lido Airport Moving Map, Lido Performance Tools	•		•				•	•		•		•	•	•		•	•						•	
Skypaq eLog															•									

4. EFB/PED Manufacturers

4.1 Hardware Manufacturers

The manufactures in this section only offer EFB/PED hardware. This includes the display itself, as well as flight deck installation and integration kits.

Apple, Inc.	**Location:** Cupertino, CA
Product(s)	iPad Air 2 Wi-Fi, iPad Air 2 Wi-Fi + Cellular, iPad Mini 3 Wi-Fi, iPad mini 3 Wi-Fi + Cellular See for complete list of previous models: http://support.apple.com/en-us/HT5452 Every generation of iPad has been deployed as an EFB. However, many application vendors recommend iPad 4 and later for Class 2 or Type B functionality in their newest app releases.
Website(s)	• www.apple.com • www.apple.com/ipad/ • www.apple.com/ipad/business/it/ • http://www.apple.com/ipad/business/it/security.html
Product Overview(s)	
A commercial-off-the-shelf (COTS) electronic hardware, iPad can provide the necessary EFB functions when combined with appropriate software and apps designed specifically for it. iPad Air 2 and iPad mini 3, as well as previous generation iPads, deliver the up to 10-hour battery life users have come to expect from iPad in a thin and light design that weighs one pound or less. Compatible EFB applications range from flight planning and weather to aeronautical charts and checklists.	
 *Image courtesy of Apple, Inc.*	
Hardware	
Hardware Class	☒ Class 1 or 2 (portable): iPad all models ☐ Class 3 (installed)

Apple, Inc.	**Location:** Cupertino, CA
Power Source	☐ Aircraft power (no battery) ☒ Internal battery only (self-powered) ☐ Aircraft power and Internal battery ☒ Other: The Type A (flat parallel-blade design) Apple 5W as well as the 10W and 12W USB power adapters (with Type A AC plug attached) comply with the IEC/UL 60950-1 standard for use with power sources rated to provide 115V AC at 400Hz
Battery Type	☒ Lithium ion secondary (rechargeable) ☐ Lithium polymer secondary (rechargeable) ☐ Lithium metal primary (non-rechargeable) ☐ Nickel metal hydride secondary (rechargeable) ☐ Nickel-cadmium secondary (rechargeable) ☐ Other ☐ N/A Expected/typical battery life: up to 10 hours
Display Size	iPad Air/Air 2: 9.4" x 6.6" iPad mini 3: 7.9" x 5.3"
Display Resolution	iPad Air/Air 2: 2048 x 1536 with retina display iPad mini 3: 2048 x 1536 with retina display
Brightness	Automatic brightness adjustment using ambient light sensor. Software enabled display brightness under developer control. iPad Air 2 features custom-designed anti-reflective coating.
Controls	☒ Touch Screen ☐ Stylus ☐ Buttons ☐ Mouse/Cursor ☐ External Keyboard ☒ Other: Touch ID is intended to offer one level of enhanced security by providing a simple biometric method for quickly unlocking the passcode protected device. Voice, video, and other inputs available to all app developers and at the system level. See - https://www.apple.com/accessibility/ios/ iPad comes with many sensors such as GPS, accelerometer, gyroscope, and compass that can be leveraged by developers for use as inputs. Additionally, iPad Air 2 includes a barometer.
Communications	☒ External wireless – not connected with aircraft: GSM/EDGE, CDMA EV-DO Rev. A and Rev. B, UMTS/HSPA/ HSPA+/ DC-HSDPA, LTE5, Wi-Fi (802.11B/ b/ g/ n/ac); dual channel (2.4GHz and 5GHz), Bluetooth 4.0 ☐ Wireless aircraft connection ☐ None ☐ Other
Data Bus	☐ ARINC 429 ☐ ARINC 828 ☐ USB ☐ LAN ☒ Other: Lightning connector and BLE; Receive data from 429 bus via Aircraft Interface Devices (AID) that are MFi certified MFI explained - https://developer.apple.com/programs/mfi/

Apple, Inc.	**Location:** Cupertino, CA
Accessories	Describe hardware that is sold separately that would enhance the use of the EFB: There are many third party products such as GPS, protective cases, cables, keyboards, stylus, and others all with MFi certification.
Operating System	iOS - For a list of devices compatible with the latest iOS release see: https://www.apple.com/ios/whats-new/
Applications Supported	With the iOS SDK, those with developer accounts can create apps and distribute them to the App Store, reaching millions of iPad, iPhone and iPod touch users. All apps submitted to the App Store and Mac App Store are reviewed to ensure they are reliable, perform as expected, and are free of offensive material. In many countries developers can also use the store to distribute custom apps directly to specific businesses using the B2B store. https://developer.apple.com/programs/ios/ Corporations wishing to develop for iOS can obtain an enterprise developer account and deploy apps privately to their employees directly https://developer.apple.com/enterprise/ For more information about app and device management https://www.apple.com/ipad/business/it/management.html Currently there are many apps deployed for EFB functions on iOS including: Flight charts, checklists, handbooks, logging, performance calculations, moving map, weather, and others. Check with your preferred vendor about support for iPad.

Microsoft	**Location:** Redmond, WA
Product(s)	Surface 2, Surface Pro 3, Surface 3
Website(s)	• www.microsoft.com • http://www.microsoft.com/surface/en-us/products/surface-pro-3 • http://www.microsoft.com/surface/en-us/products/surface-2
Product Overview(s)	
Surface tablets are commercial-off-the-shelf (COTS) electronic hardware that are used as Portable Electronic Devices (PEDs). Surface tablets weigh 2 pounds or less, and battery life ranges from 9-10 hours. A variety of EFB applications are available, including aeronautical charts, electronic checklists, flight performance calculations and weather. Both the Surface 2, Surface Pro 3 and Surface 3 have undergone decompression and EM testing – They have been authorized for use as an EFB by the FAA.	
 *Images courtesy of Microsoft*	
Hardware	
Hardware Class	☒ Class 1 or 2 (portable): ☐ Class 3 (installed)
Power Source	☐ Aircraft power (no battery) ☒ Internal battery only (self-powered) ☒ Aircraft power and Internal battery (If plugged in, aircraft power can be used) ☐ Other
Battery Type	☒ Lithium ion secondary (rechargeable) ☐ Lithium polymer secondary (rechargeable) ☐ Lithium metal primary (non-rechargeable) ☐ Nickel metal hydride secondary (rechargeable) ☐ Nickel-cadmium secondary (rechargeable) ☐ Other ☐ N/A Expected/typical battery life: Surface 2: up to10 hours Surface Pro 3: up to 9 hours Surface 3: Up to 8 hours

Microsoft	**Location:** Redmond, WA
Display Size	Surface 2: 10.6” ClearType Full HD Surface Pro 3: 12” ClearType Full HD Plus Surface 3: 10.8” ClearType Full HD Plus
Display Resolution	Surface 2: 1920 x 1080 Surface Pro 3: 2160 x 1440 Surface 3: 1920 x 1280
Brightness	Automatic brightness adjustment using ambient light sensor.
Controls	☒ Touch Screen ☒ Stylus (Surface Pro 3 & Surface 3) ☐ Buttons ☐ Mouse/Cursor ☒ External Keyboard (Surface Pro 3 & Surface 3) ☐ Other
Communications	☒ External wireless – not connected with aircraft: WiFi, Bluetooth 4.0, 3G and 4G (Surface 2 & Surface 3) ☐ Wireless aircraft connection ☐ None ☐ Other
Data Bus	☐ ARINC 429 ☐ ARINC 828 ☒ USB ☐ LAN ☐ Other
Accessories	Mounting hardware is available from several partners (e.g. NavAero) for the Surface Pro 3 tablets.
Operating System	Microsoft Windows (Surface 2: Windows RT 8.1 / Surface Pro 3: Windows 8.1 Pro & Windows 10 (Coming) / Surface 3: Windows 8.1 / Windows 10 (coming))
EFB Applications Supported	Aeronautical charts, electronic checklists, flight performance calculations and weather. GPS

SAT-WAY	**Location:** Luxembourg
Product(s)	Supply, installation kits, integration of all iOS or WINDOWS based tablets and interfaces to aircraft
Website(s)	• www.sat-way.com • http://www.sat-way.com/index.php/efbb • http://www.sat-way.com/index.php/commercial-aviation • http://www.sat-way.com/index.php/business-aviation
Product Overview(s)	
SAT-WAY and WABNET adapt many off-the-shelf tablets for use in cockpits, offering self-locking mountings, interfaces for various ARINC standards, real time weather charts in flight, EFB hardware and software management, and a private 2G/3G/4G worldwide network without roaming.	
 *Images courtesy of SAT-WAY*	
Authorization/Compliance	
Authority	☒ FAA ☒ EASA ☒ Other: Transport Canada We work in partnership with Polytech Aero Support in Montreal and get the STC's granted by Transport Canada and proceed to FAA and EASA equivalence.
TC/STC	☐ TC ☒ STC Aircraft: Various Boeing, Airbus, ATR, Bombardier, Embraer, Cessna and Dassault aircraft
TSO	☐ TSO-C113a, Airborne Multipurpose Electronic Displays ☐ TSO-C165a, Electronic Map Display Equipment for Graphical Depiction of Aircraft ☐ Other
FAA Regulatory and Guidance Material	☒ AC 20-173, Installation of Electronic Flight Bag Components ☒ AC 25-11B, Electronic Flight Deck Displays ☒ AC 120-76C, Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags ☐ FAA Order 8900.1, Electronic Flight Bag Operational Authorization Process ☐ Other
Industry Documents	☒ RTCA DO-160F, Environmental Conditions and Test Procedures for Airborne Equipment ☐ RTCA DO-254, Design Assurance Guidance for Airborne Electronic Hardware ☒ RTCA DO-257A, MOPS for the Depiction of Navigation Information on Electronic Maps ☒ RTCA DO-294C, Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDS) on Aircraft ☐ Other

SAT-WAY	**Location:** Luxembourg
Other	
Hardware	
Compatible Hardware	☒ Class 1 or 2 (portable) Tablets (iPAD AIR 2, Mini iPAD) ☐ Class 3
Power Source	☐ Aircraft power (no battery) ☒ Internal battery only (self-powered) ☒ Dedicated aircraft power and Internal battery ☐ Universal aircraft power and internal battery ☐ External battery ☐ Other
Battery Type	☐ Lithium ion secondary (rechargeable) ☒ Lithium polymer secondary (rechargeable) ☐ Lithium metal primary (non-rechargeable) ☐ Nickel metal hydride secondary (rechargeable) ☐ Nickel-cadmium secondary (rechargeable) ☐ Other ☐ N/A Expected battery life: 3 years
Securing Solution	☒ Permanently attached ☐ Not permanently attached (viewable stowage) Self-locking into position mounting Arm, Cradle, power supply/management.
Control Compatibility	☒ Touch Screen ☒ Stylus ☐ Buttons ☐ Mouse/cursor ☒ External Keyboard ☒ Other: SAT-WAY modifies industrial computers for aviation standards. Features and types change as progress comes. STC's are adapted.
Communications	☒ Wired ☒ External wireless - 2G/3G/4G and satellite links ☒ 2G/3G/4G and satellite links ☐ None ☐ Other
Data Bus	☒ ARINC 429 ☐ ARINC 828 ☒ USB ☒ LAN ☒ Other: WiFi
Aircraft Connectivity	☒ Transmit and Receive: Aircraft to EFB and EFB to aircraft ☒ Receive only: Aircraft to EFB only (FMS/GPS/FDR) ☐ Transmit only: EFB to aircraft only ☒ Other: To the ground in flight
Accessories	SATCOM wired and wireless connected interfaces from and to EFB
Operating System	iOS, Microsoft Windows XP, Linux

SAT-WAY	**Location:** Luxembourg

Applications Supported

- ☒ Data Link – Mobile internet on ground and in flight
- ☒ Electronic Charts – Jeppesen, Lido
  - ☐ Raster
  - ☐ Vector-based
- ☒ Electronic Checklists – Support integration of customer's products and practices
  - ☐ Viewer only
  - ☐ Error checking
  - ☐ Automated error-checking
  - ☐ Active checklist
- ☒ Electronic Documents – Support integration of customer's products and practices
  - ☐ Viewer only
  - ☐ Viewer with additional features
  - ☐ Mark-up language
  - ☐ Note-taking
- ☐ Enhanced Vision
- ☒ Flight Performance Calculations – Support integration of customer's products and practices
  - ☒ Weight & Balance
  - ☒ Takeoff/Landing Performance
  - ☐ Other
- ☒ Flight Planning – Support integration of customer's products and practices
- ☒ GPS/Navigation Display – Support integration of customer's products and practices
- ☒ Logbook – Support integration of customer's products and practices
- ☒ Moving Map – Support integration of customer's products and practices
- ☒ Airport Moving Map – Support integration of customer's products and practices
- ☐ Synthetic Vision
- ☒ Terrain Display – Support integration of customer's products and practices
- ☐ Traffic Surveillance
  - ☐ Merging/Spacing
- ☒ Video Surveillance – Support integration of customer's products and practices
- ☒ Voice Data Communications – Support integration of customer's products and practices
- ☒ Weather – Support integration of customer's products and practices
- ☐ Other

Noteworthy Features and Applications

Scandinavian Avionics	**Location:** Billund, Denmark
Product(s)	EFB Solutions for Class 1, 2, and 3 Data Integration Center DIC-600 (AID, SERVER, POWER versions available) Ethernet Radio Controller ERC-400 Ethernet Radio Controller ERC-400AP (Wireless EFB Access point) Control Panel With built in PowerSupply Tablet Cradles, Mounting provisions, Customized PED cables
Website(s)	• http://www.scanav.com • http://www.scanav.com/uploads/media/SAFLYER-EFB.pdf

Product Overview(s)

Scandinavian Avionics (SA) product line of avionics support equipment required to deploy any type of COTS tablet EFB. DIC-600 provides all types of Aircraft interfaces (A429/717/592/Discrete/664) as well as redundant power supplies for installed EFB tablet devices. Communication is controlled by ERC-400, utilizing COTS USB modems for deployment in environment with various communication technologies. SA supplies customized tablet EFB devices from Panasonic and supplies cradles and docking solutions for iPad and other tablet brands.

Scandinavian Avionics (SA) is an avionics solution provider and an EASA Part 21J/21G/145/147 organization with offices spanning Europe, Middle East and Asia.

Images courtesy of Scandinavian Avionics

Authorization/Compliance

Authority	☒ FAA Certification Office: Dependent on customer and location. We have DERs on staff. ☒ EASA ☐ Other

Scandinavian Avionics	**Location:** Billund, Denmark
TC/STC	☐ TC ☒ STC Aircraft: B737, A320, Dash-8 Q2/400, A319-21, Bae ATP.
TSO	☐ TSO-C113a, Airborne Multipurpose Electronic Displays ☐ TSO-C165a, Electronic Map Display Equipment for Graphical Depiction of Aircraft Position (Own-Ship) ☐ Other
FAA Regulatory and Guidance Material	☒ AC 20-173, Installation of Electronic Flight Bag Components ☐ AC 25-11B, Electronic Flight Deck Displays ☒ AC120-76C, Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags ☒ FAA Order 8900.1, Electronic Flight Bag Operational Authorization Process ☐ Other
Industry Documents	☒ RTCA DO-160F/G, Environmental Conditions and Test Procedures for Airborne Equipment ☐ RTCA DO-254, Design Assurance Guidance for Airborne Electronic Hardware ☐ RTCA DO-257A, MOPS for the Depiction of Navigation Information on Electronic Maps ☐ RTCA DO-294C, Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDS) on Aircraft ☐ Other
Other	Panasonic Premier Partner
Hardware	
Hardware Class	☒ Class 1 or 2 (portable) Device(s): COTS Tablets, i.e. Panasonic FZ-G1, iPad ☒ Class 3 (installed) Device(s): DIC-600, ERC-400, Control Panel
Power Source	☐ Aircraft power (no battery) ☐ Internal battery only (self-powered) ☒ Dedicated aircraft power and internal battery ☒ Universal aircraft power and internal battery ☐ External battery ☐ Other
Battery Type	☒ Lithium ion secondary (rechargeable) ☐ Lithium polymer secondary (rechargeable) ☐ Lithium metal primary (non-rechargeable) ☐ Nickel metal hydride secondary (rechargeable) ☐ Nickel-cadmium secondary (rechargeable) ☐ Other ☐ N/A Expected/typical battery life: Battery power lasts 3-8 hours depending on usage conditions. Typical battery life is 3 years.
Securing Solution	☒ Permanently attached ☒ Not permanently attached (viewable stowage) Structurally attached mounts and cradles

Scandinavian Avionics	**Location:** Billund, Denmark
Stowage	N/A
Display Size	10.1” Panasonic FZ-G1 / 9.7” iPad
Display Resolution	1920x1200 Panasonic FZ-G1, 2048x1536 iPad
Brightness	800Nit Brightness and optimization for night flight <1nit
Controls	☒ Touch Screen ☒ Stylus ☒ Buttons ☐ Mouse/cursor ☐ External Keyboard ☐ Other
Communications	☒ Wired ☒ External wireless – not connected with aircraft: 3G, 4G, WiFi ☒ Wireless aircraft connection: WiFi ☐ None ☐ Other
Data Bus	☒ ARINC 429 ☒ ARINC 828 ☒ USB ☒ LAN ☒ Other: RS232
Aircraft Connectivity	☒ Transmit and Receive: Aircraft to EFB and EFB to aircraft (class 3) ☒ Receive only: Aircraft to EFB only (class 2) ☐ Transmit only: EFB to aircraft only ☐ Other
Accessories	
Operating System	Windows 7, Windows 8, Windows 8.1
Applications Supported	
☒ Data Link ☒Aeronautical Charts ☒ Raster ☒ Vector-based ☒ Electronic Checklists ☐ Viewer only ☐ Error checking ☐ Automated error-checking ☐ Active checklist ☒ Electronic Documents ☐ Viewer only ☐ Viewer with additional features ☐ Mark-up language ☐ Note-taking	

Scandinavian Avionics	**Location:** Billund, Denmark

- ☒ Enhanced Vision
- ☒ Flight Performance Calculations
  - ☐ Weight & Balance
  - ☐ Takeoff/Landing Performance
  - ☐ Other
- ☒ Flight Planning
- ☒ GPS/Navigation Display
- ☒ Logbook
- ☒ Moving Map
- ☒ Airport Moving Map
- ☐ Synthetic Vision
- ☐ Terrain Display
- ☐ Traffic Surveillance
  - ☐ Merging/Spacing
- ☒ Video Surveillance
- ☒ Voice Data Communications
- ☒ Weather
- ☐ Other

Noteworthy Features and Applications

4.2 Hardware/Software Manufacturers

Manufacturers in this section offer both hardware and EFB software.

Astronautics	**Location:** Milwaukee, WI
Product(s)	Single and Dual Processor Electronic Flight Bag systems NEXIS™ Flight-Intelligence System
Website(s)	• www.astronautics.com • http://www.astronautics.com/sites/default/files/ACA_NEXIS_SS031511.pdf
Product Overview(s)	
Astronautics EFB systems include avionic quality displays with adaptable hardware and software configurations. Installed EFB systems consist of two displays, installed on either side of each pilot's seat. Single- or dual-processor options are available. In the dual-processor design, one processor is configured to run the Linux operating system and the other Microsoft Windows, allowing certified and non-certified applications to be isolated. The single-processor NEXIS design also functions as a Flight Server System and can be configured to support either a combination of certified and uncertified applications (simultaneously) or uncertified applications only. NEXIS systems can also be integrated with Portable Electronic Devices (PEDs) as portable displays for the system. All Astronautics hardware is compliant with RTCA DO-160 for use in all phases of flight, and is backed by Astronautics' worldwide support organization.	
 *Images Courtesy of Astronautics*	
Authorization/Compliance	
Authority	☒ FAA Certification Office: Atlanta ACO ☒ EASA ☐ Other
TC/STC	☒ TC Aircraft: 787, 777, 747, 737 ☒ STC Aircraft: A319, A320, A321
TSO	☐ TSO-C113a, Airborne Multipurpose Electronic Displays ☒ TSO-C165a, Electronic Map Display Equipment for Graphical Depiction of Aircraft Position (Own-Ship) ☐ Other

Astronautics	**Location:** Milwaukee, WI
FAA Regulatory and Guidance Material	☐ AC 20-173, Installation of Electronic Flight Bag Components ☐ AC 25-11B, Electronic Flight Deck Displays ☒ AC 120-76C, Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags ☒ Order 8900.1, Electronic Flight Bag Operational Authorization Process ☐ Other
Industry Documents	☒ RTCA DO-160F, Environmental Conditions and Test Procedures for Airborne Equipment ☒ RTCA DO-178B, Software Considerations in Airborne Systems and Equipment Certification (Software Level: C/D/E) ☐ RTCA DO-200B, Standards for Processing Aeronautical Data ☒ RTCA DO-254, Design Assurance Guidance for Airborne Electronic Hardware (System Development Assurance Level: C/D) ☒ RTCA DO-257A, MOPS for the Depiction of Navigation Information on Electronic Maps ☐ RTCA DO-294C, Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDS) on Aircraft ☐ Other
Other	
Hardware	
Hardware Class	☐ Class 1 or 2 / Portable ☒ Class 3 / Installed Our product is a Class 3 EFB / Server System which interfaces with Class 1/2 devices such as PEDs (tablets) but our components themselves are not.
Securing Solution	☒ Permanently attached: Articulating arm and cradle ☐ Not permanently attached
Stowage	N/A
Power Source	☒ Aircraft power (no battery) ☐ Internal battery only (self-powered) ☐ Dedicated aircraft power and internal battery ☐ Universal aircraft power and internal battery ☐ External battery ☐ Other
Battery Type	☐ Lithium ion secondary (rechargeable) ☐ Lithium polymer secondary (rechargeable) ☐ Lithium metal primary (non-rechargeable) ☐ Nickel metal hydride secondary (rechargeable) ☐ Nickel-cadmium secondary (rechargeable) ☐ Other ☒ N/A
Display Size	6.2”W x 8.3”H 10.4” diagonal screen size
Display Resolution	1024x768
Brightness	High-contrast display with LED backlighting with a wide range of brightness from sunlight readable to dark flight deck operations. Further, the luminescence is compatible with other equipment in the flight deck.

Astronautics	**Location:** Milwaukee, WI
Controls	The NEXIS DU can be provided with bezel keys. Other commands are controlled through soft keys through the resistive touchscreen. A virtual keyboard is also available for applications. Additionally, the system may use a flight deck CCD. ☒ Touch Screen ☒ Stylus ☒ Buttons ☒ Mouse/cursor (Cursor Control Device (CCD)) ☐ External Keyboard ☐ Other
Communications	☒Wired ☒ External wireless – not connected with aircraft: Wi-Fi, cellular ☒ Wireless aircraft connection: Wi-Fi, cellular, sitcom, GateLink ☐ None ☐ Other
Data Bus	☒ ARINC 429 ☐ ARINC 828 ☒ USB ☒ LAN ☒ Other: ARINC-717, Ethernet, RS-422, Discretes
Aircraft Connectivity	☒ Transmit and Receive: Aircraft to EFB and EFB to aircraft ☐ Receive only: Aircraft to EFB only ☐ Transmit only: EFB to aircraft only ☐ Other
Accessories	External Wireless Access Point (WAP) to allow for wireless communication capabilities
Operating System	☒ Microsoft Windows (Windows 7) ☒ Linux ☐ Android ☐ iOS ☐ Custom
Applications Supported	
☒ Data Link – CPDLC, SATCOM, GateLink, Link 16, etc. ☒ Aeronautical Charts – Provided by 3rd party ☒ Raster ☒ Vector-based ☒ Electronic Checklists – Provided by 3rd party ☐ Viewer only ☐ Error checking ☐ Automated error-checking ☐ Active checklist ☒ Electronic Documents – Astronautics-developed and provided by 3rd party ☐ Viewer only ☒ Viewer with additional features ☒ Mark-up language ☐ Note-taking	

Astronautics	**Location:** Milwaukee, WI

- ☐ Enhanced Vision
- ☒ Flight Performance Calculations – Provided by 3rd party
  - ☒ Weight & Balance
  - ☒ Takeoff/Landing Performance
  - ☐ Other
- ☐ Flight Planning
- ☒ GPS/Navigation Display – With certified software only
- ☒ Logbook – Provided by 3rd party
- ☒ Moving Map – Provided by 3rd party
- ☒ Airport Moving Map – Have CDTI and UCDTI application that are described above
- ☐ Synthetic Vision
- ☒ Terrain Display
- ☒ Traffic Surveillance
  - ☒ Merging/Spacing
- ☒ Video Surveillance – Provided by 3rd party
- ☒ Voice Data Communications – Single processor qualified by to support ACARS
- ☒ Weather – Provided by 3rd party
- ☒ Other: countermeasure display, FLIP charts, Falcon View, maintenance, Combat Track II, SafeBrowser™ internet browser application, ARINC 615A data loading, Communication Manager, Configuration Manager, CPDLC/FANS-1/A+, and Wind shear avoidance applications

Noteworthy Features and Applications

Astronautics' NEXIS™ systems provide enhanced EFB and server capabilities which includes the following functionality:

- **Data Loading to & from Server**
  - Loading applications, databases, and configuration parts
  - All application logs available for download
  - Built in QAR data capture functionality
  - Includes the ability to support downloading and uploading of data wirelessly
- **ARINC 717 Data Logging**
  - Supports SAR, DAR, QAR data transmitted to standard analysis packages
  - Makes data available for off-aircraft transmission
- **Aircraft Connectivity**
  - Includes Communication Manager for off-aircraft messaging
  - Interfaces to existing aircraft communication systems (e.g. SatCom, Gogo)
  - Single point for cellular data subscriptions
  - SafeBrowser™ Internet access for allowable URLs
- **Certified Linux (or non-certified Windows) OS & Services**
  - Software partitioning allows certified and non-certified applications to run independently on a single processor
  - Server controlled data & network security
- **Application / Menu Manager**
  - Single point of access for all applications
  - Includes full SDK and tools for designing and operating 3rd party applications

Astronautics is also developing tablet interface device to more easily incorporate portable devices with Astronautics' installed devices. This interface device provides data transfer between the server & PEDs allowing aircraft interface access via ARINC 834. It also provides the ability to charge devices and provide wired and wireless data connection between the PED & the server while maintaining data security (DO-326A, 355, 356).

AvMap	**Location:** Falmouth, MA
Product(s)	EKP V, EKP IV, EKP IV Pro
Website(s)	• http://www.avmap.us/index.php • http://avionics.avmap.it/en/ • http://www.avmap.us/products/aero/ekp_iv-4/introduction • http://www.avmap.us/products/aero/ekp_iv_pro-9/introduction • http://avionics.avmap.it/en/products/a2-adahrs/
Product Overview(s)	
AvMap EKP IV, IV Pro and EKP V are professional aeronautical navigators that feature a 7" color LCD display, which utilize a memory card preloaded with software and maps. Each unit can operate in portrait and landscape mode. Traffic awareness is supported when connected to ZOAN XRX receiver. AvMap EKP V is a multifunctional display, made for panel-mounting and portable use, with 7" display, removable battery, built-in GPS receiver, operative in portrait and landscape mode, and preloaded with software and maps.	
 *Images courtesy of AvMap*	
Authorization/Compliance	
Authority	☐ FAA ☐ EASA ☐ Other
TC/STC	☐ TC ☐ STC
TSO	☐ TSO-C113a, Airborne Multipurpose Electronic Displays ☐ TSO-C165a, Electronic Map Display Equipment for Graphical Depiction of Aircraft ☐ Other

AvMap	**Location:** Falmouth, MA
FAA Regulatory and Guidance Material	☐ AC 20-173, Installation of Electronic Flight Bag Components ☐ AC 25-11B, Electronic Flight Deck Displays ☐ AC120-76C, Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags ☐ FAA Order 8900.1, Electronic Flight Bag Operational Authorization Process ☐ Other
Industry Documents	☐ RTCA DO-160G, Environmental Conditions and Test Procedures for Airborne Equipment ☐ RTCA DO-178C, Software Considerations in Airborne Systems and Equipment Certification ☐ RTCA DO-200B, Standards for Processing Aeronautical Data ☐ RTCA DO-254, Design Assurance Guidance for Airborne Electronic Hardware ☐ RTCA DO-257A, MOPS for the Depiction of Navigation Information on Electronic Maps ☐ RTCA DO-294C, Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDS) on Aircraft ☐ Other
Other	
Hardware	
Hardware Class	☒ Class 1 or 2 (portable) Device(s): Portable GPS/MFD ☐ Class 3 (installed)
Power Source	☒ Aircraft power (no battery) EKP IV, EKP IV PRO, EKP V (has also internal battery) ☒ Internal battery only (self-powered) : EKP V ☒ Dedicated aircraft power and internal battery: EKP V ☐ Universal aircraft power and internal battery ☐ External battery ☐ Other
Battery Type	☒ Lithium ion secondary (rechargeable) (EKP V) ☐ Lithium polymer secondary (rechargeable) ☐ Lithium metal primary (non-rechargeable) ☒ Nickel metal hydride secondary (rechargeable) (EKP IV, EKP IV PRO) ☐ Nickel-cadmium secondary (rechargeable) ☐ Other ☐ N/A Expected/typical battery life: 4 hours
Securing Solution	☐ Permanently attached ☒ Not permanently attached (viewable stowage): EKP V dedicated Docking Station for panel mounting
Stowage	
Display Size	EKP V, IV, IV PRO: 7” EKPV: 7”
Display Resolution	EKPIV & EKPV PRO: 800 x 480 EKPV: 800 x 480 (600 cd/m2)
Brightness	EKPIV & EKPV PRO: 800 x 480, LCD TFT, display colors 64k EKPV: 800 x 480 (600 cd/m2). LCD TFT, display colors 64k

AvMap	**Location:** Falmouth, MA
Controls	☐ Touch Screen ☐ Stylus ☒ Buttons (EKP IV, EKP IV PRO, EK PV ☒ Mouse/cursor (Joystick: EKP V, EK PIV EKPIV PRO) ☒ External Keyboard (EKP V) ☒ Other: Joystick (EKP V)
Communications	☒ Wired ☐ External wireless – not connected with aircraft ☐ Wireless aircraft connection ☐ None ☐ Other
Data Bus	☐ ARINC 429 ☐ ARINC 828 ☐ USB ☐ LAN ☐ Other
Aircraft Connectivity	☒ Transmit and Receive: Aircraft to EFB and EFB to aircraft ☐ Receive only: Aircraft to EFB only ☐ Transmit only: EFB to aircraft only ☐ Other EKP V and EKP IV and EKP IV PRO products send out NMEA protocol through serial connections, and can interface with third party products like autopilots.
Accessories	EKP V: A2 ADAHRS module turns EKP V into an EFIS system.
Operating System	EKP IV and EK P IV PRO: Custom Operating system EKPV: Windows
Applications Supported	
☐ Data Link ☒ Aeronautical Charts ☒ Raster ☒ Vector-based ☒ Electronic Checklists ☐ Viewer only ☐ Error checking ☐ Automated error-checking ☒ Active checklist ☐ Electronic Documents ☐ Viewer only ☐ Viewer with additional features ☐ Mark-up language ☐ Note-taking ☐ Enhanced Vision ☐ Flight Performance Calculations	

AvMap	**Location:** Falmouth, MA

- ☐ Weight & Balance
- ☐ Takeoff/Landing Performance
- ☐ Other
- ☒ Flight Planning - 3rd party provider
- ☒ GPS/Navigation Display
- ☐ Logbook
- ☒ Moving Map
- ☒ Airport Moving Map (EKPV)
- ☐ Synthetic Vision
- ☒ Terrain Display
- ☒ Traffic Surveillance (when connected with the Zaon XRX)
  - ☐ Merging/Spacing
- ☒ Video Surveillance (EKP V : when connected to video camera)
- ☐ Voice Data Communications
- ☒ Weather (with the optional WxWorx receiver)
- ☐ Other

Noteworthy Features and Applications

EKP IV includes Jeppesen's database with ICAO airports, airfields and heliports. The EKP IV main features are: full flight planning capability, land elevation, trip computer, integration with other onboard navigation systems (autopilot, GPS, external antenna, Low Airways, TAWS, Collision Avoidance interface) and full NAVDATA page.

EKP IV Pro functions include Search And Rescue (SAR) Patterns and Detailed additional Street map for address search with POI database.

The EKP V features full flight planning capability, Low Airways, TAWS, NAVDATA page, airspace alarm, SAR, Integration with other onboard navigation systems: autopilot, CAS, EFIS, XM Weather, NMEA out, video camera, import custom maps.

ADS-B traffic in development.

The Boeing Company	**Location:** Chicago, IL
Product(s)	Boeing offers an Installed EFB hardware solution as a production option on twin aisle aircraft, including system software that includes an application manager, airplane data interfaces and off-board communication software. Boeing offers an Onboard Network System (ONS) on all current production airplanes to enable mobile EFBs to connect to the airplane for data services, print services and off-board communication. Boeing also offers EFB software applications for installed and mobile platforms, including the following: • EFB Documents Browser • Electronic Flight Folder • Electronic Logbook • Onboard Performance Tool • Interactive Quick Reference Handbook • Airport Moving Map, Terminal Chart and Enroute applications for installed systems and integrated charting applications for mobile platforms (through Jeppesen, not detailed here,)
Website(s)	• www.boeing.com • http://www.boeing.com/commercial/boeing-edge/#/brochures

Product Overview(s)

The Boeing installed EFB is a Class 3 EFB which includes hardware and system software.

2 Display Units (DU's) - The DU is the user interface for Pilots as well as Maintenance Crew.

2 Electronic Units (EU's) - Each EU has 2 Operating Systems: Linux (Certified) and Windows

Features**:**

- Fully integrated with on-board systems
- ARINC 429 data buses
- Communications via ACARS (HF/VHF/SATCOM), TWLU* (Wireless), AWLU (Cellular) and Broadband satellite* (*subject to aircraft equipage)
- Flight deck printer, cockpit lighting and cursor control device

The Application Manager on the Boeing Installed EFB allows Boeing, Jeppesen, airline and third party applications to run simultaneously, share data and access common services as defined in the SDK.

Electronic Flight Folder (EFF) is a set of applications that enables an airline to transmit day-of-flight data such as flight plans, weather, NOTAM, Loadsheet, and NOTOC information from back office systems to the EFB, utilizing ARINC 633 specifications.

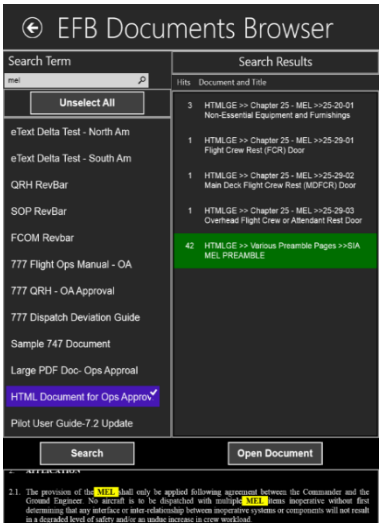
The EFB Documents Browser (EDB) is an application that allows a pilot to view airplane and company documents and manuals.

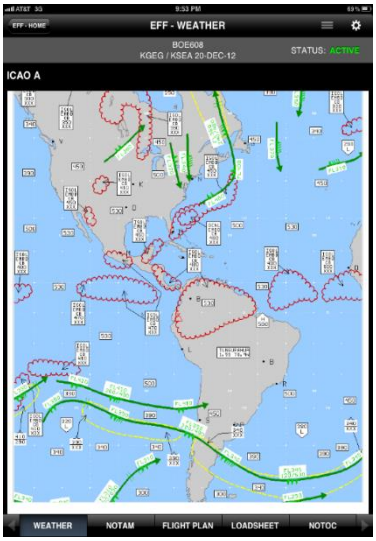
Electronic Logbook (ELB) is an application used by pilots, cabin crew and maintenance personnel to electronically record airplane faults and maintenance actions, replacing traditional, paper-based aircraft maintenance logs.

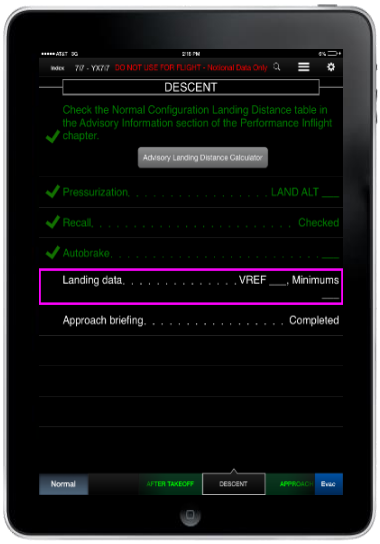
The Onboard Performance Tool (OPT) application allows pilots and dispatchers to calculate optimized takeoff, landing and weight and balance calculations in a connected or unconnected environment.

Interactive Quick Reference Handbook (IQRH) is an application that includes Normal Checklists, Non-Normal Checklists, Performance tables, Maneuvers.

The Boeing Company	**Location:** Chicago, IL







Images courtesy of the Boeing Company

Authorization/Compliance

Authority	☒ FAA Certification Office: Seattle ☒ EASA ☒ Other Class 3 EFB has also been authorized by: • Civil Aviation Administration of China • Civil Aviation Authority of New Zealand • Civil Aviation Authority (Qatar) • Civil Aviation Authority of Singapore • Directorate General Civil Aviation (India) • General Civil Aviation Authority of the United Arab Emirates • Japanese Civil Aviation Bureau

The Boeing Company	**Location:** Chicago, IL
	• Pakistan Civil Aviation Authority • Secretaría de Comunicaciones y Transportes (SCT) - Mexico • Taiwan Civil Aeronautics Administration • Transport Canada
TC/STC	☒ TC Aircraft: (Class 3) 777, 787, 747-8, 737NG (no longer offered), 747-400, 757, 767 (retrofit) ☒ STC Aircraft: (Class 2) 737NG (no longer offered)
TSO	☐ TSO-C113a, Airborne Multipurpose Electronic Displays ☐ TSO-C165, Electronic Map Display Equipment for Graphical Depiction of Aircraft ☐ Other
FAA Regulatory and Guidance Material	☐ AC 20-173, Installation of Electronic Flight Bag Components ☐ AC 25-11B, Electronic Flight Deck Displays ☒ AC120-76C, Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags ☐ FAA Order 8900.1, Electronic Flight Bag Operational Authorization Process ☐ Other
Industry Documents	☐ RTCA DO-160G, Environmental Conditions and Test Procedures for Airborne Equipment ☒ RTCA DO-178B, Software Considerations in Airborne Systems and Equipment Certification (Software Level: C - Class 3 EFB) ☐ RTCA DO-200B, Standards for Processing Aeronautical Data ☐ RTCA DO-254, Design Assurance Guidance for Airborne Electronic Hardware (☐ RTCA DO-275A, MOPS for the Depiction of Navigation Information on Electronic Maps ☐ RTCA DO-294C, Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDS) on Aircraft ☐ Other
Other	
Hardware	
Hardware Class	☐ Class 1 or 2 (portable) ☒ Class 3 (installed) Note that the software products are compatible with portable EFBs, including COTS tablets, running iOS and Windows
Power Source	☒ Aircraft power (no battery) (Class 3) ☐ Internal battery only (self-powered) ☐ Dedicated aircraft power and internal battery ☐ Universal aircraft power and internal battery ☐ External battery ☐ Other
Battery Type	☐ Lithium ion secondary (rechargeable) ☐ Lithium polymer secondary (rechargeable) ☐ Lithium metal primary (non-rechargeable) ☐ Nickel metal hydride secondary (rechargeable) ☐ Nickel-cadmium secondary (rechargeable) ☐ Other ☒ N/A
Securing Solution	☒ Permanently attached (Class3) ☐ Not permanently attached (viewable stowage)

The Boeing Company	**Location:** Chicago, IL
Stowage	N/A
Display Size	10.4” (Class 3)
Display Resolution	728 x 1024 minimum
Brightness	
Controls	☒ Touch Screen ☐ Stylus ☒ Buttons ☒ Mouse/cursor ☐ External Keyboard ☐ Other Class 3: Has 28 hard keys that outline the display the unit. The vertically aligned buttons provide an alternative method for selecting buttons displayed. The horizontal aligned buttons allow pilots to interact with the applications (i.e., zoom in and out, page up and down and back).
Communications	☒ Wired ☐ External wireless – not connected with aircraft ☐ Wireless aircraft connection ☐ None ☐ Other
Data Bus	☒ ARINC 429 (Class 3) ☐ ARINC 828 ☐ USB ☒ LAN (Class 3) ☐ Other
Aircraft Connectivity	☒ Transmit and Receive: Aircraft to EFB and EFB to aircraft (On the 787 the Class 3 EFB can send data to the FMC) ☒ Receive only: Aircraft to EFB only (Boeing Class 3 solutions can receive data from ADIRU-ADR, ADIRU-IR, Multi-mode Receivers (MMR)/GPS Sensor Unit, FMC and Common Display System (CDS)-Display Electronic Units (DEU)) ☒ Transmit only: EFB to aircraft only (The Class 3 solutions can transmit data to an ACARS unit.) ☒ Other: Mobile devices may use ONS services for connectivity to the aircraft for data and offboard communication. This includes transmit and receive capability through available channels.
Accessories	Boeing offers an Onboard Network System (ONS) on current production airplanes to enable mobile EFBs to connect to the airplane for data services, print services and offboard communication. Boeing also offers Crew Wireless LAN Units) for tablet connectivity to the ONS. TWLU, AWLU and IP Satcomm systems are available to facilitate offboard communication from EFBs and ONS on ground and inflight.
Operating System	The Boeing Installed (Class 3) EFB utilizes a Linux OS on the certified partition and Windows XP on the authorized partition. Mobile applications run on Windows and iOS platforms. Applications maintain compatibility with current iOS and Windows OS versions.

The Boeing Company	**Location:** Chicago, IL

Applications Supported

☒ Data Link
☒ Aeronautical Charts (Jeppesen)
- ☒ Raster
- ☒ Vector-based

☒ Electronic Checklists
- ☒ Viewer only
- ☒ Error checking
- ☐ Automated error-checking
- ☐ Active checklist

Interactive Quick Reference Handbook (IQRH) is an application that includes Normal Checklists, Non-Normal Checklists, Performance tables, Maneuvers. It allows pilots ready access to information in an electronic format. IQRH is available for iOS tablets for the 737 model.

☒ Electronic Documents
- ☐ Viewer only
- ☒ Viewer with additional features
- ☒ Mark-up language
- ☐ Note-taking

The EFB Documents Browser (EDB) is an application that allows a pilot to view airplane and company documents and manuals. It includes:
- an airborne viewer,
- a web-based administration tool for managing document libraries and content distribution, and
- a desktop-based document viewer application (Ground Viewer) for assisting Quality Control and Quality Assurance activities
- XML, PDF and HTML data format support
- Extensive search capability
- Display of Effective Dates and Document Expiration highlighting
- Foreign language support (installed EFB version)
- EDB is available for Installed and Mobile EFBs running Windows OS.

☐ Enhanced Vision
☒ Flight Performance Calculations

The Onboard Performance Tool (OPT) application allows pilots and dispatchers to calculate optimized takeoff, landing and weight and balance calculations in a connected or unconnected environment.
- ☒ Weight & Balance
  - Visual verification that aircraft is within operating envelope
- ☒ Takeoff/Landing Performance
  - Calculates limit weights, V speeds, stab trim settings*, and engine power settings based on user input of airport conditions and airplane configuration
  - Calculates best combination of fixed derates and assumed temperature thrust reductions for operations below limit weight
  - Accounts for MEL and CDL items affecting aircraft performance using actual AFM data
  - Accepts inputs of temporary NOTAMs which alter the airport definition (e.g. runway shortening, temporary obstacles)
  - Substantially customizable UI

  (* for applicable models)
  - OPT is available on iOS and Windows platforms.
- ☐ Other

☒ Flight Planning

The Boeing Company	**Location:** Chicago, IL

☐ GPS/Navigation Display
☒ Logbook

Electronic Logbook (ELB) is an application used by pilots, cabin crew and maintenance personnel to electronically record airplane faults and maintenance actions, replacing traditional, paper-based aircraft maintenance logs.

- ELB replaces paper logbooks with electronic records that improve operational efficiency, reliability and integration between the Flight Operations and Maintenance environments. The application works together with EFB and ground applications (EFB-Ground Systems).
- ELB integrates with Airplane Health Management and other Maintenance and Engineering systems via a standard ATA Spec 2000 Ch.17 interface.
- ELB is currently available for installed EFBs.

☒ Moving Map (Jeppesen)
☒ Airport Moving Map (Jeppesen)
☐ Synthetic Vision
☒ Terrain Display (included as part of Jeppesen Moving Maps)
☐ Traffic Surveillance
  ☐ Merging/Spacing
☒ Video Surveillance (third party)
☐ Voice Data Communications
☒ Weather (on Jeppesen charts, as well as within EFF)
☒ Other

Electronic Flight Folder (EFF) is a set of applications that:

- Enables an airline to transmit day-of-flight data such as flight plans, weather, NOTAM, Loadsheet, and NOTOC information from back office systems to the EFB, utilizing ARINC 633 specifications
- Enables pilots to conduct route briefing and log flight progress directly on the EFB
- Assembles post flight data for storage or access by ground personnel, facilitating data analytics
- Provides ground-based viewing of completed reports
- Provides automated services for data distribution and data management
- Supports route sharing with Jeppesen's FliteDeck Pro and Enroute Moving Map applications
- The EFF application is available for Installed EFBs running Windows OS and for mobile EFBs running iOS. A mobile version for Windows will be released late 2015.

Noteworthy Features and Applications

CMC Electronics, Inc.	**Location:** Montreal, Quebec, Canada
Product(s)	PilotView CMA-1100 Mk3, PilotView CMA-1108, PilotView CMA-1410, PilotView CMA-1612
Website(s)	• www.cmcelectronics.ca • http://www.esterline.com/avionicssystems/en-us/productsservices/aviation/displaysvisionsystems/electronicflightbag.aspx

Product Overview(s)

The PilotView® EFB is an avionics grade Class 2 Commercial-Off-The-Shelf (COTS) EFB system specifically designed for flight deck environments to bring up-to-date information to the pilot. The PilotView® system consists of two (2) Line Replaceable Units (LRUs): a self- contained Electronic Display Unit (EDU), and an Enhanced Expansion Module Unit (EEMU). With the PilotView CMA-1100 and CMA-1410 EFBs, CMC provides features such as high-resolution, fully dimmable display, integrated communication capabilities and RTCA DO-160E qualification. CMC's PilotView EFB is intended to improve productivity by enabling pre-flight planning and access to up- to-date aircraft documentation, checklists and flight planning information. PilotView is intended to increase situational awareness in-flight with en-route, approach charts, moving map display and graphical real time weather information.

Images courtesy of CMC Electronics, Inc.

Authorization/Compliance

Authority	☒ FAA Certification Office: Chicago ACO ☒ EASA ☐ Other
TC/STC	☒ TC Aircraft: CRJ 700/900/1000, Challenger 604/605, Global 5000, Gulfstream G-IV/GV, Falcon 900EX ☒ STC Aircraft: A320 Family, A300-600, A330/340, B737-200/300/400, B737NG, B747-400, B757, B767, Falcon 10/50, Falcon 900/2000, Challenger 604/605, Global Express/5000, G100/150/GII/GIIB/GIII/GIV/GV/GVSP
TSO	☐ TSO-C113a, Airborne Multipurpose Electronic Displays ☒ TSO-C165a, Electronic Map Display Equipment for Graphical Depiction of Aircraft Position (Own-Ship) ☐ Other
FAA Regulatory and Guidance Material	☐ AC 20-173, Installation of Electronic Flight Bag Components ☐ AC 25-11B, Electronic Flight Deck Displays ☒ AC 120-76C, Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags ☒ Order 8900.1, Electronic Flight Bag Operational Authorization Process ☐ Other

CMC Electronics, Inc.	**Location:** Montreal, Quebec, Canada
Industry Documents	☒ RTCA DO-160E, Environmental Conditions and Test Procedures for Airborne Equipment ☐ RTCA DO-178C, Software Considerations in Airborne Systems and Equipment Certification ☐ RTCA DO-200B, Standards for Processing Aeronautical Data ☒ RTCA DO-254, Design Assurance Guidance for Airborne Electronic Hardware (System Development Assurance Level: D/E) ☐ RTCA DO-257A, MOPS for the Depiction of Navigation Information on Electronic Maps ☐ RTCA DO-294C, Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDS) on Aircraft ☐ Other
Other	
Hardware	
Hardware Class	☒ Class 1or 2 (Portable) Device (s):Custom built (CMA-1612, CMA-1410, CMA-1108, CMA-1100, AID, AIS) ☒ Class 3 (Installed) Device (s): Custom built (CMA-1612, CMA-1410, CMA-1108, CMA-1100, AID, AIS)
Power Source	☐ Aircraft power (no battery) ☐ Internal battery only (self-powered) ☒ Dedicated aircraft power and internal battery ☐ Universal aircraft power and internal battery ☐ External battery ☐ Other The display unit is receives power from an expansion module unit (EMU) which is connected to a 28VDC bus, and then filters the power to the display unit. If for some reason the EMU goes offline or the 28VDC bus goes down, the internal battery in the display unit takes over.
Battery Type	☒ Lithium ion secondary (rechargeable) (Class 2 only) ☐ Lithium polymer secondary (rechargeable) ☐ Lithium metal primary (non-rechargeable) ☐ Nickel metal hydride secondary (rechargeable) ☐ Nickel-cadmium secondary (rechargeable) ☐ Other ☐ N/A Expected/typical battery life: 2h
Securing Solution	☐ Permanently attached ☒ Not permanently attached (viewable stowage) (Class 2) Securing solutions available: Articulating arm, yoke, side mount
Stowage	
Display Size	CMA-1612: 12.1” CMA-1410: 10.4” CMA-1100, 1108: 8.4”
Display Resolution	1024 x 768

CMC Electronics, Inc.	**Location:** Montreal, Quebec, Canada
Brightness	Fully dimmable from 800 nits to 0.5 nit. The EDU display has very low reflectance and is readable in direct sunlight. An integrated ambient sensor automatically adjusts brightness levels, which can also be adjusted using the controls in the bottom left corner of the EDU.
Controls	☒ Touch Screen ☒ Stylus ☒ Buttons ☒ Mouse/cursor ☒ External Keyboard (Integrated slide-out keyboard CMA-1100 only) ☐ Other
Communications	☒ Wired ☐ External wireless – not connected with aircraft ☒ Wireless aircraft connection: Wi-Fi and 3G/4G/LTE aircraft connectivity offered in conjunction with EFB through the use of an external (outside of the EFB) Wi-Fi or cellular modem. ☐ None ☐ Other
Data Bus	☒ ARINC 429 ☒ ARINC 828 ☒ USB ☒ LAN (CMA-1100 Mk3, CMA-1410 only) ☒ Other: Discrete
Aircraft Connectivity	☒ Transmit and Receive: Aircraft to EFB and EFB to aircraft (ACARS MU, CMC FMS, Iridium and SATCOM units) ☒ Receive only: Aircraft to EFB only (FMS, GPS, ADIRUs) ☒ Transmit only: EFB to aircraft only (Video Systems, Weather Receivers) ☐ Other

Accessories	• EDU options (Solid state disks capacity from 64Gbytes to 128Gbytes)
	• AID/AIS options:
	  • Up to 7x GbE Base-T Ethernet ports
	  • Up to 12x 10/100 Base-T Ethernet ports
	  • 10x ARINC 429 receivers
	  • 4x ARINC 429 transmitters
	  • 8x/4x in/out discrete support
	  • RS422/232 serial interface support
	  • USB 2.0 port
	  • ARINC 717 Rx connections
	  • ARINC 615A support
	  • ARINC 619 support
	  • IEEE 802.11 a/b/g/n wireless access support (requires external antenna)
	• Other accessories:
	  • Power adapter (for use on ground)
	  • Carrying case

Operating System	Microsoft Windows

CMC Electronics, Inc. **Location:** Montreal, Quebec, Canada

Applications Supported

- ☒ Data Link – Via SATCOM or ACARS CMU
- ☒ Aeronautical Charts
  - ☒ Raster
  - ☒ Vector-based
- ☒ Electronic Checklists
  - ☐ Viewer only
  - ☒ Error checking
  - ☒ Automated error-checking
  - ☒ Active checklist
- ☒ Electronic Documents
  - ☐ Viewer only
  - ☒ Viewer with additional features
  - ☒ Mark-up language
  - ☒ Note-taking
- ☒ Enhanced Vision – Operates as head down repeater for Enhanced Visual System (EVS) via video input
- ☒ Flight Performance Calculations
  - ☒ Weight & Balance
  - ☒ Takeoff/Landing Performance
  - ☐ Other
- ☒ Flight Planning – Via application partner software offering
- ☒ GPS/Navigation Display – Via Jeppesen, ACSS, LH Systems, EAG charting and moving maps products
- ☒ Logbook – Via application partner software offering
- ☒ Moving Map – Via Jeppesen, LH Systems, EAG charting and moving maps products
- ☒ Airport Moving Map – Supports ACSS, Jeppesen Surface moving map
- ☐ Synthetic Vision
- ☒ Terrain Display – Via Jeppesen, LH Systems, EAG charting and moving maps products
- ☒ Traffic Surveillance
  - ☒ Merging/Spacing
- ☒ Video Surveillance – Via RS170/NTSC/Phase Alternating Line (PAL) and Ethernet based EEMU/AID system options
- ☒ Voice Data Communications – Via Iridium unit integration option
- ☒ Weather – Via Sirius, XM, Satellite integration option
- ☒ Other: Main Menu, Tools, SideView, CMCView, ECM (EFB Content Manager) as optional application on PilotView® EFB system

Noteworthy Features and Applications

DAC International	**Location:** Austin, TX
Product(s)	GEN-X
Website(s)	• www.dacint.com • http://www.dacint.com/DAC-international-models-focus.php?Model=GEN-X
Product Overview(s)	
DAC's GENESYS solution including the GEN-X EFB includes a display, receiver processor unit and a mounting tray. The GEN-X EFB is a custom computer that uses operator defined software, and is designed to meet or exceed DO-160 Environmental standards.	
   *Images courtesy of DAC International*	
Authorization/Compliance	
Authority	☒ FAA Certification Office: Atlanta, Chicago, Ft. Worth, Los Angeles ☐ EASA ☐ Other
TC/STC	☐ TC ☒ STC Aircraft: • CRJ – 200, 700, 900 • DC-8 • B727 B757/767 • B777 • A320 (In progress) • A330 (In Progress) • L328 • EMB-170
TSO	☐ TSO-C113a, Airborne Multipurpose Electronic Displays ☐ TSO-C165a, Electronic Map Display Equipment for Graphical Depiction of Aircraft ☐ Other
FAA Regulatory and Guidance Material	☐ AC 20-173, Installation of Electronic Flight Bag Components ☐ AC 25-11B, Electronic Flight Deck Displays ☒ AC120-76C, Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags ☐ FAA Order 8900.1, Electronic Flight Bag Operational Authorization Process ☐ Other

DAC International	**Location:** Austin, TX
Industry Documents	☒ RTCA DO-160G, Environmental Conditions and Test Procedures for Airborne Equipment ☒ RTCA DO-178B, Software Considerations in Airborne Systems and Equipment Certification (Software Level: E) ☐ RTCA DO-200B, Standards for Processing Aeronautical Data ☐ RTCA DO-254, Design Assurance Guidance for Airborne Electronic Hardware ☐ RTCA DO-257A, MOPS for the Depiction of Navigation Information on Electronic Maps ☐ RTCA DO-294C, Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDS) on Aircraft ☐ Other
Other	
Hardware	
Hardware Class	☒ Class 1 or 2 (portable) Device(s): (Class 2, Tablet) ☒ Class 3 (installed) Device(s): RPU Two separate units: Display Unit and Remote Processor Unit (RPU). Single cable connection from the display to a rugged, quick release, removable RPU.
Power Source	☐ Aircraft power (no battery) ☐ Internal battery only (self-powered) ☒ Dedicated aircraft power and internal battery - The internal battery is used only if the normal bus for aircraft power is off and the battery bus is on. No power is drawn from the aircraft back-up battery. ☐ Universal aircraft power and internal battery ☐ External battery ☐ Other
Battery Type	☐ Lithium ion secondary (rechargeable) ☐ Lithium polymer secondary (rechargeable) ☐ Lithium metal primary (non-rechargeable) ☒ Nickel metal hydride secondary (rechargeable) ☐ Nickel-cadmium secondary (rechargeable) ☐ Other ☐ N/A Expected/typical battery life: This assumes power loss emergency. Battery power: 45 minutes minimum at max battery life.
Securing Solution	☒ Permanently attached ☒ Not permanently attached (viewable stowage) Articulating Arm. Installed system, Remote Processor Unit (RPU) can be installed in the flight deck (Class 2) or in the Electronics and Equipment bay (Class 3). Display has mounting holes tapped for direct mount attachment in the rear.
Stowage	N/A
Display Size	10.4” or 8.1”
Display Resolution	1024 x 768 or 800 X 600
Brightness	High-Bright Sunlight Readable display; Bright/Dim buttons; Dimmable to dark 900-1000 nits fully dimmable down to < 1 nit, transflective screen for viewing in bright sunlight.

DAC International	**Location:** Austin, TX
Controls	☒ Touch Screen ☐ Stylus ☒ Buttons ☐ Mouse/cursor ☐ External Keyboard ☐ Other
Communications	☒ Wired ☐ External wireless – not connected with aircraft ☐ Wireless aircraft connection ☐ None ☐ Other
Data Bus	☒ ARINC 429 ☐ ARINC 828 ☒ USB ☒ LAN ☒ Other: RS232 Ports
Aircraft Connectivity	☒ Transmit and Receive: Aircraft to EFB and EFB to aircraft (ACARS – in progress) ☒ Receive only: Aircraft to EFB only (FMS) ☐ Transmit only: EFB to aircraft only ☐ Other
Accessories	
Operating System	Microsoft Windows (XP Professional, Windows 7 Pro: Core 2 Duo Processor with 4 GB RAM)DACADI (ARINC Data Interface)

Applications Supported

☒ Data Link

☒ Aeronautical Charts -- Jeppesen, or Lido. Unique Clipboard user interface for origin, destination, en route, and alternate.

- ☒ Raster
- ☒ Vector-based

☒ Electronic Checklists

- ☒ Viewer only
- ☐ Error checking
- ☐ Automated error-checking
- ☐ Active checklist

☒ Electronic Documents -- The look of the paper document is preserved. In addition, hyperlinks are used throughout, and keyword search is supported as well as go to page number.

- ☐ Viewer only
- ☒ Viewer with additional features
- ☐ Mark-up language
- ☐ Note-taking

☒ Enhanced Vision

☒ Flight Performance Calculations – 3rd party applications

- ☒ Weight & Balance
- ☒ Takeoff/Landing Performance
- ☐ Other

DAC International	**Location:** Austin, TX

- ☒ Flight Planning – 3rd party application
- ☐ GPS/Navigation Display
- ☒ Logbook – 3rd party application
- ☐ Moving Map
- ☒ Airport Moving Map
- ☐ Synthetic Vision
- ☐ Terrain Display
- ☐ Traffic Surveillance
  - ☐ Merging/Spacing
- ☒ Video Surveillance – supported with video server
- ☐ Voice Data Communications
- ☒ Weather – XM WX WxWorx supported
- ☒ Other: Calculator

FlightPrep, Inc.	**Location:** Aurora, OR
Product(s)	ChartBook-3-EFB; Helm X650 Docking Electronic Flight Bag System and ChartCase applications
Website(s)	• www.flightprep.com • http://www.flightprep.com/rootpage.php?page=ChartBookS • http://www.flightprep.com/rootpage.php?page=helm

Product Overview(s)

The ChartBook-3 EFB is a portable tablet computer that may be secured on a yoke mount or kneeboard. The Helm X650 is a portable EFB with built in GPS and clip-in panel mount. Both portable EFBs have touch screen capability, and come with FlightPrep's ChartCase Professional software package. ChartCase Professional provides electronic charting, XM Weather, flight planning, Traffic Detection functions, delivering paperless flight deck capabilities for most Windows-based computers. All Sectional Charts, WAC Charts, High/Low Enroute Charts, Instrument Procedures, Airport Diagrams, and vector charts for the U.S. are provided. Additionally, weather capability in the flight deck is supported using the WxWorx receiver so that NEXRAD, METARs, TAFs, TFRs, and more can be overlaid for the route and flight path. A Synthetic Vision (Highway in the Sky (HITS)) feature displays flight information in 3D format and can show supplemental GPS based flight telemetry. A Terrain Awareness Function (TAWS) is also supported.

Images courtesy of FlightPrep, Inc.

Authorization/Compliance

Authority	☒ FAA (authorization) ☐ EASA ☐ Other
TC/STC	☐ TC ☐ STC
TSO	☐ TSO-C113a, Airborne Multipurpose Electronic Displays ☐ TSO-C165a, Electronic Map Display Equipment for Graphical Depiction of Aircraft Position (Own-Ship) ☐ Other

FlightPrep, Inc.	**Location:** Aurora, OR
FAA Regulatory and Guidance Material	☐ AC 20-173, Installation of Electronic Flight Bag Components ☐ AC 25-11B, Electronic Flight Deck Displays ☒ AC 120-76C, Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags ☒ FAA Order 8900.1, Electronic Flight Bag Operational Authorization Process ☒ Other: AC 91-78, Use of Class 1 or Class 2 Electronic Flight Bag (EFB)
Industry Documents	☐ RTCA DO-160G, Environmental Conditions and Test Procedures for Airborne Equipment ☒ RTCA DO-178C, Software Considerations in Airborne Systems and Equipment Certification (Software Level: E) ☐ RTCA DO-200B, Standards for Processing Aeronautical Data ☐ RTCA DO-254, Design Assurance Guidance for Airborne Electronic Hardware ☐ RTCA DO-257A, MOPS for the Depiction of Navigation Information on Electronic Maps ☐ RTCA DO-294C, Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDS) on Aircraft ☐ Other
Other	
Hardware	
Hardware Class	☒ Class 1 or 2 (portable) Devices: Chartbook (Tablet; Intel Atom Dual-Core Processor Z2760) and Helm handheld. ☐ Class 3 (installed)
Power Source	☒ Aircraft power (no battery) (Helm) ☐ Internal battery only (self-powered) ☒ Dedicated aircraft power and Internal battery (ChartBook) ☐ Universal aircraft power and internal battery ☐ External battery ☐ Other
Battery Type	☐ Lithium ion secondary (rechargeable) ☒ Lithium polymer secondary (rechargeable) (Chartbook) ☐ Lithium metal primary (non-rechargeable) ☐ Nickel metal hydride secondary (rechargeable) ☐ Nickel-cadmium secondary (rechargeable) ☐ Other ☐ N/A Expected/typical battery life: Chartbook only: 8 hours
Securing Solution	☐ Permanently attached ☒ Not permanently attached (viewable stowage) ChartBook – Yoke, cradle, kneeboard and “Side Mount” on the seat rail;
Stowage	N/A (at operator’s discretion)
Display Size	Chartbook: 8.1” Helm: 5” by 6”
Display Resolution	Chartbook: 1280 x 800 Helm: 640 x 800
Brightness	ChartBook: Approx. 300 nits, Helm: 1000 nits LED Backlight Fully Dimmable

FlightPrep, Inc.	**Location:** Aurora, OR
Controls	☒ Touch Screen ☐ Stylus ☒ Buttons ☐ Mouse/cursor ☐ External Keyboard ☐ Other
Communications	☒ Wired (Helm) ☒ External wireless – not connected with aircraft (Chartbook –Wifi, Bluetooth) ☐ Wireless aircraft connection ☐ None ☐ Other
Data Bus	☐ ARINC 429 ☐ ARINC 828 ☒ USB ☒ LAN ☐ Other
Aircraft Connectivity	☐ Transmit and Receive: Aircraft to EFB and EFB to aircraft ☐ Receive only: Aircraft to EFB only ☐ Transmit only: EFB to aircraft only ☐ Other
Accessories	Bluetooth GPS receiver, weather receiver, power adapters, weather antennas, optional traffic receiver.
Operating System	ChartBook – Microsoft Windows 8 Helm - Microsoft Windows XP ChartCase - Microsoft Windows XP Tablet/Pro/Home/Media Service Pack 2 or newer FlightPrep, Inc. provides custom software that works on most Windows-based PC's, Data Updates available in annual or 1 time downloads from FlightPrep: • Annual Subscriptions – updated every 28 days (IFR Current Update) • 1 Time data updates (also available in the form of 4 week subscriptions)
Applications Supported	
☐ Data Link ☒ Aeronautical Charts ☒ Raster ☒ Vector-based ☒ Electronic Checklists ☐ Viewer only ☐ Error checking ☐ Automated error-checking ☒ Active checklist ☒ Electronic Documents – Provides creating, viewing, printing, PDF functionality ☐ Viewer only ☐ Viewer with additional features ☒ Mark-up language ☐ Note-taking	

FlightPrep, Inc.	**Location:** Aurora, OR

- ☐ Enhanced Vision
- ☒ Flight Performance Calculations – Calculations are based on data for that specific individual aircraft. User may input performance data for numerous aircraft. Program comes with generic data for over 20 aircraft that is modifiable by user.
  - ☒ Weight & Balance
  - ☒ Takeoff/Landing Performance
  - ☒ Other – Functions supported: Weight & Balance, Climb/Descent Performance, Fuel Planning, Altitude Analysis tool for selecting efficient cruising altitude based upon forecasted winds
- ☒ Flight Planning – Full suite of tools for routing, filing, and weather provided for off-line or on-line use
- ☒ GPS/Navigation Display
- ☒ Logbook
- ☒ Moving Map
- ☒ Airport Moving Map
- ☒ Synthetic Vision
- ☒ Terrain Display – 3-D and 2-D overhead, and profile terrain display
- ☒ Traffic Surveillance – Traffic Avoidance
  - ☐ Merging/Spacing
- ☐ Video Surveillance
- ☐ Voice Data Communications
- ☒ Weather – XM Weather support when used with Bluetooth or USB XM Radio Receiver
- ☒ Other – Track building capabilities to store information about flight paths

Innovative Solutions and Support	**Location:** Exton, PA
Product(s)	Cockpit/IP®Flat Panel Display system (FPDS)
Website(s)	• http://www.innovative-ss.com • http://www.innovative-ss.com/platforms/index.asp?ID=73&L1=2&L2=4&L3=0&display=1

Product Overview(s)

IS&S Class 3 EFB system is integrated as an option in the IS&S CockpitIP™ Glass Cockpit Display Systems for both forward-fit and retrofit solutions. The EFB functionality is integrated into the Navigation Display (ND)/Multifunction Display (MFD), a Class 3 forward field of view implementation. The EFB products include Jeppesen's terminal, approach, departure, airport diagram, RNAV, and more charts, moving map display with satellite weather (XM) overlay capability, optional checklist and video input functions. Own aircraft is overlaid on all geo-referenced Jeppesen™ charts including airport diagrams/taxiways. The EFB integrates with existing or new WAAS capable Flight Management/Navigator systems. Interactive Checklist functionality uses XML based files that can be generated by the aircraft operator. Video input capability allows for the addition of composite, DVI or RGB type video feeds enabling forward field of view EVS, tail cameras, gear cameras, cabin surveillance or mission specific computers to interface with the Class 3 display(s). IS&S plans to provide this EFB/satellite weather option in the 757/767 FPDS airline Cockpit Display Systems shortly.

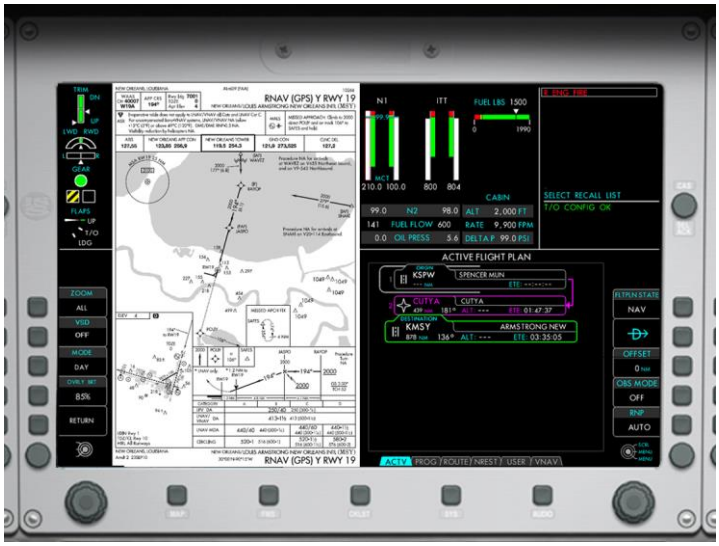


Image courtesy of Innovative Solutions and Support

Authorization/Compliance

Authority	☒ FAA Certification Office: New York ☐ EASA ☐ Other
TC/STC	☐ TC Aircraft: ☒ STC Aircraft: Pilatus PC-12, Cessna Citation, Eclipse 500, Eclipse 550
TSO	☒ TSO-C113a, Airborne Multipurpose Electronic Displays ☒ TSO-C165a, Electronic Map Display Equipment for Graphical Depiction of Aircraft ☐ Other

Innovative Solutions and Support	**Location:** Exton, PA
FAA Regulatory and Guidance Material	☐ AC 20-173, Installation of Electronic Flight Bag Components ☐ AC 25-11B, Electronic Flight Deck Displays ☒ AC120-76C, Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags ☐ FAA Order 8900.1, Electronic Flight Bag Operational Authorization Process ☐ Other
Industry Documents	☒ RTCA DO-160G, Environmental Conditions and Test Procedures for Airborne Equipment ☒ RTCA DO-178B, Software Considerations in Airborne Systems and Equipment Certification (Software Level: C - for EFB functions) ☐ RTCA DO-200B, Standards for Processing Aeronautical Data ☒ RTCA DO-254, Design Assurance Guidance for Airborne Electronic Hardware (System Development Assurance Level: A) ☐ RTCA DO-257A, MOPS for the Depiction of Navigation Information on Electronic Maps ☐ RTCA DO-294C, Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDS) on Aircraft ☐ Other
Other	
Hardware	
Hardware Class	☐ Class 1 or 2 (portable) ☒ Class 3 (installed) Device(s): IS&S CockpitIP™ Glass Cockpit Display Systems
Power Source	☒ Aircraft power (no battery) ☐ Internal battery only (self-powered) ☐ Dedicated aircraft power and internal battery ☐ Universal aircraft power and internal battery ☐ External battery ☐ Other
Battery Type	☐ Lithium ion secondary (rechargeable) ☐ Lithium polymer secondary (rechargeable) ☐ Lithium metal primary (non-rechargeable) ☐ Nickel metal hydride secondary (rechargeable) ☐ Nickel-cadmium secondary (rechargeable) ☐ Other ☒ N/A
Securing Solution	☐ Permanently attached ☐ Not permanently attached (viewable stowage) Class 3 – Integrated into the glass panel mounted in forward field of view
Stowage	N/A
Display Size	IS&S CockpitIP® Display systems are available as 10.4”, 15” and 15.4” displays
Display Resolution	1440 x 900
Brightness	Depending on cockpit configuration up to 200 fL

Innovative Solutions and Support	**Location:** Exton, PA
Controls	☐ Touch Screen ☐ Stylus ☒ Buttons ☐ Mouse/cursor ☒ Keyboard ☐ Other
Communications	☒ Wired ☐ External wireless – not connected with aircraft ☐ Wireless aircraft connection ☐ None ☐ Other Note: Wireless capable but feature not yet activated
Data Bus	☒ ARINC 429 ☐ ARINC 828 ☒ USB ☒ LAN ☐ Other
Aircraft Connectivity	☐ Transmit and Receive: Aircraft to EFB and EFB to aircraft ☒ Receive only: Aircraft to EFB only (MS, air data, AHRS) ☐ Transmit only: EFB to aircraft only ☐ Other
Accessories	XM Satellite receiver unit, Enhanced Visual System (EVS) camera
Operating System	Custom built display systems. The EFB processing unit interfaces with the display through Ethernet.

Applications Supported

☒ Data Link
☒ Aeronautical Charts
- ☐ Raster
- ☒ Vector-based Jeppesen™ JDS/JIT E-Chart integration

☒ Electronic Checklists XML based checklist, customizable
- ☐ Viewer only
- ☐ Error checking
- ☐ Automated error-checking
- ☐ Active checklist

☐ Electronic Documents
- ☐ Viewer only
- ☐ Viewer with additional features
- ☐ Mark-up language
- ☐ Note-taking

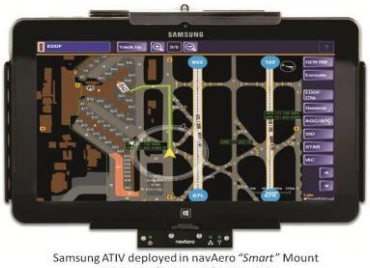
☒ Enhanced Vision requires external camera
☒ Flight Performance Calculations Available on Eclipse 500 platform
- ☒ Weight & Balance
- ☐ Takeoff/Landing Performance

Innovative Solutions and Support	**Location:** Exton, PA
☐ Other ☐ Flight Planning ☒ GPS/Navigation Display Integrated into primary ND/MFD ☐ Logbook ☒ Moving Map Integrates with existing FMS/Navigator ☒ Airport Moving Map Jeppesen™ airport maps ☒ Synthetic Vision ☒ Terrain Display ☒ Traffic Surveillance TCAS I/II, or TIS traffic is displayed on both the ND and PFD displays, Provisions are made to allow for ADS-B traffic and Merging/spacing. ☒ Merging/Spacing ☒ Video Surveillance requires external camera ☐ Voice Data Communications ☒ Weather Active weather feed from onboard weather radar unit and XM Satellite Weather receiver ☐ Other	
Noteworthy Features and Applications	

navAero Ab	**Location:** Sundsvall, Sweden
Product(s)	navAero iPad/Tablet/Slate Portable EFB Mounting Systems t•Bag™ C2² EFB Computer System to be connected to: ➢ t•Pad™ 1100 Touch Screen Display ➢ t•Pad™ 1200 Touch Screen Display ➢ t•Pad™ 1500 Touch Screen Display ➢ t•Pad™ 2000 Touch Screen Display with optional bezel keys navAero Universal Aircraft Interface Device – UAID navAero t•Server™ Aircraft Server navAero t•Com™ Communications Module navAero t•Cam™ Aircraft Cockpit Door Surveillance System
Website(s)	• www.navaero.com • http://www.navaero.com/?page=products • http://www.navaero.com/?page=products&subpage=es • http://www.navaero.com/?page=support_and_downloads • http://www.navaero.com/download/UAID_2013.pdf • http://www.navaero.com/download/Integrated_EFB_Systems_2013.pdf • http://www.navaero.com/download/tCam_2013.pdf • http://www.navaero.com/download/Tablet_EFB_Systems_2013.pdf
Product Overview(s)	
The navAero iPad/Tablet/Slate EFB Mounting Systems allow for deployment of virtually any tablet device for use as a mounted EFB platform. t•Bag™C2² is a modular aircraft-dedicated EFB system that can utilize any t▪Pad™ touch screen displays. The system features a remote-mounted CPU with integrated backup battery, docking station, and an Interface Unit. Ancillary navAero hardware provides capabilities (e.g., flight deck door surveillance and dedicated file, web and NTP server) to any deployed navAero EFB system. navAero maintains strategic relationships with leading application providers and systems integrators such as Jeppesen, Sabre Airline Solutions, Thales, SITA and others in order to provide customers with integrated hardware and software solutions.	

navAero Ab	**Location:** Sundsvall, Sweden

iPad deployed in navAero *"Smart"* Mount with Power/Data Interface Module



Samsung ATIV deployed in navAero *"Smart"* Mount with Power/Data Interface Module

t•Bag™ C2² EFB System shown with t•Pad™ 2000 Display

Images courtesy of navAero

Authorization/Compliance

Authority	☒ FAA Certification Office: Atlanta, Chicago, Los Angeles, New York ☒ EASA ☒ Other: ANAC – Brazil; TCCA – Canada; DGCA – India; DCAA – UAE; GACA – Saudi Arabia; DGCM – Malaysia
TC/STC	☐ TC ☒ STC Aircraft: See below

A300/310	FAA ST02502CH
A300/310	EASA 10040961
A319/320/321	FAA ST03335AT
A318/319/320/321	EASA 10028447
A318/319/320/321 (Tablet)	EASA 10049061
A330-200/300	EASA 10037255
A340	EASA 10043627
B727-100/200	FAA ST02648NY
B737-600/700/800	FAA ST03165AT

navAero Ab	Location: Sundsvall, Sweden
	B737-600/700/800/900 — FAA ST02714NY B737-300/400/500/600/700/800/900 — EASA 10014973
TC/STC	B737-300/400/500/600/700/800/900 — TCCA 5010-O-13-0178 B747-100/200/300 — FAA ST01815SC B747-400 — FAA ST026551NY B747-400 — EASA 10046400 B757-200/300 — FAA ST13069LA-T B757-200/300 — EASA 10029398 B767-200/300/400 — FAA ST02320LA B767-200/300/400 — EASA 10033897 MD-10/11 — FAA ST 03327AT MD-82/83/87 — FAA ST02409CH-D MD-82/83/87 — EASA.IM.A.S.03005 BAE 146/Avro RJ70/85/100 — EASA 10036958 E135 — EASA 10027700 CL601 — EASA 10032061 CL604 — FAA ST02721CH-D Q400 (Tablet) — FAA ST03170NY Q400 — EASA 10043585 Q400 (Tablet) — TCCA SA13-69 C27-J — EASA 10048865
TSO	☐ TSO-C113a, Airborne Multipurpose Electronic Displays ☐ TSO-C165a, Electronic Map Display Equipment for Graphical Depiction of Aircraft ☐ Other
FAA Regulatory and Guidance Material	☐ AC 20-173, Installation of Electronic Flight Bag Components ☐ AC 25-11B, Electronic Flight Deck Displays ☒ AC 120-76C, Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags ☐ FAA Order 8900.1, Electronic Flight Bag Operational Authorization Process ☐ Other
Industry Documents	☒ RTCA DO-160D, Environmental Conditions and Test Procedures for Airborne Equipment ☐ RTCA DO-178C, Software Considerations in Airborne Systems and Equipment Certification ☐ RTCA DO-200B, Standards for Processing Aeronautical Data ☐ RTCA DO-254, Design Assurance Guidance for Airborne Electronic Hardware ☐ RTCA DO-257A, MOPS for the Depiction of Navigation Information on Electronic Maps ☐ RTCA DO-294C, Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDS) on Aircraft ☐ Other
Other	

navAero Ab	**Location:** Sundsvall, Sweden
Hardware	
Hardware Class	☒ Class 1 or 2 (portable) Device(s) ☐ Class 3 (installed) Device(s) Based upon newly published regulatory guidance from EASA and FAA, all navAero EFB solutions are classified as "Portable" EFB solutions. • The navAero iPad/Tablet/Slate EFB system is a mounting solution for deployment of virtually any portable tablet device for its use as an EFB platform: ▪ By incorporating the navAero Power Interface Module into the navAero *"Smart"* Mount holder, certified connectivity to an aircraft DC power bus can be achieved for providing aircraft power for device charging; ▪ By replacing the Power Interface Module with the navAero Power/Data Interface Module to the *"Smart"* Mount holder and adding the navAero Universal Aircraft Interface Device (UAID) into the system architecture, certified connectivity to aircraft DC power bus and ARINC data bus can be achieved for providing aircraft power for device charging and providing aircraft data connectivity (ARINC 429/717) with the iPad/tablet EFB device. • The navAero t•BagC2^2 Computer and Display System is a portable COTS-based, purposefully built aircraft-dedicated EFB that features a removable and independent CPU module and tethered display. The CPU module connects to docking station and the two components are held in place with a PMA'd mounting plate. Installation provisions also provide a mounting solution for the tethered display so to allow for the use of the system in all phases of flight. The docking station provides a certified connection point for hardwire connectivity to the aircraft for data and power. The CPU/Docking Station assembly also connects to an Interface Unit by means of a multi-cable wiring harness kit. This Interface Unit provides a port for the t•Pad display to connect to the system. The Interface Unit can be located up to 5 meters from the CPU/Docking Station assembly. ▪ Display choices for the navAero t•BagC2^2 System are: t•Pad 1100, t•Pad 1200, t•Pad 1500. t•Pad 2000. ▪ The addition of the navAero Universal Aircraft Interface Device (UAID) to the t•BagC2^2 system will provide certified connectivity to ARINC 429/717 data buses as well as routing for Satcom connectivity.
Power Source	☐ Aircraft power (no battery) ☐ Internal battery only (self-powered) ☒ Dedicated aircraft power and Internal battery ☒ Universal aircraft power and internal battery ☐ Other
Battery Type	☒ Lithium ion secondary (rechargeable) ☐ Lithium polymer secondary (rechargeable) ☐ Lithium metal primary (non-rechargeable) ☒ Nickel metal hydride secondary (rechargeable) ☐ Nickel-cadmium secondary (rechargeable) ☐ Other ☐ N/A Expected/typical battery life: 2 Years If aircraft power to the t*Bag(tm)C22 EFB system (CPU & Display) is terminated/ interrupted, the EFB system will continue to run via the internal NiMH battery. The system will function with full capability/functionality and full display illumination for a minimum of at least 45 minutes.

navAero Ab	**Location:** Sundsvall, Sweden
Securing Solution	☐ Permanently attached ☒ Not permanently attached (viewable stowage) : swivel mount and cradle/holder The t•Pad 1100, t•Pad 1200, t•Pad 1500 and t•Pad 2000 displays are all designed to be secured and held in place by means of an STC'd mounting structure. This mounting structure is then attached to the aircraft structure (side-wall or window frame peripheral mounting solution) by means of several different types of fixtures, including the following: • STC'd "sliding" mounting fixtures and "swivel" mounting fixtures • The *"Smart"* Mount holder/mounting plate for iPad/Tablet devices can be secured in a manner identical to that described above for any of the t•Pad displays. • The *"Smart"* Mount mounting plate can also be secured by using the navAero *"Smart"* Mount-VC…a portable vacuum cup mounting system solution for containing an iPad or Windows/Android tablet so to realize benefits from the device as a mounted EFB that can be used in all phases of flight. This is an integrated carry-on "install/detach without tools" mounting system that gives the pilot the option of positioning the mounting structure in the most appropriate position for viewing and use as a mounted device. The *"Smart"* Mount-VC mounting solution is equipped with an automatic Low Vacuum Alert mechanism, which provides a visual indicator/signal as to a fault with the vacuum-mounting system and its ability to securely hold the tablet device in the mounted location. • Pump-style vacuum cup attaches to both flat and curved surfaces and features a mechanical FLAG that automatically rises to visually indicate significant vacuum loss. • Highly resilient molded vacuum cup construction meets all requirements detailed in the recently released EASA AMC 20-25 and FAA AC120-76C. Deemed a "Viewable Stowage" (carry-on) device by the FAA/EASA. No Installation Certification required. • *"Smart"* Mount holders are currently available for iPad 4th Generation, iPad Air, iPad Air 2, Samsung ATIV Tab 7, Panasonic ToughPad,, Windows Surface Pro 3, Dell Venue 11. *"Smart"* Mount holders for other devices are currently in development. • Placement/positioning human factors documentation and templates provided at no cost for Boeing B727, B737, B747, B757, B767, B777, Airbus A300-310, A318/319/320/321, A330, A340 aircrafts as well as for select Embraer and Bombardier aircrafts. • Possibility to utilize existing cockpit 28 V DC outlets for EFB tablet powering & charging by adding the navAero Power Interface module (PI) to the Smart Mount holder. The PI will convert aircraft power to tablet voltage and supply power via the device's standard USB/Power cable. The PI is connected to the cockpit outlet via separate loose/portable cable. (A 115 V cockpit outlet requires the use of the loose/portable power converter provided with the tablet.). • Upgrade path to an installed solution (STC) which utilizes the same tablet holder and Power Interface Module. Architecture can also be expanded to include aircraft data connectivity (ARINC 429/717).
Stowage	

navAero Ab	**Location:** Sundsvall, Sweden
Display Resolution	All t•Pad displays are active-matrix liquid crystal display color screen (color Thin Film Transistor (TFT) LCD) film-on-glass resistive and capacitive touch screen. • t•Pad 1100 –XGA 1024x768 resolution, 262K colors. Viewing angle L/R 160^{o}, U/D 160^{o} • t•Pad 1200 – XGA 1280x768 resolution, 262K colors. Viewing angle L/R 160^{o}, U/D 160^{o} • t•Pad 1500 –XGA 1024x768 resolution, 262K colors. Viewing angle L/R 160^{o}, U/D 160^{o} • t•Pad 2000 –XGA 1024x768 resolution. 262K colors. Viewing angle L/R 160^{o}, U/D 160^{o} For the navAero iPad/Tablet EFB System, mounting solutions are currently available for the following tablet devices with the following resolutions: • iPad 4: 2048 x 1536 • iPad Air: 2048 x 1536 • Windows Surface Pro 3: 2160 x 1440 • Samsung ATIV: 1920 x 1080 • Panasonic Toughpad: 1024 x 768 • Dell Venue 11: 1920 x 1080 Mounting solutions for other tablet devices are presently in development. Display resolution of other commercially available tablet devices are as per the manufacturer's specifications.
Brightness	All t•Pad displays have contrast ratio 450:1. • t•Pad 1100 – LED backlighting brightness is 1000 NITS (1000cd/m^2 progressively dimmable to 0cd/m^2) manually controlled by hard buttons • t•Pad 1200 – LED backlighting brightness is 1000 NITS (1000cd/m^2 progressively dimmable to 0cd/m^2) manually controlled by hard buttons • t•Pad 1500 LED backlighting brightness is 1000 NITS (1000cd/m^2 progressively dimmable to 0cd/m^2) manually controlled by hard buttons • t•Pad 2000 – LED backlighting brightness is 1000 NITS (1000cd/m^2 progressively dimmable to 0cd/m^2) Illumination is automatically controlled by a light sensor that automatically adjusts to ambient conditions and can be manually adjusted to a user defined level. Illumination levels (brightness) of commercially available tablet devices are as per the manufacturer's specifications.

navAero Ab	**Location:** Sundsvall, Sweden
Controls	•t•Pad 1100 and t•Pad 1500 feature 3 hard buttons that control illumination on/off, illumination increase and illumination decrease. •t•Pad 1200 feature 12 pre- assigned keys to control illumination as well as other pre-assigned and assignable functions •t•Pad 2000 feature optional bezel keys: 22 user-assignable and 12 pre- assigned keys) to control illumination as well as other pre-assigned and assignable functions Illumination controls of commercially available tablet devices are as per the manufacturer's specifications. ☒ Touch Screen ☐ Stylus ☒ Buttons ☐ Mouse/cursor ☐ External Keyboard ☐ Other
Communications	☒Wired ☒ External wireless – not connected with aircraft ☒ Wireless aircraft connection: SATCOM, ACARS
Data Bus	☒ ARINC 429 ☒ ARINC 828 ☒ USB ☒ LAN ☒ Other: A717
Aircraft Connectivity	☒ Transmit and Receive: Aircraft to EFB and EFB to aircraft (Wireless LAN, ACARS) ☒ Receive only: Aircraft to EFB only (ARINC 429, 717) ☒ Transmit only: EFB to aircraft only (ACARS, printer) ☐ Other
Accessories	Universal Aircraft Interface Device – UAID t•Com Module: LTE / HSPA / HSDPA / UMTS backwards compatibility to GMS, GPRS and EDGE t•Cam Cockpit Door Surveillance System t•Server dedicated aircraft File, Web and NTP server
Operating System	Microsoft Windows (Version: Windows 8 / Windows 7 / Windows XP), Linux, Android, iOS
Applications Supported	
☒ Data Link ☒ Aeronautical Charts – Compatible and supports applications from Jeppesen, LIDO, EAG and other charting applications designed to run under the Microsoft Windows or Linux operating system ☐ Raster ☐ Vector-based ☒ Electronic Checklists ☒ Viewer only ☐ Error checking ☐ Automated error-checking	

navAero Ab	**Location:** Sundsvall, Sweden

- ☐ Active checklist
- ☒ Electronic Documents – Compatible and supports Electronic Document viewer applications from Jeppesen, LIDO, EAG, and others
  - ☒ Viewer only
  - ☐ Viewer with additional features
  - ☐ Mark-up language
  - ☐ Note-taking
- ☐ Enhanced Vision
- ☒ Flight Performance Calculations – Compatible with Flight Performance Calculation applications from Boeing, Airbus, Embraer, Bombardier as well as third party providers who applications are designed to run under the Microsoft Windows or Linux operating system
  - ☒ Weight & Balance
  - ☒ Takeoff/Landing Performance
  - ☐ Other
- ☒ Flight Planning
- ☒ GPS/Navigation Display
- ☒ Logbook – Compatible with Electronic Logbook applications from numerous third party providers like Ultramain and others whose applications are designed to run under the Microsoft Windows or Linux operating system
- ☒ Moving Map
- ☒ Airport Moving Map – navAero t•BagC2^2 EFB system was the first portable EFB system to be STC'd and deployed with the Jeppesen AMM application and currently flying on a Part 121 airline
- ☐ Synthetic Vision
- ☐ Terrain Display
- ☒ Traffic Surveillance – The navAero t•BagC2^2 EFB system is currently deployed in the FAA New Technology full motion flight simulators (B737NG; A330/340) located in OKC for testing the ACSS CDTI applications
  - ☐ Merging/Spacing
- ☒ Video Surveillance – navAero has developed a proprietary video surveillance system (t•Cam) which features Ethernet cameras and a viewing/recording/playback software application
- ☒ Voice Data Communications– navAero t•BagC2^2 EFB system is currently flying on Part 121 commercial airliners as a data communications display device (ACARS alternative) that is using the Iridium SATCOM as the communications pipeline. Deployment done in conjunction with SITA AIRCOMConnect allows for AEEC 619 (connection to ACARS CMU for basic ACARS messaging), AEEC 841 MIAM over ACARS or MIAM over IP.
- ☒ Weather – navAero t•BagC2^2 EFB system is compatible with and supports applications designed to run under the Microsoft Windows operating system – WSI, WxWorx, Honeywell WINN and others
- ☐ Other

Noteworthy Features and Applications

Additional FAA, EASA, TCCA and other regulatory agency Supplemental Type Certifications/Minor Change Certifications are being achieved on an on-going basis for the deployment of the navAero iPad/Tablet EFB System as well as the navAero t•BagC2^2 EFB system.

Universal Avionics	**Location:** Tucson, AZ
Product(s)	EFI-1040, EFI-890R
Website(s)	• www.uasc.com • http://www.uasc.com/products/efi890r.aspx • http://www.uasc.com/products/insight.aspx
Product Overview(s)	
The ASU provides a supplemental electronic display system that can be integrated with flight deck instruments. The remote ASU computer supports up to two displays and can be displayed on the EFI-890R Navigation Display (ND). Pilots can access electronic charts, checklists, electronic documents, WSI satellite weather and video sources. The ASU electronic chart database is provided by Jeppesen's JeppView product; appropriate charts can be sorted automatically based on departure and arrival airport information supplied by the Flight Management System (FMS). Aircraft present position can be displayed on the electronic charts or WSI broadcast weather products for all phases of flight. Aircraft-specific procedural checklists can be created by pilots for normal, abnormal, and emergency situations. Documents such as Flight Manuals can be digitized and stored for convenient in-flight access. The charts are integrated in the new EFI-1040 display and are controlled by the electronic control display unit (ECDU).	
 *Images courtesy of Universal Avionics*	
Authorization/Compliance	
Authority	☒ FAA (in progress) ☒ EASA (EFI-890R only, not planned for EFI-1040) ☐ Other
TC/STC	☐ TC ☒ STC Aircraft: Falcon 10, 20, 50 and 900B; King Air 200/300350; Pilatus PC-12; Boeing Business Jet and 737-300/400; Bombardier's Lear 25, 35 & 60; Challenger 600 & 601; Dassault Falcon 2000; Gulfstream GII, GIII; Cessna Citation 500, 501, 550, S550, 551, 560, & 650; IAI Astra. The EFI-1040 will be certified and installed in the Citation VII in June 2015.
TSO	☒ TSO-C113a, Airborne Multipurpose Electronic Displays ☒ TSO-C165a, Electronic Map Display Equipment for Graphical Depiction of Aircraft ☐ Other
FAA Regulatory and Guidance Material	☐ AC 20-173, Installation of Electronic Flight Bag Components ☐ AC 25-11B, Electronic Flight Deck Displays ☐ AC120-76C, Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags ☐ FAA Order 8900.1, Electronic Flight Bag Operational Authorization Process ☐ Other

Universal Avionics	**Location:** Tucson, AZ
Industry Documents	☒ RTCA DO-160D/E, Environmental Conditions and Test Procedures for Airborne Equipment ☒ RTCA DO-178B, Software Considerations in Airborne Systems and Equipment Certification (Software Level: A) ☐ RTCA DO-200B, Standards for Processing Aeronautical Data ☐ RTCA DO-254, Design Assurance Guidance for Airborne Electronic Hardware ☐ RTCA DO-257A, MOPS for the Depiction of Navigation Information on Electronic Maps ☐ RTCA DO-294C, Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDS) on Aircraft ☐ Other
Other	
Hardware	
Hardware Class	☐ Class 1 or 2 (portable) ☒ Class 3 (installed)
Power Source	☒ Aircraft power (no battery) ☐ Internal battery only (self-powered) ☐ Dedicated aircraft power and internal battery ☐ Universal aircraft power and internal battery ☐ External battery ☐ Other
Battery Type	☐ Lithium ion secondary (rechargeable) ☐ Lithium polymer secondary (rechargeable) ☐ Lithium metal primary (non-rechargeable) ☐ Nickel metal hydride secondary (rechargeable) ☐ Nickel-cadmium secondary (rechargeable) ☐ Other ☒ N/A
Securing Solution	☐ Permanently attached ☐ Not permanently attached (viewable stowage) N/A – Installed EFB
Stowage	N/A - Installed
Display Size	EFI 890R – 8.9” EFI 1040 – 10.4”
Display Resolution	EFI 890R – 780x780 pixel, LED backlit EFI 1040 - 1024x768 pixels, 123.07 pixels per inch, LED backlit
Brightness	Low reflectance, fully dimmable for nighttime viewing.

Universal Avionics	**Location:** Tucson, AZ
Controls	Describe the control interface for each product, and indicate whether the product has the following controls (check all that apply): ☐ Touch Screen ☐ Stylus ☒ Buttons EFI-1040 can also be controlled by the ECDU ☐ Mouse/cursor ☐ External Keyboard ☒ Other: Cursor Control Panel (CCP) for both
Communications	☒ Wired ☐ External wireless – not connected with aircraft ☐ Wireless aircraft connection ☐ None ☐ Other
Data Bus	☒ ARINC 429 ☐ ARINC 828 ☐ USB ☐ LAN ☒ Other: CSDB input/output ports, ARINC 407, ARINC 708, Manchester bus ports, RS-232, RS 422, Ethernet
Aircraft Connectivity	☐ Transmit and Receive: Aircraft to EFB and EFB to aircraft ☒ Receive only: Aircraft to EFB only (UASC FMS, Generic FMS, generic GPS) ☐ Transmit only: EFB to aircraft only ☒ Other: RS-232 I/O to WSI (EFI-890R only), Ethernet I/O to Data loader and printer
Accessories	
Operating System	Custom built hardware, with separate display and processor units.

Applications Supported

☐ Data Link
☒ Aeronautical Charts – Jeppesen electronic charts with world-wide coverage and printing
  ☐ Raster
  ☐ Vector-based
☒ Electronic Checklists – Checklists are interactive and interface to yoke switches. Aircraft specific checklists are supported. Offline program to create aircraft unique checklist is provided. (EFI-890R only)
  ☒ Viewer only
  ☐ Error checking
  ☐ Automated error-checking
  ☐ Active checklist
☒ Electronic Documents
  ☒ Viewer only – PDF files can be loaded, viewed, deleted, printed, and managed within the viewer application (EFI-890R only)
  ☐ Viewer with additional features
  ☐ Mark-up language
  ☐ Note-taking
☒ Enhanced Vision – Support display of Enhanced Visual System (EVS) camera input in landscape or portrait mode in UCDT III display

Universal Avionics	**Location:** Tucson, AZ

- ☐ Flight Performance Calculations
  - ☐ Weight & Balance
  - ☐ Takeoff/Landing Performance
  - ☐ Other
- ☐ Flight Planning
- ☐ GPS/Navigation Display
- ☐ Logbook
- ☒ Moving Map – Show Present Position (PPOS) in flight on Jeppesen electronic charts and WSI weather depictions (WSI EFI-890R only)
- ☒ Airport Moving Map – Show PPOS on airport chart diagrams
- ☒ Synthetic Vision
- ☒ Terrain Display
- ☐ Traffic Surveillance
  - ☐ Merging/Spacing
- ☒ Video Surveillance Support for RS-170 (e.g., EVS camera) and NTSC (e.g., standard camera) video inputs
- ☐ Voice Data Communications
- ☒ Weather – WSI Embedded application viewer (EFI-890R only)
- ☒ Other: Printer support (EFI-890R only)

Noteworthy Features and Applications

UTC Aerospace Systems	**Location:** Charlotte, NC
Product(s)	G500 SmartDisplay® Electronic Flight Bag, G700 SmartDisplay® Electronic Flight Bag, Tablet Interface Module (TIM™) and Aircraft Interface Device (AID)
Website(s)	• http://utcaerospacesystemsefb.com/ • http://utcaerospacesystems.com • http://utcaerospacesystems.com/cap/products/Pages/electronic-flight-bags.aspx • http://utcaerospacesystems.com/cap/systems/Pages/SIS-document-library.aspx (click on EFB solutions)

Product Overview(s)

UTC Aerospace Systems is a supplier of electronic flight bag (EFB) solutions. Our SmartDisplay® EFB combines a computer and display in a lightweight, compact unit with our unique multi-touch display and is capable of supporting Windows®-based EFB applications.

Our innovative tablet-compatible EFB system couples a tablet interface module (TIM™) with an aircraft interface device (AID), transforming any tablet into a fully functional EFB, interfacing with and displaying aircraft data for commercial and military platforms.

The electronic flight bag (EFB) suite of products from UTC Aerospace Sysetms features (from left to right) the G700 SmartDisplay® EFB, Tablet Inteface Module (TIM™) and Aircraft Interface Device (AID). Image courtesy of UTC Aerospace Systems.

Authorization/Compliance

Authority	☒ FAA Certification Office: Chicago, Wichita ☒ EASA ☒ Other: CAAC
TC/STC	☐ TC Aircraft: ☒ STC Aircraft: 717, 737NG/CL, 747-400, 767, 777, A320, A330, A340
TSO	☐ TSO-C113a, Airborne Multipurpose Electronic Displays ☐ TSO-C165a, Electronic Map Display Equipment for Graphical Depiction of Aircraft ☐ Other
FAA Regulatory and Guidance Material	☒ AC 20-173, Installation of Electronic Flight Bag Components ☐ AC 25-11B, Electronic Flight Deck Displays ☒ AC 120-76C, Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags ☒ FAA Order 8900.1, Electronic Flight Bag Operational Authorization Process ☐ Other

UTC Aerospace Systems	**Location:** Charlotte, NC
Industry Documents	☒ RTCA DO-160G/F, Environmental Conditions and Test Procedures for Airborne Equipment ☒ RTCA DO-178C, Software Considerations in Airborne Systems and Equipment Certification (Software Level: C and E) ☐ RTCA DO-200B, Standards for Processing Aeronautical Data ☒ RTCA DO-254, Design Assurance Guidance for Airborne Electronic Hardware (System Development Assurance Level: C) ☐ RTCA DO-257A, MOPS for the Depiction of Navigation Information on Electronic Maps ☐ RTCA DO-294C, Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDS) on Aircraft ☐ Other
Other	
Hardware	
Hardware Class	☒ Class 1 or 2 (portable) Device (s): Table Interface Module, G500/G700 SmartDisplay, Aircraft Int Device ☒ Class 3 (installed) Device (s): G500/G700 SmartDisplay
Power Source	☒ Aircraft power (no battery) ☒ Internal battery only (self-powered) Separate COTS Tablet (iPad, Surface, etc.) ☐ Aircraft power and Internal battery ☐ Other
Battery Type	☐ Lithium ion ☐ Lithium polymer ☐ Lithium metal (non-rechargeable) ☐ Nickel metal ☐ Other ☒ N/A Expected/typical battery life: N/A to UTC Aerospace Systems equipment, there are no internal or external battery requirements.
Securing Solution	☒ Permanently attached ☒ Not permanently attached (viewable stowage) Both solutions have been certified/authorized for use throughout all phases of flight.
Stowage	N/A
Display Size	G500 Series: 10.4” G700 Series: 10”
Display Resolution	G500 Series: 1024 x 768 G700 Series: 1024 x 768
Brightness	G700 Series: Optically enhanced for optimized sunlight readability.

UTC Aerospace Systems	**Location:** Charlotte, NC
Controls	☒ Touch Screen (G700 SmartDisplay is multi-touch capable) ☐ Stylus ☒ Buttons ☐ Mouse/cursor ☐ External Keyboard ☐ Other
Communications	☐ External wireless – not connected with aircraft ☒ Wireless aircraft connection ☐ None ☐ Other
Data Bus	☒ ARINC 429 ☒ ARINC 828 ☒ USB ☒ LAN ☐ Other
Aircraft Connectivity	☒ Transmit and Receive: Aircraft to EFB and EFB to aircraft ☐ Receive only: Aircraft to EFB only ☐ Transmit only: EFB to aircraft only ☐ Other
Accessories	Tablet Interface Module (TIM™) Aircraft Interface Device (AID)
Operating System	Microsoft Windows (G500/G700 SmartDisplay and Tablets), Linux (Aircraft Interface Device), iOS (iPad Tablets), Custom (G500/G700 - Certified Real Time Operating System)
Applications Supported	

☒ Data Link (Third Party)
☒ Electronic Charts (Third Party)
- ☒ Raster
- ☒ Vector-based

☒ Electronic Checklists (In house)
- ☐ Viewer only
- ☒ Error checking
- ☐ Automated error-checking
- ☐ Active checklist

☒ Electronic Documents (In house)
- ☐ Viewer only
- ☒ Viewer with additional features
- ☐ Mark-up language
- ☐ Note-taking

☐ Enhanced Vision
☒ Flight Performance Calculations
- ☒ Weight & Balance (In house)
- ☒ Takeoff/Landing Performance (In house)
- ☐ Other

UTC Aerospace Systems	**Location:** Charlotte, NC
☒ Flight Planning (Third Party) ☐ GPS/Navigation Display ☒ Logbook (Third Party) ☒ Moving Map(Third Party) ☒ Airport Moving Map (Third Party) ☐ Synthetic Vision ☐ Terrain Display ☒ Traffic Surveillance (Third Party) ☒ Merging/Spacing (Third Party) ☒ Video Surveillance (In house) ☐ Voice Data Communications ☒ Weather (Third Party) ☐ Other	
Noteworthy Features and Applications	
UTC Aerospace Systems has recently received FAA supplemental type certification (STC) for the Tablet Interface Module (TIM™) and Aircraft Interface Device (AID) as well as Parts manufacturing approval (PMA) for the TIM™. In addition, the G700 SmartDisplay also received a class 2 and class 3 STC and has been provided PMA.	

4.3 Integrated and Customizable Software Manufacturers

Manufacturers listed in this section provide custom software that performs a specific function or integrates and/or manages EFB applications from other software providers.

Flightman™	**Location:** Dublin, Ireland
Product(s)	eJourney Log, Electronic Flight Folder, eTechlog, Weight & Balance and Performance Calculations, Large Content Manager, Forms Designer, Passenger Relationship Management, Business Intelligence Tool, Ground Administrative Manager
Website(s)	www.flightman.com
Product Overview(s)	
Flightman is an integrated set of Electronic Flight Bag (EFB) products which run on all classes of EFBs (1, 2, and 3) including tablets devices (iPad and Android).	

Flightman™ eJourney Log

Flightman™ Business Intelligence

Flightman™ Electronic Flight Folder

Flightman™ eTechlog

Flightman™ Perf. Calcs & WAB

Flightman™ Large Content Manager

Flightman™ Forms Designer

Flightman™ PRM

Flightman™ GAM

Images courtesy of Flightman

Authorization/Compliance	
Authority	☒ FAA (authorization) ☒ EASA ☐ Other
TC/STC	☐ TC ☐ STC

Flightman™	**Location:** Dublin, Ireland
TSO	☐ TSO-C113a, Airborne Multipurpose Electronic Displays ☐ TSO-C165a, Electronic Map Display Equipment for Graphical Depiction of Aircraft Position (Own-Ship) ☐ Other
FAA Regulatory and Guidance Material	☐ AC 20-173, Installation of Electronic Flight Bag Components ☐ AC 25-11B, Electronic Flight Deck Displays ☒ AC 120-76C, Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags ☐ FAA Order 8900.1, Electronic Flight Bag Operational Authorization Process ☐ Other
Industry Documents	☒ RTCA DO-178B, Software Considerations in Airborne Systems and Equipment Certification (Software Level: D) ☐ RTCA DO-200B, Standards for Processing Aeronautical Data ☐ RTCA DO-254, Design Assurance Guidance for Airborne Electronic Hardware ☐ RTCA DO-257A, MOPS for the Depiction of Navigation Information on Electronic Maps ☐ Other
Other	
Hardware Compatibility	
Hardware Class	☒ Class 1 or 2 (portable) ☒ Class 3 (installed)
Display Resolution	Any
Control Compatibility	Describe the control interface compatibility with the software (check all that apply): ☒ Touch Screen ☒ Stylus ☒ Buttons ☒ Mouse/cursor ☒ External Keyboard ☐ Other
Communications	☒ Wired ☒ External wireless – not connected with aircraft ☐ Wireless aircraft connection ☐ None ☐ Other
Data Bus	☒ ARINC 429 ☒ ARINC 828 ☒ USB ☒ LAN ☐ Other
Aircraft Connectivity	☐ Transmit and Receive: Aircraft to EFB and EFB to aircraft ☒ Receive only: Aircraft to EFB only (ARINC 429 aircraft data bus) ☐ Transmit only: EFB to aircraft only ☐ Other
Operating System	Microsoft Windows, Linux, Android, iOS

Flightman™	**Location:** Dublin, Ireland

Applications Supported

- ☐ Data Link
- ☒ Aeronautical Charts - Capable of integrating with any 3rd party charting system that provides maps or charts in electronic format
  - ☐ Raster
  - ☒ Vector-based
- ☒ Electronic Checklists - Business rules, automated error-checking and active checklist is intended to assist the pilot in completing all the pre-flight and post-flight documentation.
  - ☒ Viewer only
  - ☒ Error checking
  - ☒ Automated error-checking
  - ☒ Active checklist
- ☒ Electronic Documents - The Flightman™ Large Content Manager enables the remote distribution and management of content to the EFB devices. In addition the system provides for the support of the configuration management of the EFB's data and software revisions.
  - ☐ Viewer only
  - ☒ Viewer with additional features
  - ☒ Mark-up language
  - ☐ Note-taking
- ☐ Enhanced Vision
- ☒ Flight Performance Calculations - Flightman™ allows the onboard calculation from first principles of aircraft Weight and Balance and Performance Calculations. The flightcrew can pre-calculate for all desired runways and intersections at a specific airport, and enables entry and management of NOTAM and MEL restrictions. (The screen shot provided is of the performance calculations entry data entry screen.)
  - ☒ Weight & Balance
  - ☒ Takeoff/Landing Performance
  - ☐ Other
- ☒ Flight Planning - The electronic flight folder (EFF) is a set of flight briefing applications (including Flight Plans) which allow pilots to access their flight plans and other briefing information onboard the aircraft, and also from home/hotel/crew room, via a secure internet connection. In addition, the EFF also offers the possibility to create annotations in the flight plans. The applications in the EFF are not stand alone point applications and may be tailored to meet specific customer requirements.
- ☐ GPS/Navigation Display
- ☒ Logbook - The eJourney Logbook includes hours and cycles, crew information, fuel management, delays and landing information, and vendor services used. It can be used on any portable computer (tablet, laptop etc.) as well as aircraft-mounted computers. Forms include Crew Assignment & Route information, Takeoff and Landing Data, Aircraft Hours and Cycles, Schedule Delays, Vendor Services, Oil and Hydraulic Fluid data, Engine Cruise Log data, De-Icing information, and Fuel Management. Fuel Management is intended to help the flightcrew plan for their fuel requirements based on the airline's flight plan fuel. It allows flightcrew to calculate fuel requirements and uplifts as well as automatically performing unit conversions. Pilots' compliance with the airline's fuel plan can be measured over time and built-in gross error checking helps eliminate erroneous entries and increase accuracy. All fuel records will be held on the server and populated into relevant airline systems. In addition, records can be sorted by vendor allowing for easy fuel management reconciliation. Fuel consumption can also be reported and analyzed by aircraft, flight number, flightcrew, etc.
- ☐ Moving Map
- ☐ Airport Moving Map
- ☐ Synthetic Vision
- ☐ Terrain Display
- ☐ Traffic Surveillance

Flightman™	**Location:** Dublin, Ireland

☐ Merging/Spacing

☒ Video Surveillance - Cabin Surveillance allows the user to view feeds from one or more cameras installed in the aircraft cabin. The cameras can be either still or video and the images can be viewed in real time by the user or archived for future use.

☐ Voice Data Communications

☒ Weather - As part of the Electronic Flight Folder module, briefing information such as weather can be made available in the flight deck in real time, and can easily be tailored to integrate with any weather provider such as WSI, Meteo Group, etc.

☒ Other

- Forms Designer – allows users to design and maintain airline-specific Electronic Forms (e.g., ASR, Birdstrike etc.) and distribute the e-Forms to a specified Flightman™ application (onboard the aircraft or the Flightman™ Ground Administrative Manager).
- Business Intelligence – allows airlines to view the high-level critical metrics from the data originating from the onboard EFBs with the added ability of drilling down on any of the selected items to provide detailed information (e.g., Actual Flight Plan Fuel vs Actual Fuel Burn, delays by tail number, load percentage per route, etc.).
- Passenger Relationship Management – allows cabin crew to access all pre-flight information and submit post-flight reports directly from the aircraft to the airline's Flight Operations department. Some cabin crew applications include Cash Reconciliation, Passenger Incident, Crew Health & Safety, Flight Report, Cabin Techlog, Performance Feedback & Duty Free Sales Report.
- Electronic Flight Folder – a comprehensive set of flight briefing applications (e.g. Flight Plan, NOTAMs, Waypoints, ETOPs, Alternate Airport Summary, Weather etc.) which allow pilots to access their briefing package onboard the aircraft and also from home/hotel/crew room, via a secure internet connection
- Electronic Tech Log (with separate flightcrew and maintenance user versions) – an electronic version of current paper-based techlog held aboard an aircraft that allows an airline to manage defects within its fleet. Flightman™ eTechLog is configurable to any aircraft type and provides a standard user interface across a mixed fleet.

Noteworthy Features and Applications

Jeppesen	**Location:** Englewood, CO
Product(s)	Integrated Software • Jeppesen Applications for Boeing EFB • Jeppesen Applications for Airbus EFB Commercial-Off-The Shelf COTS Software • Jeppesen FliteDeck Pro • Jeppesen Mobile FliteDeck • Jeppesen Mobile FliteDeck VFR • JeppView FliteDeck • JeppView MFD* *Aviation data provided by Jeppesen for applications developed by other avionics vendors through subscription.
Website(s)	• www.jeppesen.com • http://www.jeppesen.com/industry-solutions/aviation/commercial/electronic-flight-bag.jsp • www.jeppesen.com • Jeppesen Mobile Solutions • JeppView

Product Overview(s)

AMM using pre-composed charts:

- Jeppesen Mobile FliteDeck – an iOS application for use on iPad.
- Jeppesen FliteDeck Pro – an application for iOS and Windows 8 that is available for the Commercial Air Carrier and Military markets only.
- JeppView FliteDeck – a Windows application for use in-flight, marketed to the Business and General aviation markets. This application has been nearly replaced at the customer level by Jeppesen Mobile FliteDeck since 2011 though it is still available as an option with a JeppView subscription.

AMM dynamically rendered:

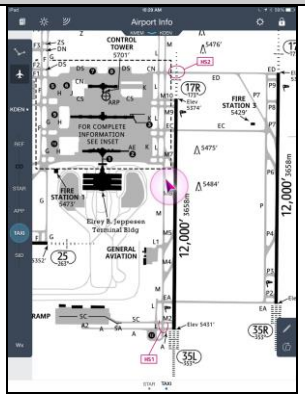
- Jeppesen Mobile FliteDeck VFR – an iOS application for use on iPad targeted primarily to the General Aviation market. This application uses dynamic rendering of aeronautical data for airports and airspace.

Jeppesen's FLITEDECK Pro is an open EFB software solution providing a stable, FAA authorized means for hosting applications, data loading, and configuration management for all EFB classes. Jeppesen provides its eCharts, Airway Manual Text, Airport Moving Map, and Enroute applications integrated into this EFB environment. These data driven applications are intended to provide enhanced situational awareness and decision making, while removing paper on the flight deck. In addition, third-parties, such as ARINC, Boeing and others have leveraged the open framework to develop applications that extend capability for operators. Communications functionality is provided through hardware integration (e.g., using ARINC-429, RS-422, Ethernet, fiber optic, SATCOM, GateLink, Cellular data links). Jeppesen has successful installations with Astronautics, CMC Electronics, Goodrich, and NavAero for hardware, applications, and system integration.

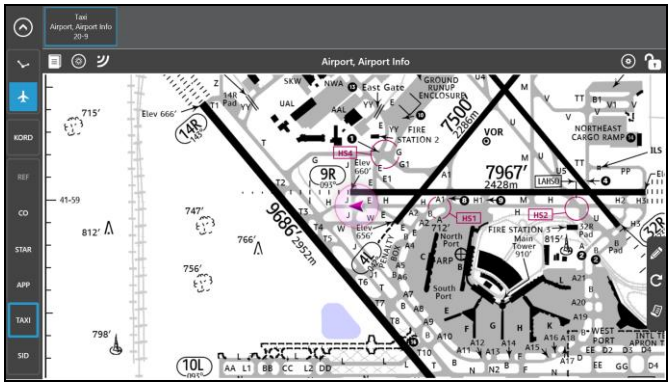
Jeppesen has integrated its navigational application suite, as well as data and software management tools, with Boeing's EFB system. Jeppesen's data management tools integrate with Boeing's TWLU (Terminal Wireless LAN Unit) and Communication offering to provide wireless updates to EFBs on the flight deck.

Jeppesen has also integrated its navigational application suite for the Airbus FlySmart system and A380 onboard information system (OIS).

Jeppesen **Location:** Englewood, CO

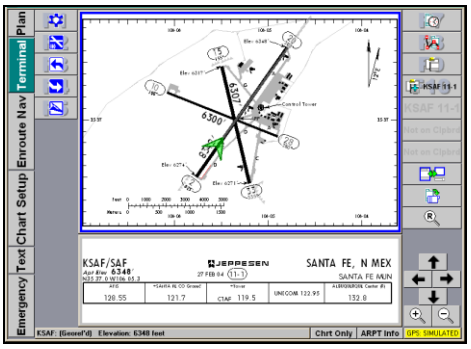


Jeppesen FliteDeck Pro (iOS)

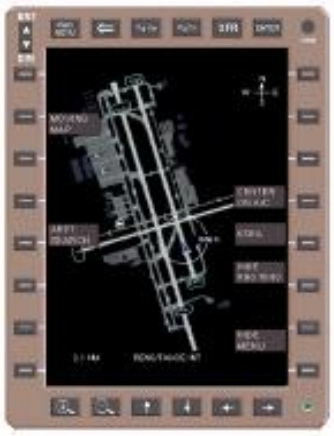


Jeppesen FliteDeck Pro (Windows 8)

Jeppesen Mobile FliteDeck VFR



JeppView FliteDeck



AMM for Boeing EFB

Images courtesy of Jeppesen

Authorization/Compliance

Authority	☒ FAA (authorization) ☒ EASA ☐ Other

Jeppesen	**Location:** Englewood, CO
TC/STC	Applicable to hardware only, which is not supplied by Jeppesen. ☒ TC Aircraft: multiple ☒ STC Aircraft: multiple
TSO	☐ TSO-C113a, Airborne Multipurpose Electronic Displays ☐ TSO-C165a, Electronic Map Display Equipment for Graphical Depiction of Aircraft Position (Own-Ship) ☐ Other
FAA Regulatory and Guidance Material	☐ AC 25-11B, Electronic Flight Deck Displays ☒ AC120-76C, Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags ☒ FAA Order 8900.1, Electronic Flight Bag Operational Authorization Process ☐ Other
Industry Documents	☐ RTCA DO-178B, Software Considerations in Airborne Systems and Equipment Certification (Software Level: D) ☒ RTCA DO-200A, Standards for Processing Aeronautical Data ☐ RTCA DO-254, Design Assurance Guidance for Airborne Electronic Hardware ☒ RTCA DO-257A, MOPS for the Depiction of Navigation Information on Electronic Maps ☒ Other: RTCA DO-272, User Requirements for Aerodrome Mapping Information
Other	Jeppesen AMM technologies are addressed in various Operational Suitability reports (including EASA equivalent), and in FSB reports generated during an Operator's 8900.1 EFB Authorization process.
Hardware – Not provided by Jeppesen.	
Hardware Class	Jeppesen does not provide hardware, but supports many platforms including tablets, laptops, and desktops. ☒ Class 1 or 2 (portable) ☒ Class 3 (installed)
Display Resolution	Any resolution above minimum requirements of 1024x768
Control Compatibility	☒ Touch Screen ☒ Stylus ☒ Buttons ☒ Mouse/cursor ☒ External Keyboard ☐ Other
Communications	☐ Wired ☐ External wireless – not connected with aircraft ☐ Wireless aircraft connection ☐ None ☐ Other The Jeppesen software is capable of performing data updates via TCP\IP. Any means of providing a TCP\IP connection on the devise may be used for this purpose, and is hardware dependent.

Jeppesen	**Location:** Englewood, CO
Data Bus	☐ ARINC 429 ☐ ARINC 828 ☐ USB ☐ LAN ☐ Other
Aircraft Connectivity	☐ Transmit and Receive: Aircraft to EFB and EFB to aircraft ☐ Receive only: Aircraft to EFB only ☐ Transmit only: EFB to aircraft only ☐ Other Jeppesen has implemented a hardware abstraction layer in our software that, with coordination from the hardware vendor, allows us to connect to a wide variety of aircraft busses.
Operating System	Windows 7, Windows 8 (all products) iOS (Jeppesen Mobile FliteDeck, Jeppesen FliteDeck Pro, JeppView FliteDeck, JeppView MFD, Jeppesen Mobile FliteDeck VFR)

Applications Supported

- ☐ Data Link
- ☒ Aeronautical Charts
  - ☐ Raster
  - ☒ Vector-based
- ☒ Electronic Checklists – Provided by Jeppesen's parent company Boeing on Class 3 only
  - ☒ Viewer only
  - ☐ Error checking
  - ☐ Automated error-checking
  - ☐ Active checklist
- ☒ Electronic Documents
  - ☐ Viewer only
  - ☒ Viewer with additional features
  - ☒ Mark-up language
  - ☐ Note-taking
- ☐ Enhanced Vision
- ☒ Flight Performance Calculations – Provided by Jeppesen parent company Boeing on Class 3 only
  - ☒ Weight & Balance
  - ☒ Takeoff/Landing Performance
  - ☐ Other
- ☒ Flight Planning
- ☒ GPS/Navigation Display
- ☒ Logbook – Provided by Jeppesen parent company Boeing on Class 3 only
- ☒ Moving Map
- ☒ Airport Moving Map
- ☐ Synthetic Vision
- ☒ Terrain Display
- ☐ Traffic Surveillance
  - ☐ Merging/Spacing
- ☒ Video Surveillance – Provided by Jeppesen parent company Boeing on Class 3 only
- ☐ Voice Data Communications

Jeppesen	**Location:** Englewood, CO
☒ Weather ☐ Other	
Noteworthy Features and Applications	

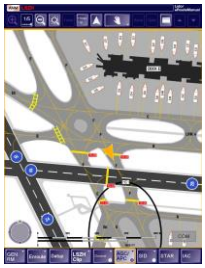
Lufthansa Systems	**Location:** Kelsterbach, Germany
Product(s)	Lido mPilot (replaces the previously separate applications Lido/Enroute, Lido/iRouteManual Pro and Lido/DocView in a combined platform). Lido/eRouteManual Lido/AMM (Airport Moving Map) Lido/Performance Tools (TakeOff, InFlight and Landing)
Website(s)	• http://www.LHsystems.com • http://mobility.LHsystems.com/

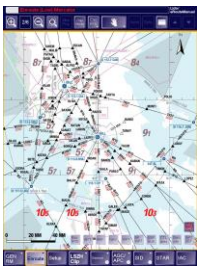
Product Overview(s)

Lido mPilot is the integrated EFB-solution to support the entire flight process. Lido/mPilot is an iOS application that contains all of the information available in the Lido/RouteManual, including static terminal charts, a dynamic enroute map, and supporting textual information. In addition to navigational support, Lido/mPilot contains a document module that allows an operator to manage documentation with a web based application. The documentation is automatic synchronized with Lido/mPilot when an internet connection is available.

On the Windows platform Lido/eRouteManual is Lufthansa Systems' mature electronic charting solution for all classes of EFBs. It is complemented with Lido/AMM Airport Moving Map using Lido/AMDB Airport Mapping Databases (available in ARINC 816 also for built-in Airbus OANS and Boeing AMM).







Images courtesy of Lufthansa Systems

Authorization/Compliance

Authority	☒ FAA Certification Office: N/A -- currently authorized charting applications on Windows and iPad with some U.S. customers ☒ EASA ☒ Other: Various CAAs worldwide, including Asia-Pacific and Australia
TC/STC	☐ TC ☐ STC
TSO	☐ TSO-C113a, Airborne Multipurpose Electronic Displays ☒ TSO-C165a, Electronic Map Display Equipment for Graphical Depiction of Aircraft Position (Own-Ship) ☐ Other

Lufthansa Systems	**Location:** Kelsterbach, Germany
FAA Regulatory and Guidance Material	☐ AC 20-173, Installation of Electronic Flight Bag Components ☒ AC 25-11B, Electronic Flight Deck Displays ☒ AC 120-76C, Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags ☐ Order 8900.1, Electronic Flight Bag Operational Authorization Process ☒ Other: AC 20-159, Design and Productions Approval for Airport Moving Map Display Applications Intended for EFB Systems
Industry Documents	☒ RTCA DO-178C, Software Considerations in Airborne Systems and Equipment Certification (Software Level: preparing level D for some charting applications and level C certifiability for components (not a whole system)) ☒ RTCA DO-200A, Standards for Processing Aeronautical Data (Lido/AMM) ☐ RTCA DO-254, Design Assurance Guidance for Airborne Electronic Hardware ☒ RTCA DO-257A, MOPS for the Depiction of Navigation Information on Electronic Maps ☒ Other DO-272 (Lido/AMM)
Other	EASA AMC 20-25
Hardware	
Hardware Class	☒ Class 1 or 2 / Portable Device(s): Any Class 1 or 2 Windows or iOS systems. ☒ Class 3 / Installed Device(s): LPC NG, NSS-OIS, FlySmart; Boeing EFB BP 3.x, 4.x (Astronautics)
Display Resolution	Recommended minimum 800 x 600 in landscape format or 600 x 800 in portrait format; no system limitation.
Controls	☒ Touch Screen ☒ Stylus ☒ Buttons ☒ Mouse/cursor ☒ External Keyboard ☐ Other
Communications	☒ Wired : Any TCP/ IP connection ☒ External wireless – not connected with aircraft: Any TCP/ IP connection ☒ Wireless aircraft connection: Any TCP/ IP connection ☐ None ☐ Other
Data Bus	☒ ARINC 429 ☒ ARINC 828 ☒ USB ☒ LAN ☒ Other: Any TCP/IP connection
Aircraft Connectivity	☐ Transmit and Receive: Aircraft to EFB and EFB to aircraft ☒ Receive only: Aircraft to EFB only ☐ Transmit only: EFB to aircraft only ☐ Other
Operating System	Microsoft Windows (from XP to current version), iOS

Lufthansa Systems	**Location:** Kelsterbach, Germany

Applications Supported

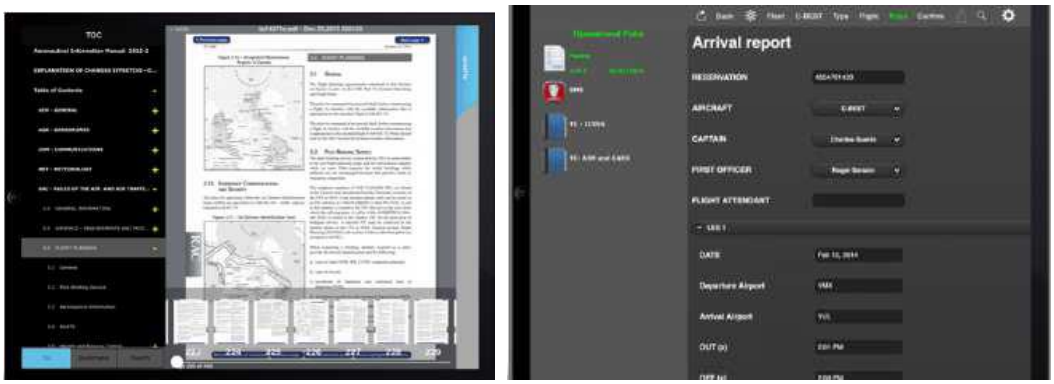
- ☒ Data Link
- ☒ Aeronautical Charts
  - ☐ Raster
  - ☒ Vector-based
- ☐ Electronic Checklists
  - ☐ Viewer only
  - ☐ Error checking
  - ☐ Automated error-checking
  - ☐ Active checklist
- ☒ Electronic Documents
  - ☐ Viewer only
  - ☒ Viewer with additional features
  - ☒ Mark-up language
  - ☒ Note-taking
- ☐ Enhanced Vision
- ☒ Flight Performance Calculations
  - ☐ Weight & Balance
  - ☒ Takeoff/Landing Performance
  - ☐ Other
- ☒ Flight Planning
- ☒ GPS/Navigation Display
- ☐ Logbook
- ☒ Moving Map
- ☒ Airport Moving Map
- ☐ Synthetic Vision
- ☐ Terrain Display
- ☐ Traffic Surveillance
  - ☐ Merging/Spacing
- ☐ Video Surveillance
- ☐ Voice Data Communications
- ☒ Weather
- ☐ Other

On-Board Data Systems (OBDS)	**Location:** Mirabel, Quebec
Product(s)	Aviation Docs™ and Electronic Checklist Update Service
Website(s)	www.obds.com

Product Overview(s)

Aviation Docs™ is an EFB application that provides flightcrews with access to a variety of electronic documents, charts, forms and checklists, including aircraft manuals, flight plans, training manuals, MELs, NOTAMS, and regulation changes. Features include document search, bookmarks, annotations, and electronic signatures. Aviation Docs™ also provides operators with Operator Managed Libraries, allowing operators to securely send electronic documents to flightcrews, and view which aircraft are flying without the most up-to-date documents.

OBDS Electronic Checklist Update Service provides operators with electronic checklist services to maintain, update, and distribute electronic checklists to flightcrews.



Images courtesy of OBDS

Authorization/Compliance

Authority	☐ FAA Certification Office: ☐ EASA ☐ Other
TC/STC	☐ TC ☐ STC
TSO	☐ TSO-C113a, Airborne Multipurpose Electronic Displays ☐ TSO-C165a, Electronic Map Display Equipment for Graphical Depiction of Aircraft Position (Own-Ship) ☐ Other
FAA Regulatory and Guidance Material	☐ AC 20-173, Installation of Electronic Flight Bag Components ☐ AC 25-11B, Electronic Flight Deck Displays ☒ AC120-76C, Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags ☐ FAA Order 8900.1, Electronic Flight Bag Operational Authorization Process ☒ Other: AC 120-64, Operational Use and Modification of Electronic Checklists
Industry Documents	☐ RTCA DO-178C, Software Considerations in Airborne Systems and Equipment Certification ☒ RTCA DO-200A, Standards for Precessing Aeronautical Data ☐ RTCA DO-254, Design Assurance Guidance for Airborne Electronic Hardware ☐ RTCA DO-257A, MOPS for the Depiction of Navigation Information on Electronic Maps ☐ Other

On-Board Data Systems (OBDS)	**Location:** Mirabel, Quebec
Other	
Hardware Compatibility	
Hardware	☒ Class 1 or 2 (portable) ☒ Class 3 (installed)
Display Resolution	
Controls	Indicate the control interface compatibility for each product (check all that apply): ☒ Touch Screen ☒ Stylus ☒ Buttons ☒ Mouse/cursor ☒ External Keyboard ☐ Other
Communications	☐ Wired ☐ External wireless – not connected with aircraft ☒ Wireless aircraft connection ☐ None ☐ Other
Data Bus	☐ ARINC 429 ☐ ARINC 828 ☐ USB ☐ LAN ☐ Other
Aircraft Connectivity	☐ Transmit and Receive: Aircraft to EFB and EFB to aircraft ☐ Receive only: Aircraft to EFB only ☐ Transmit only: EFB to aircraft only ☐ Other
Operating System	Microsoft Windows™ 8 and iOS
Applications Supported	

☐ Data Link
☐ Aeronautical Charts
  ☐ Raster
  ☐ Vector-based
☒ Electronic Checklists
  ☒ Viewer only
  ☐ Error checking
  ☐ Automated error-checking
  ☐ Active checklist
☒ Electronic Documents
  ☐ Viewer only	

On-Board Data Systems (OBDS)	**Location:** Mirabel, Quebec

- ☒ Viewer with additional features
- ☒ Mark-up language
- ☒ Note-taking

☐ Enhanced Vision

☐ Flight Performance Calculations

- ☐ Weight & Balance
- ☐ Takeoff/Landing Performance
- ☐ Other

☒ Flight Planning - Flight Docs may be delivered to EFB by Online Sync or USB update

☐ GPS/Navigation Display

☐ Logbook

☐ Moving Map

☐ Airport Moving Map

☐ Synthetic Vision

☐ Terrain Display

☐ Traffic Surveillance

- ☐ Merging/Spacing

☐ Video Surveillance

☐ Voice Data Communications

☐ Weather

☐ Other

Noteworthy Features and Applications

Skypaq	**Location:** Westmeath, Ireland
Product(s)	eLog
Website(s)	• www.skypaq.com • http://www.skypaq.com/services.htm

Product Overview(s)

The eLog software enables the flightcrew to create logbook entries both on-line and off-line, and access the latest aircraft status during all phases of flight from the flightcrew's own iPad, or Windows Tablet PC.

Mechanics also can create logbook entries both on-line and off-line on the logbook from their own devices using either iPads or Windows Tablet PC's.

The aircraft technical log is the primary source for technical and operational data on each flight that occurs on an aircraft. This data includes defects and malfunctions, block times and fuel consumption. It also records all maintenance carried out on an aircraft between scheduled base maintenance visits. The technical log data is then dispersed throughout the aviation organization thus becoming essential to the continuous operation of the business from accounts to aircraft maintenance. Our company has developed an EASA approved electronic method of collecting technical log data. Skypaq has developed a comprehensive software framework which brings substantial cost savings and efficiencies to an aviation organization.

Image courtesy of Skypaq

Authorization/Compliance

Authority	☐ FAA ☒ EASA ☐ Other

Skypaq	**Location:** Westmeath, Ireland
TC/STC	☐ TC ☐ STC
TSO	☐ TSO-C113a, Airborne Multipurpose Electronic Displays ☐ TSO-C165a, Electronic Map Display Equipment for Graphical Depiction of Aircraft ☐ Other
FAA Regulatory and Guidance Material	☐ AC 20-173, Installation of Electronic Flight Bag Components ☐ AC 25-11B, Electronic Flight Deck Displays ☐ AC120-76C, Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags ☐ FAA Order 8900.1, Electronic Flight Bag Operational Authorization Process ☐ Other
Industry Documents	☐ RTCA DO-178C, Software Considerations in Airborne Systems and Equipment Certification ☒ RTCA DO-200A, Standards for Precessing Aeronautical Data ☐ RTCA DO-254, Design Assurance Guidance for Airborne Electronic Hardware ☐ RTCA DO-275A, MOPS for the Depiction of Navigation Information on Electronic Maps ☐ Other
Other	(EC) No 859/2008 1.1055 Journey log (EC) No 859/2008 1.135(a)(2) (EC) No 859/2008 1.415 Journey log (EC) No 859/2008 1.420(b)(4) Occurrence reporting EASA PART-M (EC) No 2042/2003 Annex I M.A.305 Aircraft continuing airworthiness record system M.A.306 Operator's technical log system IOSA ISM Ed 8 FAA Aircraft Maintenance Log
Hardware	
Hardware Class	☒ Class 1 or 2 (portable) ☐ Class 3 (installed)
Display Resolution	iPad – 1024x768, Windows Tablet PC's Any standard resolutions. Software is configured to meet resolution requirements based on hardware requirements.
Control Compatibility	☒ Touch Screen ☒ Stylus ☒ Buttons ☒ Mouse/cursor ☒ External Keyboard ☐ Other For tablet pc's, Skypaq have developed our own customized keyboard input to further assist the user.
Communications	☒ Wired ☒ External wireless – not connected with aircraft ☒ Wireless aircraft connection ☐ None ☐ Other

Skypaq	**Location:** Westmeath, Ireland
Data Bus	☒ ARINC 429 ☒ ARINC 828 ☒ USB ☒ LAN ☐ Other
Aircraft Connectivity	☐ Transmit and Receive: Aircraft to EFB and EFB to aircraft ☒ Receive only: Aircraft to EFB only ☐ Transmit only: EFB to aircraft only ☐ Other – Skypaq also manages aircraft messages passed through ACARS, these are stored on our servers and transferred to aircraft logbook device as required.
Operating System	iOS, Windows XP, Windows 7, Windows 8

Applications Supported

- ☐ Data Link
- ☐ Aeronautical Charts
  - ☐ Raster
  - ☐ Vector-based
- ☐ Electronic Checklists
  - ☐ Viewer only
  - ☐ Error checking
  - ☐ Automated error-checking
  - ☐ Active checklist
- ☐ Electronic Documents
  - ☐ Viewer only
  - ☐ Viewer with additional features
  - ☐ Mark-up language
  - ☐ Note-taking
- ☐ Enhanced Vision
- ☐ Flight Performance Calculations
  - ☐ Weight & Balance
  - ☐ Takeoff/Landing Performance
  - ☐ Other
- ☐ Flight Planning
- ☐ GPS/Navigation Display
- ☒ **Logbook**
- ☐ Moving Map
- ☐ Airport Moving Map
- ☐ Synthetic Vision
- ☐ Terrain Display
- ☐ Traffic Surveillance
  - ☐ Merging/Spacing
- ☐ Video Surveillance
- ☐ Voice Data Communications
- ☐ Weather
- ☒ Other: eCabinLog

Skypaq	**Location:** Westmeath, Ireland
Noteworthy Features and Applications	
We have also completed an eCabinLog for one of our large clients, which cabin crew, flight crew and technical staff use to quickly ascertain cabin faults bringing immediate payback in operational efficiencies. Once our software has been installed, a key element of our services is the integration of data to the important elements of an Airline's IT infrastructure. To date we have worked with other providers such as IBM Informatica, Rockwell Collins HERMES, AvFinity AIRS, LIDO, AMOS, CAMP SYSTEMS etc. All Skypaq solutions are designed to integrate with the airline's legacy systems. These integration solutions are based on published aviation standards where applicable. Skypaq is an active member of the Air Transport Association (ATA) eLog Book Standards Working Group. With electronic information now available instantly from the aircraft, Skypaq releases existing legacy systems from dated batch driven data feeds energizing their potential and increasing the airline's ROI from currently deployed systems. Skypaq has become the enabler that manages disparate airline IT systems and provides substantial costs saving benefits across the airline.	

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4.4 Commercial-Off-The-Shelf (COTS) Software Manufacturers

Manufacturers in this section offer standalone COTS software applications. The information included in this section is based solely upon information accessible via online websites and product brochures for those manufacturers offering *only* COTS software. In some cases, they are also listed in the hardware/software manufacturer section (4.2) or the integrated software manufacturer section (4.3), as some manufacturers offer COTS software in addition to their other products. In these cases, a survey was provided. Note that this section is not intended to be comprehensive, but rather to provide a snapshot of the types of standalone, COTS software applications currently available.

Table 7. Commercial-Off-The-Shelf Software Manufacturers.

Manufacturer	Products	Application Type																	Operating System			
		Data Link	Aeronautical Charts	Electronic Checklists	Electronic Documents	Enhanced Vision	Flight Performance Calculations	Flight Planning	GPS /Navigation Display	Logbook	Moving Map	Airport Moving Map	Synthetic Vision	Terrain Display	Traffic Surveillance	Video Surveillance	Voice Data Communications	Weather	Other	Microsoft Windows	iOS	Android	Other
Adobe	Acrobat Reader				•															•	•	•	Mac OS
Aero Data Solutions				•																			
AeroCharts			•																		•		
Aircraft Performance Group	Weight & Balance				•		•														•		
	iPreflight, Mobile		•		•		•											•			•		

Table 7. Commercial-Off-The-Shelf Software Manufacturers (continued).

Manufacturer	Products	Application Type																	Operating System			
		Data Link	Aeronautical Charts	Electronic Checklists	Electronic Documents	Enhanced Vision	Flight Performance Calculations	Flight Planning	GPS /Navigation Display	Logbook	Moving Map	Airport Moving Map	Synthetic Vision	Terrain Display	Traffic Surveillance	Video Surveillance	Voice Data Communications	Weather	Other	Microsoft Windows	iOS	Android	Other
AirWatch	Content locker				•														Content manager	•	•	•	
American Aeronautics	iFly Weight & Balance						•														•		
Approach Systems Inc.	APIC software		•					•			•			•				•		•			
Arconics	AeroDocs EFB				•															•	•		
Automated Systems in Aircraft Performance, Inc.	STAR Systems						•	•												•	•		
AvioVision N.V.	Aviobook™		•	•				•										•	Content manager	•	•		
Aviation Communications & Surveillance Systems (ACSS)	SafeRoute											•		•	•				ITP, merging & spacing	•			Linux
CAVU Companies	EFB-Pro		•		•		•	•										•	•	•	•		
Comply365	Productivity Suite				•														•	•	•	•	

Table 7. Commercial-Off-The-Shelf Software Manufacturers (continued).

Manufacturer	Products	Application Type																	Operating System			
		Data Link	Aeronautical Charts	Electronic Checklists	Electronic Documents	Enhanced Vision	Flight Performance Calculations	Flight Planning	GPS /Navigation Display	Logbook	Moving Map	Airport Moving Map	Synthetic Vision	Terrain Display	Traffic Surveillance	Video Surveillance	Voice Data Communications	Weather	Other	Microsoft Windows	iOS	Android	Other
Control Vision Corporation Corp.	AnywhereMap PRO		•				•				•	•		•	•			•		•	•	•	
Coradine	Log Ten Pro X									•											•		
Edgemont Aviation	WXCHECK						•											•		•			
Euroscript	Document Management Systems				•																		
Evoke Systems	Electronic Flight Operations System (EFOS)				•			•		•											•		unspecified
Flatirons	Corena Suites				•															•	•	•	
Flight Explorer	Flight Explorer Pilot edition							•										•					
ForeFlight, LLC	ForeFlight Mobile		•		•			•			•	•		•	•			•			•		
	ForeFlight Military Flight Bag		•		•								•								•		
Garmin	Garmin Pilot, SafeTaxi		•					•			•	•	•	•				•			•	•	
Global Nav Source	Electronic Flight Bag (EFB)		•															•			•		

Table 7. Commercial-Off-The-Shelf Software Manufacturers (continued).

Manufacturer	Products	Application Type																	Operating System			
		Data Link	Aeronautical Charts	Electronic Checklists	Electronic Documents	Enhanced Vision	Flight Performance Calculations	Flight Planning	GPS /Navigation Display	Logbook	Moving Map	Airport Moving Map	Synthetic Vision	Terrain Display	Traffic Surveillance	Video Surveillance	Voice Data Communications	Weather	Other	Microsoft Windows	iOS	Android	Other
Gulfstream	PlaneBook		•	•	•															•	•	•	
Hilton Software LLC	WingX Pro 7		•								•	•	•	•	•			•			•	•	
Inquisitive Graphics	FS kneeboard 2, Premiere logbook, Calculator		•	•	•			•		•								•			•		
Jeppesen	Mobile FlightDeck, Mobile TC, JeppView, ChartView		•								•	•						•				•	
Mikelsoft	SunFlight																		Sunrise/sunset calculator		•		
	Max FDP																		Flight duty calculator		•		
	Fuel Uplift																		Uplifted fuel calculator		•		

Table 7. Commercial-Off-The-Shelf Software Manufacturers (continued).

Manufacturer	Products	Application Type																		Operating System			
		Data Link	Aeronautical Charts	Electronic Checklists	Electronic Documents	Enhanced Vision	Flight Performance Calculations	Flight Planning	GPS /Navigation Display	Logbook	Moving Map	Airport Moving Map	Synthetic Vision	Terrain Display	Traffic Surveillance	Video Surveillance	Voice Data Communications	Weather	Other	Microsoft Windows	iOS	Android	Other
Mikelsoft	TrimCheck																		Trim crosscheck		•		
	Crewlog									•										•			
	Roster2go																		Roster management	•			
Moving Terrain	Moving Map Software										•												
	MT BlitzPlan							•															
	MT Charting		•																				
	MT Satellite Radar																	•					
	MT TWAS													•									
	MT TCAS														•								
Myairplane.com	PocketEFB		•																	•	•	•	

Table 7. Commercial-Off-The-Shelf Software Manufacturers (continued).

Manufacturer	Products	Application Type																	Operating System			
		Data Link	Aeronautical Charts	Electronic Checklists	Electronic Documents	Enhanced Vision	Flight Performance Calculations	Flight Planning	GPS /Navigation Display	Logbook	Moving Map	Airport Moving Map	Synthetic Vision	Terrain Display	Traffic Surveillance	Video Surveillance	Voice Data Communications	Weather	Other	Microsoft Windows	iOS	Android	Other
NavTech	Take-Off Data Calculation (TODC), iCharts		•				•													•	•		
NC Software	LogBook Pro				•					•								•			•	•	
PCAvionics	MountainScope		•					•			•			•	•			•		•	•	•	
PilotLog	PilotLog				•					•										•	•	•	Mac OS
Readdle	PDF Office				•																•		
RocketRoute, Ltd.	RocketRoute		•					•			•			•						•	•	•	
Seattle Avionics	FlyQ EFB		•					•			•		•	•	•			•			•		
	FlyQ Pocket		•					•										•			•	•	
	Voyager		•				•	•										•		•			
	SmartPlates & Charts		•																		•		
SkyCharts	SkyChart Pro		•	•	•																•		
SkyRadar	SkyRadar iPad Application and Receiver		•								•			•	•			•			•		

Table 7. Commercial-Off-The-Shelf Software Manufacturers (continued).

Manufacturer	Products	Application Type																	Operating System			
		Data Link	Aeronautical Charts	Electronic Checklists	Electronic Documents	Enhanced Vision	Flight Performance Calculations	Flight Planning	GPS /Navigation Display	Logbook	Moving Map	Airport Moving Map	Synthetic Vision	Terrain Display	Traffic Surveillance	Video Surveillance	Voice Data Communications	Weather	Other	Microsoft Windows	iOS	Android	Other
Trueflight	TrueMap		•										•	•				•	Winds aloft	•			
Ultramain	efbTechLogs™									•											•		
Ultra-Nav Aviation Inc.	Ultra-Nav						•													•	•	•	
Warbred Studio	Flight Plan							•													•		
	Flight Log									•											•		
	Flight Scale						•														•		
WSI	Pilotbrief Optima																	•			•		
WxWorks	WxWorks																	•		•	•		
X-Avionics, LLC	Xavion							•					•	•	•			•			•		

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FEDERAL AVIATION ADMINISTRATION (FAA) PUBLICATIONS:

Advisory Circulars (ACs)

FAA Advisory Circular (AC) 20-173, *Installation of Electronic Flight Bag Components*. Available at: http://www.faa.gov/documentLibrary/media/Advisory_Circular/AC 20-173.pdf

FAA Advisory Circular (AC) 23.1311-1C, Installation of Electronic Display in Part 23 Airplanes. Available at: http://www.faa.gov/documentLibrary/media/Advisory_Circular/AC 23.1311-1C.pdf

FAA Advisory Circular (AC) 25-11B, *Electronic Flight Deck Displays*. Available at: http://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_25-11B.pdf

FAA Advisory Circular (AC) 91-21.1B, *Use of Portable Electronic Devices Aboard Aircraft*. Available at: http://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_91_21-1C.pdf

FAA Advisory Circular (AC) 91-78, *Use of Class 2 or Class 2 Electronic Flight Bag (EFB)*. Available at: http://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_91_78.pdf

FAA Advisory Circular (AC) 120-76C, Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags. Available at: http://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_120-76C.pdf

Technical Standard Orders (TSOs)

FAA Technical Standard Order (TSO)-C113a, *Airborne Multipurpose Electronic Displays*. Available at: http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgTSO.nsf/0/dd968e96d184041e862579f10070b452/$FILE/TSO-113a.pdf

FAA Technical Standard Order (TSO) -C165a, *Electronic Map Display Equipment for Graphical Depiction of Aircraft Position (Own-Ship)*. Available at: http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgTSO.nsf/0/19597353ffb220c986257c08006b4113/$FILE/TSO-C165a.pdf

FAA Orders

FAA Order 8900.1, Volume 4, Chapter 15, Section 1. *Flight Standards Information Management System,* Electronic Flight Bag Operational Authorization Process, April 3, 2014. Available at: http://fsims.faa.gov/wdocs/8900.1/v04 ac equip & auth/chapter 15/04_015_001.pdf

Pilocy Statements

FAA Policy Statement PS-ACE-23-01-R1, *Installation of Mounting Devices and Wiring Integration for Attachment of Portable Displays and Electronic Devices in Normal, Utility, and Acrobatic Category Airplanes*. Available at: http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgPolicy.nsf/0/fce53346d1e3417986257bf3006b423b/$FILE/PS%20ACE-23-01-R1.pdf

Information for Operators (InFo)

Information for operators (InFO) 13010, *Expanding Use of Passenger Portable Electronic Devices (PED)*. Available at: http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info/all_infos/media/2013/InFO13010.pdf

Information for operators (InFO) 13010 Supplement (SUP*), FAA Aid to Operators for the Expanded Use of Passenger PEDS*. Available at: https://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info/all_infos/media/2013/InFO13010SUP.pdf

FAA Job Aids :

Electromagnetic Compatibility Assessment Checklist – 08-22-2013. Available at: http://fsims.faa.gov/wdocs/other/electromagnetic_compatibility_assessment_checklist%20-%2008-22-2013.pdf

Surface Ownship – Operator Checklist – FAA Job Aid – 02-14-2014. Available at: http://fsims.faa.gov/wdocs/other/type%20b%20-%20surface%20own-ship%20-%20%20operator%20checklist%20-%20faa%20job%20aid%20-%2002-14-2014.pdf

RTCA, INC. DOCUMENTS :

RTCA DO-160G, *Environmental Conditions and Test Procedures for Airborne Equipment*. Available at: http://www.rtca.org/store_product.asp?prodid=770

RTCA DO-178C, *Software Considerations in Airborne Systems and Equipment Certification*. Available at: http://www.rtca.org/store_product.asp?prodid=803

RTCA DO-200B, *Standards for Processing Aeronautical Data*. Available at: http://www.rtca.org/store_product.asp?prodid=1202

RTCA DO-254, *Design Assurance Guidance for Airborne Electronic Hardware*. Available at: http://www.rtca.org/store_product.asp?prodid=752

RTCA DO-257A, *Minimum Operational Performance Standards for the Depiction of Navigation Information on Electronic Maps*. Available at: http://www.rtca.org/store_product.asp?prodid=745

RTCA DO-294C, *Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDS) on Aircraft.* Available at: http://www.rtca.org/store_product.asp?prodid=623

EUROPEAN AVIATION SAFETY AGENCY (EASA) PUBLICATIONS:

EASA Acceptable Means of Compliance (AMC) 20-25, *Airworthiness and operational consideration for Electronic Flight Bags (EFBs)*. Available at: https://easa.europa.eu/system/files/dfu/2014-001-R-Annex%20II%20-%20AMC%2020-25.pdf

SOCIETY OF AUTOMOTIVE ENGINEER (SAE) PUBLICATIONS:

SAE Aerospace Standard AS8034B, *Minimum Performance Standard for Airborne Multipurpose Electronic Displays*, June 27, 2011. Available at: http://standards.sae.org/as8034b/

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Appendix A: Additional EFB/PED Publications

This appendix provides a list of additional documentation related to EFB/PEDs in addition to those provided in the References section. These include additional FAA and international regulatory and guidance material, Flight Standardization Board (FSB) reports, operational evaluations, and human factors research publications.

FAA PUBLICATIONS:

Information for Operators (InFo)

Information for Operators (InFo) 11011, *The Apple iPad and Other Suitable Tablet Computing Devices as Electronic Flight Bags (EFB)*. Available at: http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info/all_infos/media/2011/InFO11011.pdf

Information for Operators (InFo) 14006, *Prohibition of Personal Use of Electronic Devices on the Flight Deck*. Available at: http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info/all_infos/media/2014/InFO14006.pdf

Flight Standardization Board (FSB) Reports

ADR GF-6000 EFB FSB -- Date 11/16/2006

ARINC Messenger Class 2 EFB -- Date 01/07/2005

Boeing EFB Class 3 -- Date 11/18/2011 (REV 2 - 11/18/11)

Compaq (HP) PC TC1000 Electronic Tablet Class 1 EFB -- Date 03/03/2006

Dassault Jeppesen FliteDeck, Mobile FD, and EPM for EASy cockpit -- Date 09/20/2012

Advanced Data Research FG-3600, FG-5000 Class 2 EFB -- Date 09/13/2005 (ORIGINAL - 9/13/05)

Fujitsu Stylistic 3500 Class 1 EFB -- Date 06/01/2007 (ORIGINAL - 6/1/07)

Fujitsu Stylistic LT C-500 Class 2 EFB -- Date 03/02/2007 (REV 1 - 3/2/07)

Fujitsu LT P-600 Class 1 EFB -- Date 05/31/2006

Fujitsu Lifebook P1610 Class 1 EFB -- Date 11/30/2007

Jeppesen EFB Application Software v1.0, 1.1, 1.5 and 2.0 -- Date 12/08/2008 (REV 3 - 12/8/08)

Electronic Flight Bag (EFB) Type B Software, Udo/iRM Application Ver 1.05 -- Date 07/07/2011

navAero Class 2 EFB -- Date 01/24/2007 (ORIGINAL - 1/24/07)

Teledyne Controls OSR EFB -- Date 07/03/2007

Xplore Technologies Class 1 EFB -- Date 02/28/2007 (REV 1 - 2/28/07)

EUROPEAN AVIATION SAFETY AGENCY (EASA) ELECTRONIC FLIGHT BAG (EFB) OPERATIONS EVALUATION REPORTS:

Boeing Class 3 EFB - Rev 1.3
Navtech iCharts (12.7) for iOS - 17/06/2013
Jeppesen FliteDeck Pro (iOS) (v1.1)/Jeppesen Mobile TC Pro (iOS) (v1.3)
ATR – Class 2 EFB with performance calculation – 29/08/13
Dassault - All EASy Cockpits - Class 2 EFB with JeppView/FlightDeck as backup avionics - 03/08/11
Airbus - A380 - Class 3 EFB (OIS1b) with Documentation and Performance Software - 20/11/08
FlySmart with Airbus for iPad - V2
Dassault - All EASy Cockpits - Class 1 EFB with Jeppesen Mobile TC / FD iOS
Dassault Falcon - 7X - Electronic Performance Module for Class 2 EFB

JOINT AVIATION AUTHORITIES (JAA) PUBLICATIONS:

Joint Aviation Authorities (JAA) Temporary Guidance Leaflet No. 36, *Approval of Electronic Flight Bags (EFBs)*. Available at: http://www.dac.public.lu/documentation/procedures_ops/TGL_36.pdf

TRANSPORT CANADA PUBLICATIONS:

Transport Canada Commercial and Business Aviation Advisory Circular (CBAAC) 700-020, *Electronic Flight Bags*. Available at: http://www.tc.gc.ca/eng/civilaviation/opssvs/managementservices-referencecentre-acs-700-700-020-1348.htm

OTHER PUBLICATIONS:

Aviation Safety Reporting System. (2010). Paperless Flying – Electronic Flight Bags (EFBs). *Callback (Issue 369)*. Available at: http://asrs.arc.nasa.gov/publications/callback.html#2010

Chandra, D. C. and Yeh, M. (2006a). *A Tool Kit for Evaluating Electronic Flight Bags*. Report Nos. DOT/FAA/AR-06/44. DOT-VNTSC-FAA-06-21. Washington, DC. U.S. Department of Transportation, Federal Aviation Administration. Available at: http://ntl.bts.gov/lib/34000/34200/34294/DOT-VNTSC-FAA-06-21.pdf

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