

FLIGHT STANDARDIZATION BOARD REPORT

Compaq (HP) PC TC1000 Electronic Tablet
Class 1 Electronic Flight Bag (EFB)
Type A and B Applications

Kneeboard/Laptop Mounting System

APPROVED: _____ DATE: 03/03/2006

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1. Purpose and Applicability

This Flight Standardization Board (FSB) report specifies FAA requirements for operational approval of the *Compaq (HP) PC TC1000 Tablet* Electronic Flight Bag (EFB) Class 1 device, under FAR 135. Provisions of this report are consistent with the guidance defined in FAA Advisory Circular 120-76A and assume that appropriate airworthiness certification for installation of the EFB is/will be accomplished. The following information related to operational approval, as applicable, is included:

- 1.1 A general description of the EFB system approved under this report, including:
 - 1.1.1 EFB manufacturer
 - 1.1.2 EFB model
 - 1.1.3 A list of major components within the EFB
 - 1.1.4 The EFB operating system and version
 - 1.1.5 A list of the applications approved under this report
- 1.2 The manufacturer's name and model number of the mounting system approved under this report.
- 1.3 EFB Display Lighting and Reflectivity
- 1.4 Typical acceptable procedures for EFB use during all phases of flight
- 1.5 Typical acceptable procedures to follow when one unit fails and when both units fail to include alternate means of accessing data
- 1.6 A revision process procedure/method that ensures appropriate database accuracy and currency
- 1.7 FSB specifications for training and typical acceptable training course description
- 1.8 FSB specifications for Checking including specification of those checks that must be administered by FAA or operators
- 1.9 FSB specifications for Currency
- 1.10 Electromagnetic Interference (E.M.I.)
- 1.11 Rapid Depressurization Testing
- 1.12 Operating system change requirements
- 1.13 Configuration Control- including the procedures which govern the distribution of updates to the aircraft and confirmation of the EFB configuration.

- 1.14 Instructions for Continued Airworthiness
- 1.15 Compliance Checklist
- 1.16 FSB Specifications for Devices and Simulators (Reserved)
- 1.17 The applicability of this report
- 1.18 Alternate Means of Compliance
- 1.19 List of documents to meet the requirements of AC120-76A for operational approval and continued airworthiness (Appendix 1)
- 1.20 List of regulatory compliance status (compliance checklist) for the pertinent parts of Title 14 CFR (Appendix 2)
- 1.21 EFB Evaluation Checklist used during the evaluation of the EFB System at Camden Aviation, Inc. upon which this FSB Report is based (Appendix 3)

2 EFB Description

This Electronic Flight Bag (EFB) system provides additional electronic flight deck displays that may be used to depict a variety of aviation data traditionally provided in paper form. This system is a Class 1 EFB system using a laptop or kneeboard mounted display.

The EFB approved under this report consists of a COTS electronic tablet computer with the Microsoft Windows operating system and applications as listed. The EFB is mounted on a kneeboard and is not connected to any airplane system.

2.1 Manufacturer

Compaq (Hewlett Packard) is the manufacturer of this EFB System.

2.2 Model

The model of this EFB is a *PC TC1000*. The manufacturer's part number is *470045-149*.

2.3 Components

The following major components are included with this make/model of EFB

Component	Manufacturer	Model	Part Number
Motherboard	Compaq	SPS-BD	310664-001
BIOS	Phoenix	4.06CJ15	v0F09
Processor	Transmeta Crusoe	TM5800	800821
Video Card	NVIDIA	GeForce2 GO	D7255J
Hard Drive	Hitachi	DK23EA-30	310668-001
CD-ROM	Compaq	PO7455	217389-001
DVD Drive	N/A	N/A	N/A
Wireless Connection	Compaq	WLAN 802.11b	310670-001
Power Supply	Compaq 65-Watt, 90-264 Vac Adapter	8708DAB001A	288285-001
	Compaq Lithium-Ion Battery Pack – 6 cell, 40W 14.8V, 3.6AH	8911B20034A	301956-001

2.4 Operating System and Version

This EFB has been demonstrated and approved with *Microsoft Windows XP Professional Tablet PC Edition*, version *5.1.2600*, Service Pack *1.0*, build *2600*, (*xpsp2.030422-1633*).

2.5 Applications

The following applications supplied by Jeppesen (Jeppview/Flightdeck) have been demonstrated and approved for use on this specific EFB.

“Type A” Applications

2.5.1.1 The following “Type A” applications were demonstrated and are approved under this FSB Report:

- 1) Company standard operating procedures
- 2) Company General Operations Manual
- 3) Maintenance manuals
- 4) Aircraft flight log and servicing records
- 5) Minimum Equipment Lists (MEL)
- 6) Federal, state and airport-specific rules and regulations
- 7) Airport/Facility Directory
- 8) International Operations Manuals, including regional supplementary information and International Civil Aviation Organization (ICAO) differences
- 9) Aeronautical Information Publications (AIP)
- 10) Aeronautical Information Manual (AIM)
- 11) Oceanic navigation progress logs
- 12) Pilot flight and duty time logs
- 13) Antiterrorism profile data
- 14) Emergency response guidance for aircraft incidents involving dangerous goods (ICAO Doc 9481-AN/928)
- 15) Customs declaration and United States Department of Agriculture (USDA) agriculture inspection/clearance form
- 16) Special reporting forms, such as near mid-air collision (NMAC) reports, National Aeronautics and Space Administration (NASA) Aviation Safety Reporting System (ASRS), bird and wildlife encounters, Service Difficulty Reports (SDR), etc.
- 17) Realistic training modules including “PC at home” training applications, off-duty training materials review and preflight mission rehearsals
- 18) Title 14 of the Code of Federal Regulations (14 CFR)

2.5.2 “Type B” Applications

2.5.2.1 The following “Type B” applications were demonstrated and are approved under this FSB Report:

- 1) Master flight plan and updating
- 2) Panning, zooming, scrolling and rotation for approach charts
- 3) Pre-composed or dynamic interactive, electronic approach charts and airport surface maps, including centering and page turning but without display of aircraft position
- 4) Applications that make use of the Internet and/or aircraft operational communications or Company specific data links to collect, process and disseminate data for uses such as spare parts, inventory control, maintenance scheduling and budget management
- 5) Weather and aeronautical data

2.5.3 “Type C” Applications

2.5.3.1 There are no “Type C” applications demonstrated and approved under this FSB Report

3 EFB Mounting System

The EFB mounting system approved under this report is a kneeboard or laptop system and has been found to be acceptable for use in all phases of flight.

There are no operating limitations associated with this EFB mounting system.

4 EFB Display Lighting and Reflectivity

4.1 Display lighting.

This EFB has been evaluated in both low-light and full sunlight conditions. The display is readable under the full range of lighting conditions. However, since the electronic tablet is in a horizontal position on the knee or lap, sunlight does affect its readability. An operator should ensure that it can be adequately tilted or shielded when used in bright sunlight to improve readability.

4.2 Display Reflectivity.

The display has been evaluated under night lighting conditions. There is no distracting reflectivity observed from the display under these conditions.

5 Typical Acceptable Operations Manual Procedures for Use of EFB

5.1 Normal operating procedures shall be included in the General Operations Manual and Flight Crew Training Manual. Descriptions of specific applications are contained in a Pilot’s User Guide supplied by the application vendor.

5.2 There are no non-normal procedures for use with this EFB.

6 Acceptable EFB Data Revision Process

- 6.1 The operator shall establish a data revision process, which will use a secure data distribution network. All EFB Systems must have password protected security measures that permit access only by authorized personnel. EFB systems must be protected from external viruses by an antivirus program.

This EFB will only use approved and authorized Jeppview/Flightdeck program data from Jeppesen for the Type B applications. It is the responsibility of the operator to set up a revision procedure. This EFB has an internal electronic revision record in addition to Jeppesen's self-protecting updates and user notification software. The operator must establish a policy for providing revisions to the EFB database to flight crews that do not have access to the CDs that are used for database revision.

The procedures for performing revisions to the database shall be contained in the Company General Operations Manual and/or the Jeppview User's Manual.

7 FSB Specifications for Training and Typical Acceptable Training Course Description

- 7.1 **General.** All operators will conduct EFB training for its flight crews in accordance with its approved training program. The EFB training module shall be submitted to the assigned principal operations inspector and approved prior to the conduct of training for operations under 14 CFR 135.
- 7.2 **Programs Crediting Previous EFB Experience.** The Company training program may grant training credit to flight crewmembers for previous EFB training and/or experience with similar applications.
- 7.3 **Pilots Initial, Transition and Upgrade Ground Training**
- 7.3.1 **Pilots: Initial Training.** Initial EFB training for flight personnel shall consist of ground training in the following subjects:
- 1) EFB System description and related equipment
 - 2) Information Access and operational procedures
 - 3) Panning, zooming, scrolling and data rotation
 - 4) System applications
 - 5) Systems integration training
 - 6) System limitations
 - 7) Abnormal and emergency procedures
- 7.3.2 Although a minimum number of flight hours are not required, EFB training shall be integrated into the flight-training segment of the Company training program in at least the following areas:
- 1) Operational procedures and information access
 - 2) Normal, abnormal and emergency procedures

7.3.3 **Areas of Emphasis.** Operators must emphasize during training and initial line operating experience the need to avoid fixation on the display during critical phases of flight including taxi operations.

7.4 **Recurrent Training**

7.4.1 Recurrent training will not be required for EFB operations provided flight crews have regularly used the EFB in line operations. Operators shall provide recurrent training, as needed, on the use of the EFB to all flight crews who have not regularly used the EFB System.

7.4.2 As part of their approved training program, operators may use many methods when conducting recurrent training including classroom instruction, videotape, training devices, computer-based instruction, and static aircraft training.

7.4.3 If an operator's approved training program includes simulator training, some EFB system training shall be integrated.

8 **FSB Specifications for Checking**

8.1 **Checking Items.** Pertinent knowledge and operational procedures for EFB use shall be checked following initial EFB training. Initial checking shall include the use of the EFB System in flight. Operators are encouraged to include EFB use as a part of recurrent checking where practical. EFB System use should also be included in line checks.

8.2 **Areas of emphasis.** The following areas of emphasis should be addressed during line checks as necessary:

8.2.1 Proficiency with use of EFB applications shall be demonstrated,

8.2.2 Proper outside visual scan without prolonged fixation on the EFB equipment

8.2.3 Proper selection and use of EFB displays, should be demonstrated, particularly during taxi operations,

8.2.4 EFB System or component failure

8.3 **Proficiency Checks/Practical Tests.** If an EFB System is installed in the operator's aircraft, training device or simulator, and approved for the operator's use, its operational function shall be included in the practical test and/or annual proficiency check.

9 **FSB Specifications for Currency**

9.1 If an operator's flight personnel use their EFB System regularly, no specific currency requirements will apply to the EFB.

10 Electromagnetic Interference (E.M.I.)

The *Compaq (HP) PC TC1000 Tablet* has been tested in accordance with the emission control standards guidelines contained in Advisory Circular (AC) 91.21-1A, Use of Portable Electronic Devices Aboard Aircraft, as one acceptable method for meeting these requirements. The *Compaq (HP) PC TC1000 Tablet* has been found to not exhibit any unacceptable levels of electromagnetic radiation.

Changes of any of the components listed in paragraph 2.3 will require that the EFB be checked again for acceptable levels of EMI.

11 Rapid Depressurization Testing

The *Compaq (HP) PC TC1000 Tablet* in the configuration shown in Para. 2.3, has been tested by *HP* for survivability of a rapid depressurization above 10,000 feet with the EFB operating and above 30,000 feet with the EFB not operating. If these unpressurized altitude limits are exceeded, the EFB System shuts down due to its self-protection features when thermal limits are exceeded.

If there is no depressurization protection, the operator shall establish alternate procedures to deal with the total loss of the EFB System.

12 Operating System

Changes to the Windows operating system that involve .exe, .dll files or Java scripts will require that the operator notify the FAA Principal Inspector that the operation of all approved applications continues to meet its intended function.

13 Configuration Control

The operator shall ensure, to the satisfaction of the assigned FAA principal operations inspector that procedures are in place to manage the hardware and software configuration of any Class 1 EFBs that will be in operational use.

14 Instructions for Continued Airworthiness

The operator shall ensure, to the satisfaction of the assigned FAA principal airworthiness inspector that procedures are in place to track repairs to EFB units and to ensure each EFB remains in compliance with its approved configuration.

15 Compliance Checklist

15.1 Compliance Checklist (See Appendix 2).

Compliance checklists are provided as an aid to identify those specific rules or policies for which compliance has already been demonstrated to FAA. The checklist also notes rules or policies, which must be demonstrated to the assigned Certificate Holding District Office (CHDO) by the operator. Not all rules or policies or variants are necessarily listed or addressed.

15.2 Discussion of Specific Compliance Checklist Items (reserved)

16 FSB Specifications for Devices And Simulators (Reserved)

17 Application of FSB Report

Relevant parts of this report are effective for the specific combination of this Class 1 EFB its mounting system and Type A and B applications when the report is approved by FAA.

18 Alternate Means of Compliance

- 18.1 **Approval Level and Approval Criteria.** Alternate means of compliance to the provisions of this report, must be approved by AFS-200 and AFS-800, if appropriate. If alternate compliance is sought, operators will be required to establish that any proposed alternate means provides an equivalent level of safety to the provisions of AC 120-76A and this FSB report. Analysis, demonstrations, proof of concept testing, differences documentation, or other evidence may be required.
- 18.2 **Requires Equivalent Safety.** In the event alternate compliance is sought, training program hour reductions, simulator approvals, and device approvals, may be significantly limited and reporting requirements may be increased to assure equivalent safety. FAA will generally not consider relief through alternate compliance means, unless sufficient lead time has been planned by an operator to allow for any necessary testing and evaluation.
- 18.3 **Unforeseen Circumstances.** In the event of clearly unforeseen circumstances in which it is not possible for an operator to comply with report provisions, the operators may seek an interim equivalent program rather than a permanent alternate compliance method. Financial arrangements, schedule adjustment, and other such reasons are not considered “unforeseen circumstances” for the purposes of this provision.

19 Miscellaneous - (Reserved)

Appendix 1

List of Required Documents for Operational Approval and Continued Airworthiness

Flight Crew Operations Manual

Flight Crew Training Manual

Training Courseware

- Flight Crew
- Maintenance
- Administrative

EFB Pilot's User Guide

Minimum Equipment List

Data Delivery Management Description and Procedures

EFB Configuration Control Description and Procedures

Vendor Maintenance Manual and/or Company Maintenance Procedures

Appendix 2

Compliance Checklist

An operator using a Class 1 EFB System may have to comply with part or all of the Regulations listed below as an acceptable means of compliance with the applicable sections of Title 14 CFR, Parts 91 and 135.

(1) Title 14 CFR §§ 91.9, 91.21, 91.103, 91.167, 91.169, 91.503, 91.605, 91.611, 91.1023, 91.1025, 91.1063, 91.1065, 91.1067, 91.1069, 91.1073, 91.1075, 91.1077, 91.1079, 91.1081.

(2) Title 14 CFR §§ 135.21, 135.23, 135.63, 135.81, 135.83, 135.144, 135.179, 135.213, 135.293, 135.297, 135.299, 135.323, 135.325, 135.327, 135.329.