EUROPEAN AVIATION SAFETY AGENCY

OPERATIONAL EVALUATION BOARD REPORT

DASSAULT AVIATION

CLASS 2 EFB FOR EASy COCKPIT

Final Report (V1)
Dated 03 08 2011

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NOTIFICATION

DASSAULT AVIATION has applied to EASA Flight Standards through the letter DGT-DTC/CER 578101 in March 25th, 2010, for an operational evaluation of an Electronic Flight Bag (EFB) Class 2 (hardware CMC CMA-1100 installed on Falcon 7X).

The mounting device and the connectivity have been certified through the EASA modification M-OPT-0252.

The following software application (step 1- JeppView /FliteDeck) has been subject to an operational evaluation:

JeppView/FliteDeck

This software application aims to replace original paper terminal charts (Jeppesen Charts). These electronic charts will be used as a back up to the EASy avionics. En route charts are not part of the backup and remain as paper.

The evaluation has been based, as a part, upon the following Dassault-Aviation documents:
-A comprehensive Master policy
-A comprehensive Operational Risk Assessment (ORA)
-A Compliance Matrix to Draft AMC 20-25 and ORI09 for EFB

The backup aspect has been the object of a particular attention in addition to the normal EFB compliance.

The EASA-OEB recommends the operation of this application and this hardware in all Dassault EASy cockpit aeroplanes according to the criteria retained for this evaluation.
The training proposed by Jeppesen has been retained for this application.
The evaluation of the two next Steps (Electronic Performance and Falcon Perf) is in progress.

Evan Nielsen
Head of Flight Standards
EASA Certification Directorate

PREAMBLE

Dassault has requested an OEB process for the evaluation of the Dassault Class 2 Electronic Flight Bag (EFB).

The original application for the evaluation of this device was for the specific installation on the Dassault Falcon 7X aeroplane type but the applicability has been expanded to cover all Dassault aeroplane types equipped with the EASy cockpit on the basis that no significant differences apply between aeroplane types with the EASy cockpit that affect the use of the Class 2 EFB system. Should significant differences apply, this Report and its recommendations will be invalid.

Though the primary intended use of the Dassault Class 2 EFB system is to provide a means of backup to the EASy charting system that is part of the EASy cockpit concept, there are no requirements or guidelines that recognise an EFB system as purely a means of backup to another EFB system. The Dassault Class 2 EFB system was therefore evaluated as a standalone system according to the current requirements and guidelines for EFB approval.

This OEB evaluation has been performed using the following methods:

1. Inspection of the EFB and conduct of functional tests;

2. Review of the Training Programme recommended by Dassault.

Requirements contained in Annex III to Commission Regulation (EC) No 859/2008 of 20 August 2008 (EU-OPS) have been considered together with the material in JAA TGL 36 (Approval of Electronic Flight Bags) and Draft AMC 20-25 (Airworthiness and Operational Considerations for the Approval of Electronic Flight Bags (EFBs).

Hardware evaluated for use in the Dassault Class 2 EFB system is described in Section 1 of this Report.

Software evaluated for use with the Dassault Class 2 EFB system is described in Section 2 of this Report.

This Report specifies the requirements for training and operational procedures for the Dassault Class 2 Electronic Flight Bag (EFB).

EXECUTIVE SUMMARY

The OEB evaluation found that the Dassault Class 2 Electronic Flight Bag and the applications evaluated satisfy the guidelines of TGL 36 and Draft AMC 20-25 for operational approval of this Class 2 EFB system. This Report, however, does not constitute an Operational Approval in itself and individual operators are required to obtain approval from their regulatory authority prior to use of the Dassault Class 2 EFB system.

EASA recommends the Dassault proposed training course and operational procedures as specified in this Report.

The MMEL for the specific aeroplane type or variant in which the EFB is installed is the document recommended for approval by EASA. In accordance with the guidance provided by JAA TGL 26 (Guidance Document for MEL Policy), operators may choose or not to include this Class 2 EFB in their MEL as the means of controlling inoperative EFB equipment. Other means may also be agreed with the operator's regulatory authority.

PURPOSE AND APPLICABILITY

This OEB Report specifies EASA recommendations to National Aviation Authorities (NAAs) and operators seeking guidance for the grant of an operational approval of the Dassault Class 2 Electronic Flight Bag (EFB) that may be installed in Dassault EASy cockpit aeroplanes. Provisions of this Report are consistent with the guidance defined in JAA TGL 36 and the Draft AMC 20-25. This Report assumes that appropriate airworthiness certification has been accomplished for the installation of the device in the specific aeroplane type.

This Report does not in itself approve the operational use of this EFB or its installed software. Operators must apply to their regulatory authority for operational approval of this device and its installed software.

The following information related to operational suitability is considered in this Report:

1. A general description of the EFB system approved under this Report, including:

   - EFB description;
   - A list of major components within the EFB;
   - The EFB operating system and version.

2. A list of the applications evaluated under this report;

3. Human / Machine Interface (HMI) testing;

4. Procedures for EFB use during all phases of flight;

5. An Operational Risk Assessment including means of mitigation for typical failure cases;

6. Procedures for ensuring appropriate database accuracy and currency;

7. Specifications for training, checking and currency;

8. Electromagnetic Interference (EMI) compliance testing;

9. Lithium Battery compliance testing;

10. Rapid Depressurization testing;

11. EFB Administration Procedures.

1   EFB DESCRIPTION

The Dassault Class 2 EFB system consists of two CMA-1100™ EFB devices manufactured by CMC Electronics mounted on a mounting device attached to the sidewall of the cockpit. Identical devices are installed on each side of the cockpit.

The primary use of the EFB system is to provide a backup to the EASy charting system that forms part of the EASy cockpit concept, but the system may be used as a standalone system in the absence of the EASy charting system.

Each EFB device hosts software applications for the operational use of the pilot. These software applications are limited to EFB Type A and Type B software.

1.1   EFB Components

The CMC Pilot View® CMA-1100 EFB Electronic Flight Bag (EFB) consists of two line replaceable units (LRUs):

- A self-contained Electronic Display Unit (EDU);

- A remotely mounted Expansion Module Unit (EMU) or Enhanced Expansion Module Unit (EEMU).

In addition, a mounting device secures the EFB when in use and allows for it to be stowed when not in use.

Note: *Not all EASy cockpit aeroplanes allow the device to be stowed.*

The following shows the installation on the Dassault Falcon 7X and with the device deployed:

The following shows the installation on the Falcon 7X with the device stowed:

1.1.1   The Electronic Display Unit (EDU)

The EDU consists of an 8.4" AMLCD XGA display with an internal processor capable of running Microsoft Windows™ based applications. The display unit's capabilities are expanded with the addition of 2 x USB 2.0 ports and a PCMCIA interface.
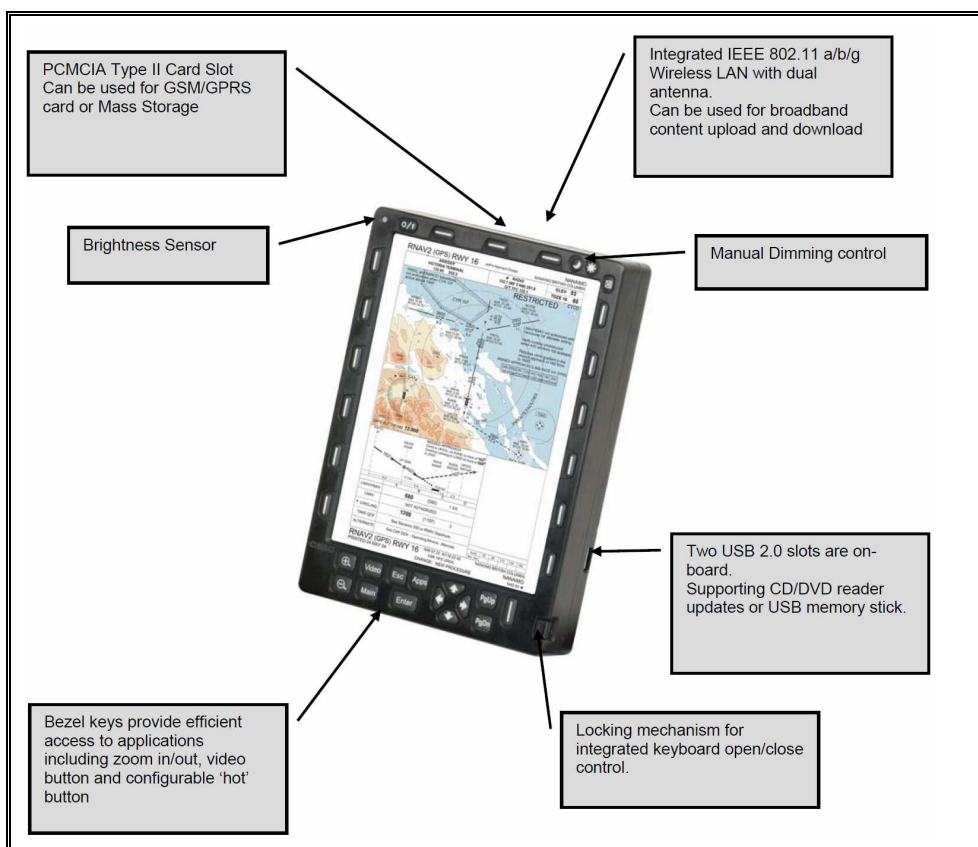
The EDU has a high-quality, fully dimmable display that provides acceptable readability in all cockpit lighting conditions. A "film-on-glass" touch-sensitive screen complements the backlit "FMS-style" line select keys providing the user quick access to specific functions.

The EDU pilot interface is by touch screen as well as by backlit bezel keys. Several bezel keys are pre-defined to facilitate user navigation across applications. In addition, the display portion of the EDU slides up to reveal an "FMS-style" alphanumeric keyboard with backlit keys.

Technical Specifications for the EDU are in the Table that follows:

FEATURE	DETAILS
Size	8.5" H x 6.1" W x 1.5" D (216mm H x 155mm W x 40mm D)
Weight	Including batteries: 3.5 lbs (1.6kg) nominal, 4.0 lbs (1.8kg) maximum
Casing	Machined aircraft-grade aluminium alloy.
Battery	Lithium Ion rechargeable (2 battery packs inside unit).
Display	- Active Matrix Liquid Crystal Display (AMLCD); "Film-on-glass" touch-sensitive screen; - Custom, Cold Cathode Fluorescent Lamp (CCFL) backlight; 8.4"(214 mm) diagonal screen; - Resolution 1024 x 768 (XGA); 262,144 colours; - Viewing angle: - Vertical: +40°, -50° - Horizontal: +60°, -60° The EDU display has very low reflectance and is readable in direct sunlight. An integrated ambient light sensor automatically adjusts brightness levels. The brightness level may also be adjusted using the controls in the upper-right corner of the EDU.
Memory	The EDU provides 512 Mbytes of Error Correcting Code (ECC) RAM in the standard configuration. ECC encoding protects the processing environment from electrical field interference, in particular at high altitudes. As an option, 1 Gb of ECC RAM can be installed on the EDU.
Storage	The EDU has two internal interfaces that accommodate solid-state Compact Flash cards providing up to a total storage capacity of 16 Gb that provides high performance and reliability particularly in high vibration environments.
Processor	The EDU is based on an Intel Centrino 1.1 GHz or, optionally, a 1.4 GHz processor with a 400 MHz system bus and Enhanced SpeedStep® power management. The chipset integrates an Intel® Graphics and Memory Controller HUB (GMCH) as well a 3D graphics engine that supports Intel's Extreme Graphics 2 suite of graphics drivers.

Power Supply	On the aeroplane during normal operation, the EFB is powered by the EMU-EDU interface. Nominal power consumption is 45W with a peak of 75W maximum.
	Battery backup in the EDU provides 40 minutes or more of independent power in the event of aeroplane power failure.
	When used outside of the aeroplane in a portable manner, the EDU is powered by an optional 110-220 VAC (50-60Hz) Power Adapter that is similar to a laptop computer power supply.
EDU Communication Interfaces	The EDU communicates with aeroplane systems via the EMU and the EDU-EMU cable.
	The EDU also provides an integrated IEEE 802.11 a:b:g wireless LAN communications capability with dual antennas integrated in the EDU case.
	For additional i/o communications, the EDU incorporates a single channel PCMCIA/Card Bus interface on the motherboard through a TI PCI1510 Card Bus controller.
	Two USB 2.0 ports are available externally, one on each side, of the EDU to interface to external devices such as a USB memory stick or CD/DVD ROM.

1.1.2   *Expansion Module Unit (EMU) and Enhanced Expansion Module Unit*

The Expansion Module Unit (EMU) provides certified aircraft power to the EDU protecting applications from aircraft power spurious and short term interruptions. The Basic EMU provides, as standard, the following interfaces between aircraft systems and the EDU:
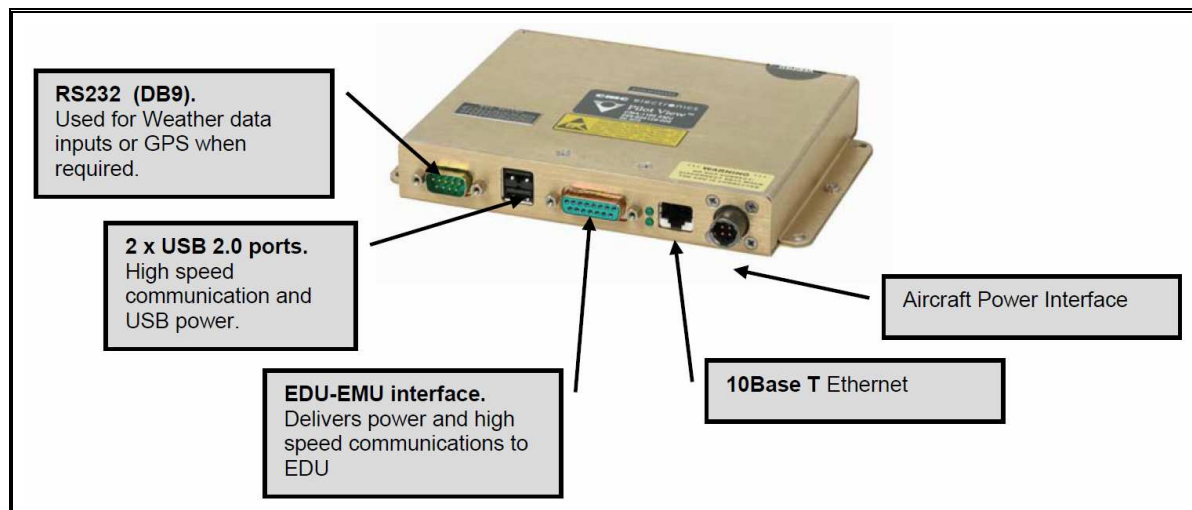
The Enhanced EMU provides the same interfaces as the EMU but also ARINC 429, RS422, discrete support and/or RS- 170 Video interfaces.
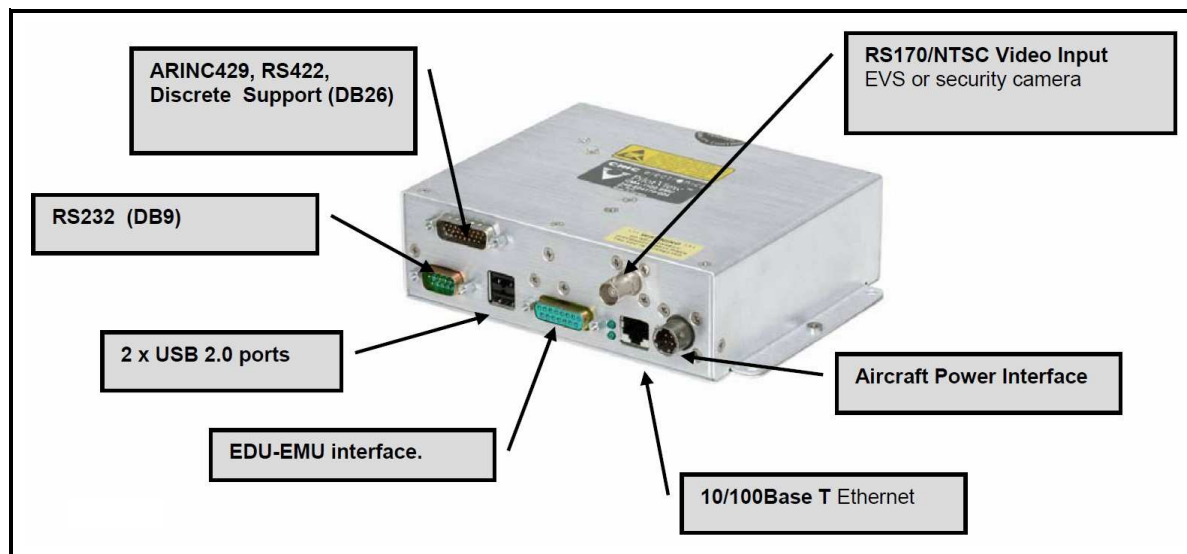
1.1.3   Pilot Interface

Navigation is via the Line Select keys or the touch screen or the built-in keyboard may be deployed:

The front page offers shortcuts to:

- Installed applications;

- EFB management including:

  - Windows access protection
  - EFB settings

- Note Taker;

- e-Docs;

- Calculator;

- Etc.

Other controls are as follows:
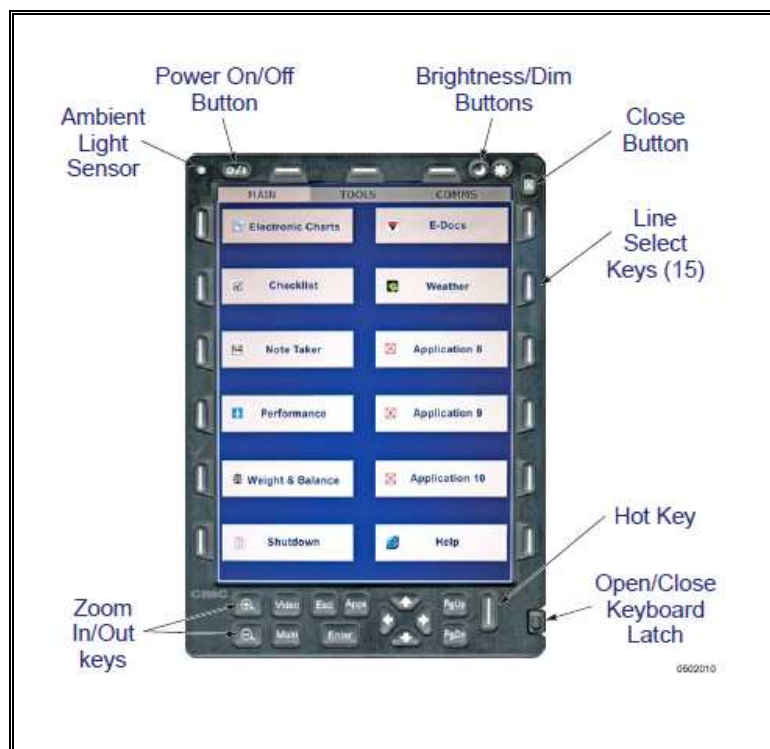
1.1.4   *Mounting Device*
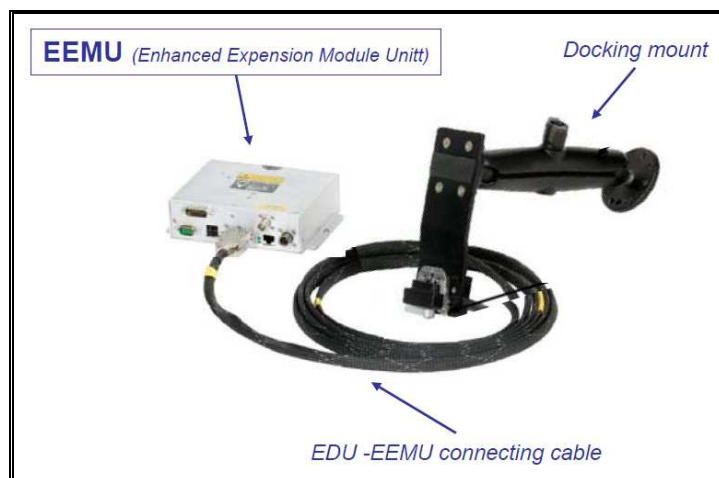
The provision of the mounting device is approved as follows:

TYPE	APPROVAL
Falcon 7X	EASA.A.C.11942 at Revision 1.
Falcon 900EX EASy	Modification M5111 dated August 22nd 2006 approved under the authority of DOA EASA.21J.051.
Falcon 2000 EASy	Modification M2735 dated May 9th 2006 approved under the authority of DOA EASA.21J.051.

The mounting device consists of a Docking Mount with a latching device which holds the EDU to the mount and provides power and a high speed interface to the unit by means of the EDU-EMU/EEMU interface cable.

The Docking Mount is attached to the aircraft by means of an adjustable arm fixed to the sidewall of the cockpit. The adjustable arm allows the device to be positioned within the pilot's view or to be stowed away when not in use.

Identical devices are installed on each side of the cockpit.

1.2.1   Operating System and Version

The CMC PilotView® CMA-1100 EFB Electronic Flight Bag contains an Operating System (OS) consisting of:

- Windows XP Professional at Service Pack 2;
- Master Menu.

1.2.2   Installed Software

The following pieces of software are also provided with the operating system but were not subject to evaluation:

- Adobe® Reader for viewing .pdf documents;
- EFB Note Taker and EFB Setup;
- CMC PilotView (Version number is available via the SW CID button of PilotView);
- CMC e-DocView (part of CMC PilotView basic installation);
- Mozilla FireFox (part of CMC PilotView basic installation);
- Wi-Fi Controller (part of CMC PilotView basic installation).

The following E-documents are also provided with the operating system but were not subject to evaluation:

- PilotView® EFB Installation Manual;
- PilotView® EFB Operator's Manual;
- PilotView® EFB Quick Reference Guide.

Note: *As the provision of documents for display on the EFB is the operator's responsibility, NAAs should evaluate the operator's electronic documents and their means of display on the EFB as part of the process for the grant of an operational approval.*

2 APPLICATIONS EVALUATED

The following applications have been evaluated for use on this specific EFB.

2.1 Type A Applications

No Type A applications were evaluated.

2.2 Type B Applications

Type B applications (and version for each application) evaluated for this report were:

- Jeppesen JeppView software application at version 3.5.1.0;
- Jeppesen FliteDeck software application at version 3.7.1.0.

JeppView provides the capability to view and print Jeppesen terminal charts and en-route maps from a desktop or portable computer. Amongst its chart printing options, JeppView provides a Trip Kit feature that prints charts for the route in the order that they will be used during the flight, including charts for the departure, destination, alternate, and contingency airports.

JeppView is intended for use in the ground environment but may also be used in-flight.

FliteDeck is the in-flight portion of JeppView that does the following:

- Displays Jeppesen terminal charts;
- Provides airport, FSS, ATC frequencies, and other information needed during the flight.

FliteDeck is designed for use in-flight and it is not possible to print charts from FliteDeck.

JeppView and FliteDeck and their derivatives have been the subject of other EASA evaluations and these products are in general use. The combination of the CMA CMA-1100TM Class 2 EFB and JeppView and FliteDeck software applications were found to be suitable for the display of terminal charts and other information during all phases of flight.

2.3 Type C Applications

No Type C applications were evaluated.

CAUTION*: On those aircraft with an EEMU and GPS position available to the Class 2 EFB through ARINC 429 data bus connectivity, it is possible to display own-ship position superimposed on the FliteDeck charting application. This would be considered to be a Type C software application under Draft AMC 20-25. Since FliteDeck uses pre-composed charts of indeterminate accuracy, the display of own-ship position is not acceptable and must be inhibited by means of the Administration procedure described in Dassault EFB Master Policy document (DGT 124704).*

3   HUMAN / MACHINE INTERFACE (HMI) TESTING

HMI testing was the subject of Dassault Report DGT 125393. As detailed EASA guidance beyond Appendix D to Draft AMC 20-25 is not available, Dassault elected to use the detailed checklists provided in FAA Order 8900.1 Chg 47 Volume 4 Chapter 15. This evaluation was comprehensive and the outcome was satisfactory.

Note: The HMI testing was conducted in the environment of the Falcon 7X but the results are considered to be valid for all Falcon types with the EASy cockpit concept.

In addition, the EASA evaluation team conducted further HMI testing of the CMC CMA-1100™ device in isolation, comprising of usability and pilot interface assessments. Again, this evaluation was satisfactory.

4   PROCEDURES FOR EFB USE DURING ALL PHASES OF FLIGHT

Detailed recommended flight crew procedures are described in the Dassault EFB Master Policy document (DGT 124704). The procedures include:

- EFB general policy, environment and data flow;
- Limitations of the EFB;
- Stowage;
- Normal flight crew operating procedures by phase of flight;
- Abnormal operations.

These procedures have been reviewed by the EASA evaluation team and found to be suitable and valid for all Falcon types with the EASy cockpit concept. Operators are recommended to use these procedures as the basis for their EFB SOPs.

5   OPERATIONAL RISK ASSESSMENT

An Operational Risk Assessment (ORA) was conducted by Dassault and reported in the Dassault EFB Risk Assessment document (DGT124691).

This document addresses paragraph 7.2 of Draft AMC 20-25 ("Risk Assessment for EFB Systems"). It is composed of two main parts:

- The Hardware Risk Analysis (HRA);
- The Operational Risk Analysis (ORA).

The Hardware Risk Analysis is independent of software applications that could be loaded onto the EFB. Then, an Operational Risk Analysis is conducted for each software application. The first issue of this document covers the HRA and the ORA for the electronic aeronautical charts contained in Jeppesen JeppView and FliteDeck software.

Note: The HRA and ORA were conducted for the installation in the Falcon 7X but the results are considered to be valid for all Falcon types with the EASy cockpit concept.

The objective of the Risk Assessments is to demonstrate that the application(s) hosted on the EFB achieve at least the same level of accessibility, usability and reliability as the traditional means that they would replace (i.e. paper-based documentation).

The HRA determines the potential causes that may impact the EFB system as far as accessibility, usability and reliability is concerned for the hardware and software architectural phase. It provides conclusions for those parts such as use of reliable alternative means or mitigation factors.

The ORA addresses each specific software application and their operating mode in order to provide mitigation factors for availability and integrity issues for each specific software application.

Note: If an operator intends to deviate from Dassault recommendations contained in the EFB Master Policy document (DGT124704), the Risk Assessment must be customized by the operator so that it can be included in the operator's operational approval submission.

The ORA identifies potential losses of function or malfunction (detected erroneous output, undetected erroneous output) and associated failure scenarios, including those situations arising from the HRA;

- Analyses the operational repercussions of these failure scenarios;
- Proposes mitigation means e.g., software design features, availability of back-up data, operational procedures, training, administration, method to ensure appropriate accuracy and currency of databases etc. linked to the use of the application.

The following functions were analyzed for loss of function or malfunction (spurious or erroneous):

- EFB power-on;
- EFB power-off;
- Launch of application software (Jeppesen JeppView or FliteDeck);
- Display of aircraft position;
- Display of Terminal Chart;
- Display of En-Route Chart;
- Zoom-In of the Chart;
- Zoom-out of the Chart;
- Use of virtual keypad;
- Sliding the display up to access the keyboard;
- Use of the keyboard;
- Use of the touch screen.

The ORA was not conducted by phase of flight and the mitigation means were considered by Dassault to be appropriate for all phases of flight. This means, however, that there are no specific MMEL conditions available for the EFB and the MMEL Chapter 46 has yet to be developed.

The conduct of the ORA was comprehensive and the mitigation proposed was reasonable and acceptable.

6   DATABASE ACCURACY AND RECENCY

Jeppesen provides a 60 day grace period to update the Electronic Chart Data in JeppView. After the grace period, JeppView and FliteDeck no longer display charts. Electronic Chart Data updates are available either:

- On the Internet when the EFB unit is connected through either wireless or a LAN connection;
- On the Electronic Chart Data CD-ROM update.

The 60 day grace period allows usage when users are away from their home base and do not have access to the Internet or the current Electronic Chart Data CD. Use of the programme within the 60 day grace period should only be made with great caution. Users should ensure that they are flying with current flight information, and comply with all requirements regarding pre-flight planning and required or recommended flight information. Jeppesen recommends that users use the Internet to update their chart data when they do not have access to the latest Electronic Chart Data update on CD.

Software updates are embedded with the Jeppesen Database, either through internet update or Electronic Chart Data update on CD. Jeppesen is sole manager and provider responsible for software versions. A trace of software modifications is provided by Jeppesen in each new software user manual.

Each time JeppView or FliteDeck is started, it displays a warning with the effective date of the Electronic Chart Data, the issue date of the terminal chart data, and the cycle number of the Electronic Text Pages. When the data becomes obsolete, the fonts on the warning change color:

- For the NavData cycle, red signifies that the data has expired and an update is needed to ensure safety of flight;
- For the terminal chart cycle, dark red signifies that an update is imminent and appears one to six days after an issue of updated terminal charts.

Red signifies that the charts should only be used with great caution.

7   SPECIFICATIONS FOR TRAINING, CHECKING AND RECENCY

Dassault provides specifications for training in its EFB Training Specifications document (DGT 123081). Dassault recommends that the pilot training documentation which shall be used during the EFB Pilot Training Course is, at the minimum:

- CODDE 1;
- CODDE 2;
- CODDE 3 / QRH 1&2;
- AFM;
- Operator's MEL;
- CMC PilotView User's Manual;
- JeppView FliteDeck User's Manual.

The detailed EFB Training Specification provides guidance to operator's that is generally in line with Appendix F to Draft AMC 20-25 but operators should construct their own EFB training programmes to ensure that the guidance of Appendix F to Draft AMC 20-25 has been followed.

The Dassault EFB Training Specifications addresses both Initial and Recurrent Training and checking and makes recommendations for the following:

- Initial Training:

  - Ground training:
    i. Pre-requisites;
    ii. Ground session characteristics;
    iii. Training progress;
    iv. Duration.

  - Flight training:

    i. Objective;
    ii. Flight training session.

- Recurrent training:

  - Recurrent EFB training;
  - Recurrent EFB checking.

7.1   OEB Recommendation for Training

7.1.1   Initial Training

Initial Ground Training should be at Level B. Level B training can be adequately addressed through aided instruction such as slide / tape presentation, computer based instruction which may be interactive, video or classroom instruction.

Initial Flight Training should be at Level C. Level C training should be accomplished by use of "hands on" training in a STD qualified according to JAR-STD 1A, Level C (or higher) or on an aeroplane equipped with the Dassault Class 2 EFB. The training should address skills and abilities as well as knowledge and include both normal and non-normal procedures.

7.1.2   Recurrent Training

Recurrent training for the use of an EFB is not normally required, provided the functions of the EFB system are used regularly in line operations.

The OEB recommends that normal EFB operations are included as a component of the annual ground and recurrent training required by App. 1 to EU-OPS 1.965(a)(1), including, in particular, the alternative procedures to be used for dispatch with an EFB inoperative or not available.

7.2   OEB Recommendations for Checking

7.2.1   Initial Checking

The check conducted following the ground-based element of Initial EFB Training may be accomplished by questionnaire (oral or written) or as an automated component of EFB computer-based training depending on the nature of the training conducted.

Proficiency in EFB use is not shown in the required items in App 2 to JAR-FCL 1.240 & 1.295 for the Skill Test for the issue of a type rating following type conversion training or for the Proficiency Check for the renewal of a type rating. However, where the operator is the TRTO and the Skill Test is being conducted following training that is integrated with the operator's conversion course as required by EU-OPS 1.945, or where the Proficiency Check is being conducted concurrently with the Operator's Proficiency Check required by EU-OPS 1.965, and where the operator's SOPs are dependent on the use of the EFB on the particular type or variant, proficiency in the use of the EFB should be assessed in the appropriate areas (e.g. item 1.1, item 1.5 etc. in App 2 to JAR-FCL 1.240 & 1.295).

EU-OPS 1.965(b)(1)(i) requires that flight crew demonstrates their competence in carrying out normal procedures during the Operator Proficiency Check. Therefore, where an operator's SOPs are dependent on the use of an EFB, proficiency in its use should be assessed.

EU-OPS 1.965(c) requires that flight crew demonstrate their competence in carrying out normal procedures during the Line Check. Therefore, where an operator's SOPs are dependent on the use of an EFB, proficiency in its use should be assessed.

7.3   OEB Recommendations for Recency

The OEB makes no recommendations for Recency beyond the recommendations for Recurrent Training.

8   ELECTROMAGNETIC INTERFERENCE (EMI) COMPLIANCE TESTING

The Class 2 EFB System is intended to be powered during take-off and landing. This requires the System to meet the requirements of ED-14()/DO-160() Section 21, Emission of Radio Frequency Energy as described in TGL 36 paragraph 6.1.1(a).

EMI compliance was addressed in EASA major modification approval MOPT 252.

Note: *The results of successful EMI testing conducted to the standards of RTCA/DO-160D are published in Dassault EFB Qualification Compliance Summary (DGT 119392) and in Appendix A to the Installation Manual for the CMC CMA-1100^{TM} Class 2 EFB system (CMC Document: 929-600040-000).*

9   LITHIUM BATTERY COMPLIANCE TESTING

Each CMC CMA-1100 device is powered by a lithium battery that has been demonstrated to meet the Underwriters Laboratory Inc (UL) Standard for Safety for Lithium Batteries reference UL 1642. This ensures that:

- Safe cell temperatures and pressures are maintained during any foreseeable charging or discharging condition and during any failure of the charging or battery monitoring system. The lithium battery installation precludes explosion in the event of those failures.

- The design of the lithium batteries precludes the occurrence of self-sustaining, uncontrolled increases in temperature or pressure.

- No explosive or toxic gases emitted by the lithium battery in normal operation, or as the result of any failure of the battery charging system or monitoring system, can accumulate in hazardous quantities within the aeroplane.

- No corrosive fluids or gases that may escape from the lithium battery will damage the surrounding structure or any adjacent systems, equipment, or electrical wiring of the aeroplane.

- Each lithium battery has provisions to prevent any hazardous effect on structure or essential systems caused by the maximum amount of heat the battery can generate during a short circuit of the battery or of its individual cells.

The CMC CMA-1100 device has the capability to control the charging rate of the battery automatically, so as to prevent battery overheating or overcharging.

Lithium battery compliance was addressed by EASA major modification approval MOPT 252.

10   RAPID DEPRESSURIZATION TESTING

Rapid depressurisation testing of the CAC CMA-1100^{TM} device is addressed in Dassault EFB Qualification Compliance Summary (DGT 119392) and in Appendix A to the Installation Manual for the CMC CMA-1100TM Class 2 EFB system (CMC Document: 929-600040-000).

Testing consisted of:

- Operate to 15,000 ft;
- Overpressure to -15,000 ft;
- Decompression to 55,000 ft

No abnormal operation was observed.

Note: *The CMC CMA-1100^{TM} device is fitted with solid state data storage devices.*

11   EFB ADMINISTRATION PROCEDURES

Certain key administration procedures are described in the Dassault EFB Master Policy document (DGT 124704).

CAUTION: *The Installation and Maintenance Procedures for the Jeppesen FliteDeck software contained in Chapter 8 the Dassault EFB Master Policy document must be followed in their entirety.*

Operators are advised to follow the guidance in the Dassault EFB Master Policy document (DGT 124704) and in Section 7 and Appendix G to Draft AMC 20-25 to obtain acceptable EFB Administration procedures.

12   APPLICABILITY OF THIS REPORT

The evaluations conducted in respect of this Report were conducted on the Dassault Falcon 7X. However, this OEB Report is applicable to all Dassault Falcon types with the EASy cockpit concept provided no significant differences exist in the installation and use of the Class 2 device.

This Report is valid for installations under:

- M2735 for the Falcon 2000EX EASy aeroplane;

- M5111 for the Falcon 900EX EASy aeroplane;

- M-OPT 252 G for the Falcon 7X aeroplane.

This Report recommends the approval of this EFB installation on these aeroplane types.

APPENDIX 1 – DOCUMENTS REVIEWED

The following Dassault documents have been reviewed and evaluated by the OEB during the determination of this Report.

DGT123586_-_LH
DGT343364_-_LH_
DGT344436_-_RE
DGT124949_-_PHR
DGT346257
DO031-001_DGT125154_F7X
DO031-010_DGT124704_F7X
DO031-300_DGT124691_F7X

APPENDIX 2 – COMPLIANCE REQUIREMENTS

Compliance with the following European Safety Agency requirements has been established where possible.

Compliance is based on a field examination and/or an office evaluation of the EFB.

Airworthiness Requirements

All the airworthiness requirements are listed in each following Change Approval Sheet linked to modification M-Opt 252 for Falcon 7X, M5111 for Falcon 900EX Easy and 2735 for Falcon 2000EX Easy.

Operational Requirements

Because of the regulation transition, EASA applied the provisions of both TGL 36 and Draft AMC 20-25 in determining the operational acceptability of the EFB.

Compliance with Annex III to Commission Regulation (EC) No 859/2008 of 20th August 2008 (commonly known as "EU-OPS 1"), specifically OPS 1.135(b) and OPS 1.1040(m), were considered.

ORI 9 (EFB)

ORI 9 (EFB) was applied to this application for operational approval that required the applicant to address the following:

ORI 9 (EFB) Requirement 1	A Human / Machine Interface (HMI) Assessment addressing the functionality of applications designed for the EFB architecture.
ORI 9 (EFB) Requirement 2	Details of the recommended operating procedures designed to be used for both the hardware and the software applications.
ORI 9 (EFB) Requirement 3	An Operational Risk Analysis addressing failures, loss of function and errors and additionally the impact of available application customization on the application's compliance with operational and other requirements.
ORI 9 (EFB) Requirement 4	Details of the proposed or recommended EFB flight crew and operations personnel training including, if applicable, the recommended flight crew Differences and Familiarization training syllabi for EFB applications in situations where the EFB system is installed on other aircraft types or variants.
ORI 9 (EFB) Requirement 5	Verification that aircraft performance data output provided by the EFB software applications produce the correct output in comparison with data derived from the AFM (or other appropriate certified source) under a representative cross section of conditions (e.g. take-off and landing performance data on a dry, wet and contaminated runway, different wind conditions and aerodrome pressure altitudes, etc.).
ORI 9 (EFB) Requirement 6	Details of the proposed or recommended EFB Administration procedures.
ORI 9 (EFB) Requirement 7	Details of proposed or recommended EFB Administrator training required.
ORI 9 (EFB) Requirement 8	Where an own ship position can be displayed on any EFB application, verification that the accuracy of the position displayed in terms of the position source, the charting used and other factors (total system error) is appropriate.

ORI 9 Compliance Matrix

ORI REFERENCE	AMC 20-25	JAA TGL 36	MEANS OF COMPLIANCE / COMMENTS
1	• §7.4 : "HMI Assessment for Type A & B Software Applications" • Appendix D : "HMI Assessment and HF Considerations	• §7.2 : "HMI Assessment for Type A & B Software Applications" • Appendix D : "HMI Assessment and HF Considerations"	**OMC-4** Dassault-Aviation Response: DO 031-OSC- 400 EFB MMI assessment.
2	• §7.5.1 : "Procedures for Using EFB Systems with Other Flight Deck Systems"	• §7.3.1: "Procedures for Using EFB Systems with Other Flight Deck Systems"	**OMC-0** Dassault-Aviation Response: DO 031-OSC-010 EFB Master Policy.
2	• §7.5.3 : "Procedure to Mitigate / Control Workload"	• §7.3.3 : "Procedure to Mitigate / Control Workload"	**OMC-6** The impact of the proposed crew operational procedures on the flight crew workload in critical phases of flight will be evaluated in a LOFT session Dassault-Aviation Response: DO 031-OSC-601 Simulator LOFT Report.
2 & 4	• §7.5.1 : "Procedures For Using EFB with Other Flight Deck Systems" • §7.5.4: "Defining Flight Crew Responsibilities for Performance Calculations"	• §7.3.1 : "Procedures for Using EFB with Other Flight Deck Systems" • §7.3.4: "Defining Flight Crew Responsibilities for Performance Calculations"	**OMC-0, OMC-6** Dassault-Aviation Response: DO 031-OSC-010 EFB Master Policy; DO 031-OSC-601 Simulator LOFT Report

ORI REFERENCE	AMC 20-25	JAA TGL 36	MEANS OF COMPLIANCE / COMMENTS
2 & 4	• §7.12 : "Operational Evaluation Test"	• §7.7.2 : "Operational Evaluation Test-Commencement of Operations Without Paper Back-Up"	**OMC-6, OMC-0** Checklist from FAA 8900.1 CHG 47 that contains a list of questions for operator consideration during an operational evaluation of the Electronic Flight Bag (EFB), its documentation, procedures, and training. It contains questions that can be answered in a training or operational environment by pilots, instructor / evaluators, or other operational personnel, and sample crew performance questions that can be addressed in a simulation environment. After the operator has completed this checklist, the Flight Operations Inspector (FOI) will review the results with the operator. LOFT sessions to be conducted with JOEB to validate the use of the EFB under operational conditions including normal and abnormal conditions will be conducted after evaluation phase of FliteDeck, EPM, and FalconPerf applications. Dassault-Aviation Response: DO 031-OSC-010 EFB Master Policy; DO 031-OSC-601 Simulator LOFT Report.
3	• §7.2.1 :"Risk Assessment-MS Risk assessment" • § 7.2.2 : "ORA"	• §7.1 : "Operational Risk Analysis (ORA)"	**OMC-3** ORAs to be established, reviewed and validated with the JOEB for the following applications: • OEM Documentation • Performance Calculators: Take-Off, En-Route, Landing Dassault-Aviation Response: DO031-OSC- 300 EFB Risk Assessment.

ORI REFERENCE	AMC 20-25	JAA TGL 36	MEANS OF COMPLIANCE / COMMENTS
4	• §7.11 : "Flight Crew Training" • Appendix E : "Flight Crew Training"	• §7.6 : "Flight Crew Training"	**OMC-2** F7X Type Rating Course has been validated by JOEB without EFB. Dassault-Aviation Response: DO031-OSC-200 Flight Crew Training Specifications
4 & 6	• §7.5.2 : "Flight Crew Awareness of EFB Software / Database Revisions"	• §7.3.2 : "Flight Crew Awareness of EFB Software / Database Revisions"	**OMC-0** Dedicated status page for FalconPerf, including validity of obstacles and terrain databases plus pop-up indicating obsolete databases2. Dedicated status page for EPM. Dassault-Aviation Response: DO 031-OSC-010 EFB Master Policy.
6 & 7	• §7.9 : "Role of the Administrator" • §7.7 : "EFB System Security" • §7.6 : "Quality Assurance"	• §4.5 : "EFB Administrator" • §7.4 : "Quality Assurance" • §7.5 : "Role of the Administrator"	**OMC-0** Generic definition and role of EFB Administrator role to be provided by Dassault-Aviation in EFB Policy and Procedures Manual. Training specifications will be also be defined. Dassault-Aviation Response: DO 031-OSC-010 EFB Master Policy.
5	• §6.2.4: "Specific Considerations for Mass & Balance & Performance Applications • Appendix F: "Software Application Approval Submission"	• §6.2 b : "EFB Software Applications-Specific Considerations for Performance"	**OMC-2** FALCON PERF application requires to be validated in order to check that performance calculations from the software provide consistent results when compared with calculations from the approved AFM. Dassault-Aviation Response: Validation will be provided later.

Other EFB Regulations of EASA

ORI REFERENCE	AMC 20-25	JAA TGL 36	MEANS OF COMPLIANCE / COMMENTS
Not covered by ORI but necessary for Operational Approval	• §5.1.2: "Hardware Classes of EFB Systems - Class 2" • §6.1.2: "Class 2 EFB"	• §5.1.2: "Hardware Classes of EFB Systems - Class 2" • §6.1.2: "Class 2 EFB"	**OMC-0** <u>Dassault-Aviation Response: None</u> EASA approved M-OPT-252G covers this item.

Not covered by ORI but necessary for Operational Approval	• §5.2: "Software Applications for EFB Systems"
	• §6.2: "Hardware and Software Approval Process - EFB Software Approval Process"
		• §5.2: "Software Applications for EFB Systems"
		• §6.2: "EFB Software Applications (Type A and B)"
			OMC-2
			
			• Type A application: CMC Pilotview
			• Type B applications:
			  1. JEPPESEN FliteDeck;
			  2. OEM designed performance calculator for en-route (EPM);
			  3. OEM designed performance calculator for T/O and LDG (FalconPerf).
			
			<u>Dassault-Aviation Response:</u>
			
			DO 031-OSC-200 Training Specifications for Pilot and Administrator; Analysis.

Not covered by ORI but necessary for Operational Approval	• §6.1.4.1: "Certification Documentation-AFM"	• §6.1.4.a): "Certification Documentation-AFM"	No additional limitations in the AFM
Not covered by ORI but necessary for Operational Approval	• §6.1.4.3: "Guidelines for EFB System Suppliers-Class 2" • §7.1 : "Role of the EFB System Supplier"	• §6.1.4 b : "Guidelines for EFB Application Developers	The EFB hardware is a Class 2 stand-alone COTS (Commercial Off The Shelf product). Refer to the description document published by CMC " PilotView® Class 2 EFB Enabling Paperless Cockpit" <u>Dassault-Aviation Response:</u> None

ORI REFERENCE	AMC 20-25	JAA TGL 36	MEANS OF COMPLIANCE / COMMENTS
Not covered by ORI but necessary for Operational Approval	• §7.3 :"Dispatch Considerations" • §7.10 : "EFB System Maintenance"	• §7.4 : "Quality Assurance"	**OMC-0** Dassault-Aviation Response: • DO 031-OSC-010 EFB Master Policy.
Not covered by ORI but necessary for Operational Approval	• §7.13 : "Operational Approval Submission"	• §7.8 "Operational Compliance Summary"	**OMC-0** Dassault-Aviation Response: Specific document for guidelines will be provided to operator including all documents presented to EASA FS during this certification process.

Other EFB Regulations of EASA and/or the FAA Not Answered by Dassault-Aviation

DRAFT AMC 20-25	JAA TGL 36	MEANS OF COMPLIANCE / COMMENTS
5.1.1 Hardware Classes of EFB Systems - Class 1		Not applicable
5.1.3 Hardware Classes of EFB Systems - Class 3		Not applicable
5.2.3 Software Applications for EFB Systems - Type C		Not applicable
6.1.1 Hardware Approval Process - Class 1 EFB		Not applicable
6.1.2.1 Design of the Mounting Device		OMC 0, EASA approved M-OPT-252G covers this item.
6.1.2.2 Placement of EFB Display		OMC 0, EASA approved M-OPT-252G covers this item.
6.1.2.3 EMI Demonstrations		OMC 0 EASA approved M-OPT-252G covers this item.
6.1.2.4 Batteries		OMC 0 EASA approved M-OPT-252G covers this item.
6.1.2.5 Power Source		OMC 0 EASA approved M-OPT-252G covers this item.
6.1.2.6 EFB Data Connectivity		
6.1.2.7 Rapid Depressurization Testing		OMC 0 EASA approved M-OPT-252G covers this item.
6.1.2.8 Installed Resources		OMC 0 EASA approved M-OPT-252G covers this item.
6.1.3 Hardware Approval Process - Class 3 EFB		Not applicable
6.1.4.2 Guidelines for EFB Software Application Developers - Class 3 EFB	6.1.4 b Guidelines for EFB Application Developers	Not applicable
6.2.2 Software Approval Process - Type C Software Applications		Not applicable
6.2.3 Software Approval Process - Non-EFB Software Applications		OMC 0 through DO 031-OSC-010 EFB Master Policy document
7 Operational Approval Process		Operator has to complete initial certification process between Dassault with EASA FS.
7.1 Role of the EFB System Supplier		Not applicable
7.3 Dispatch Considerations	7.4 Quality Assurance	OMC 0 through DO 031-OSC-010 EFB Master Policy document
7.3.1 Dispatch with Inoperative EFB Elements		OMC 0 through DO 031-OSC-010 EFB Master Policy document
7.5.3 Procedure to Mitigate / Control Workload	7.3.3 Procedure to Mitigate / Control Workload	Not applicable
7.8 Electronic Signatures	4.5 EFB Administrator 7.4 Quality Assurance 7.5 Role of the Administrator	Not applicable
7.10 EFB System Maintenance		OMC 0 through DO 031-OSC-010 EFB Master Policy document

DRAFT AMC 20-25	JAA TGL 36	MEANS OF COMPLIANCE / COMMENTS
7.12.1 Initial retention of paper back up		Operator responsibility
7.12.2 Commencement of operations without paper back up		Operator responsibility
7.13 Operational approval submission	7.8 Operational Compliance Summary	Operator responsibility

END