

**EUROPEAN AVIATION SAFETY AGENCY
ELECTRONIC FLIGHT BAG (EFB) EVALUATION REPORT**



Gael Ltd.

Q-Pulse Docs for iPad – V1.48

12 Feb. 2014

REVISION RECORD

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Date: 12 Feb. 2014

ACRONYMS AND ABBREVIATIONS

AMC	Acceptable Means of Compliance
AMMD	Airport Moving Map Display
CBT	Computer Based Training
CDL	Configuration Deviation List
EASA	European Aviation Safety Agency
EFB	Electronic Flight Bag
EMI	Electromagnetic Interference
FAA	United States Federal Aviation Administration
FCOM	Flight Crew Operating Manual
FSTD	Flight Simulation Training Device
HMI	Human Machine Interface
LIFUS	Line Flying Under Supervision
MFD	Multi-function Display
MMEL	Master Minimum Equipment List
NAA	National Aviation Authority
OEB	Operational Evaluation Board (EASA term)
TGL	Temporary Guidance Leaflet

EXECUTIVE SUMMARY

The OEB evaluation found that Q-Pulse Docs satisfies the guidelines of AMC 20-25.

This current evaluation has been performed using the following methods:

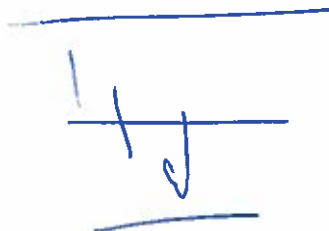
- Desktop review of the software specifications and manual;
- Review of compliance documents;
- Limited functional tests on sample EFBs.

Requirements contained in Commission Regulation (EC) N° 859/2008 of 20 August 2008 (EU-OPS) and Commission Regulation (EU) N° 965/2012 of 5 October 2012 (Air Operations Rules) have been considered together with guidance material in AMC 20-25 (Airworthiness and Operational considerations for Electronic Flight Bags).

This report does not substitute for, or prevail over, any of the terms of the Q-Pulse Docs End User License Agreements (EULA) or the Apple hardware and software Product Agreements. The operators must read the EULA and take the responsibility to accept the different agreements prior to using the applications.

The EASA-OEB sees no technical objections to the grant by the National Authorities of an operational approval for the use of Q-Pulse Docs taking the recommendations proposed in this report into account.

Francois Fabre
Deputy Head of Experts Department for Flight:
Date: 12 02 2014

A handwritten signature in blue ink, consisting of a horizontal line at the top, a vertical line on the left, and a stylized 'F' shape in the center.

Jean Baril
Special OPS Evaluation Section Manager
Date: 16/02/2014

A handwritten signature in black ink, featuring a large, stylized 'J' and 'B' with a horizontal line crossing through them.

1 PURPOSE AND APPLICABILITY

1.1 Purpose

This Report specifies EASA requirements and recommendations applicable to operators seeking Operational Approval to use Q-Pulse Docs under Commission Regulation (EC) N° 859/2008 of 20 August 2008 (EU-OPS), or Commission Regulation (EU) No 965/2012 of 5 October 2012 (referred to in this Report as “Part-OPS”), and it additionally provides guidance to National Aviation Authorities (NAAs) responsible for granting such approvals.

1.2 Applicability

This report is applicable to version 1.48, as well as subsequent versions added via addendum or not requiring a further evaluation by EASA (see [chapter 5.10.3](#)).

Findings of compliance and recommendations of approval contained in this report are consistent with the guidance specified in AMC 20-25.

This Report assumes that the parts not covered by this report regarding the evaluation of the compliance of the EFB will be performed by the operator and evaluated by its competent authority.

This report includes:

- Minimum requirements which should be applied by the NAA when considering the grant of an Operational Approval;
- Information which is advisory in general, but is mandatory for particular operators if the designated configurations apply and if approved for that operator.

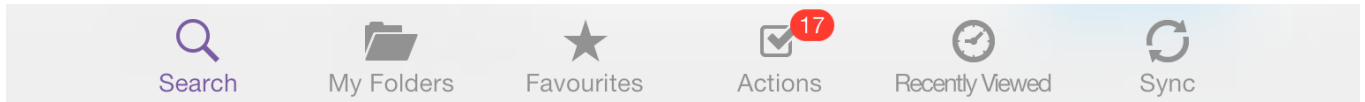
Provisions of this Report are effective until amended, superseded, or withdrawn.

The structure of this report ([paragraphs 4 and 5](#)) has been adapted to follow the structure of the AMC 20-25.

2 GENERAL DESCRIPTION OF THE SOFTWARE

Q-Pulse Docs provides users with the ability to store and view documents on their iPad, and for companies to mirror controlled documents from a library onto the users iPad.

The iPad application offers the following functionalities:



Search:

The search function allows to search online and offline documents of a particular category (thanks to a selection filter) for a particular search string (title only).

A blank search will return all documents within the selected category.

My Folders:

Displays the folder structure as built by the administrator. Both online (when connected) and offline documents can be shown.

Favourites:

Quick links to documents selected as favourites by the user.

Actions:

Notifications appear in this tab when the administrator require the user to acknowledge the presence of new documents. After opening the document a first time, the user can close the corresponding action.

Notes: this function was not assessed. This function is unrelated to aircraft checklists.

Recently Viewed:

Quick links to recently viewed documents.

Sync:

Options related to the documents synchronization. An automatic synchronization may be set up here.

3 EFB CLASSIFICATION

3.1 Hardware Classification

This evaluation did not cover the hardware aspects.

3.2 Software Classification

The Q-Pulse Docs application is classified as type B under AMC 20-25.

3.3 Non-EFB Applications

The iOS system provides default applications not related to flight operations and allows easy installation of additional applications.

These applications are out of the scope of this document. An operator's EFB administrator should ensure that non-EFB software applications do not adversely impact the operation of the EFB (see [paragraph 4.7.4](#)) and include them in the EFB configuration management.

It is reminded that third party applications enabling a display of own-ship position or flight parameters are considered to be Type C applications under TGL-36, or normal avionics functions under AMC 20-25, if the present position function is not inhibited and locked by the administrator.

4 HARDWARE OPERATIONAL EVALUATION

The hardware operational evaluation is not covered by this evaluation and remains under the responsibility of the operator. This includes:

- Electromagnetic Interference (EMI) Demonstrations (AMC 20-25 §6.2.1.1)
- Battery (AMC 20-25 §6.2.1.2)
- Power Source (AMC 20-25 §6.2.1.3)
- Environmental Testing (AMC 20-25 §6.2.1.4)
- Display Characteristics (AMC 20-25 §6.2.1.5)
- Viewable Stowage if applicable (AMC 20-25 §6.2.1.6)

5 SOFTWARE OPERATIONAL EVALUATION

5.1 Risk Assessment

The Risk Assessment process of AMC 20-25 corresponds to the former Operational Risk Analysis from TGL-36.

For this evaluation, such an assessment could difficultly be conducted at a generic level without knowledge of the documents loaded in the application and their intended use (in particular, whether they would replace paper or not).

The Risk Assessment remains therefore under operator's responsibility and should be tailored to the foreseen list of documents, their use, and other specificities such as the number of devices on board and their installation (use during all phases of flight allowed or not).

5.2 Changes to the EFB system

As stated in AMC 20-25, the modifications to the EFB applications that do not bring changes to the HMI, or introduce new functionalities, do not require an approval from the competent authority.

5.3 Dispatch Considerations

As for the Risk Assessment, the determination of dispatch considerations remains under operator's responsibility. Refer to AMC 20-25 chapter 7.4.

Examples of operational procedures used in case of dispatch with inoperative document viewers include the printing and presence on board of the manuals and information required for the flight as per operational regulations and SOPs.

5.4 Human Factors and HMI Assessment

The following elements are based on a limited EASA evaluation and on supporting material provided by Gael Ltd. during the evaluation.

These elements have led to the content of the chapters below, including recommendations for the flight crew training. In addition, several HMI points raised during the evaluation were discussed with Gael Ltd., and upon agreement several modifications were brought to the application. They are included in version 1.48.

The HMI is deemed satisfactory and compliant with AMC 20-25 appendix D, provided the training recommendations are implemented.

The results of this evaluation may be reused by operators. It is reminded however that operators should carry out a complementary HMI assessment of the integration of the EFB in the flight deck environment (see AMC 20-25 §7.5).

5.4.1 Human Machine Interface

The HMI was found consistent and intuitive after an initial training on the application.

5.4.2 Legibility of Text

Q-Pulse Docs provides a Brightness control that adjusts the general device brightness (i.e. it is coupled with the iOS slider).

The legibility under the full range of lighting conditions expected on the operator's flight deck, including use in direct sunlight, is out of scope of this document and remains to be evaluated.

The legibility also depends strongly on the quality of the documents loaded in the application. Initial testing by the designated EFB administrator is therefore recommended.

5.4.3 Input Devices

The assessment of the input device (touch screen) was out of scope of this evaluation. However, the behaviour of Q-Pulse Docs during limited ground trials, was satisfactory.

Operators and their competent authorities should evaluate on a case by case basis that flight deck reasonably expected environmental factors (in particular turbulence) do not affect the usability of the touch screen for the expected operations.

5.4.4 User Interfaces Consistencies

Consistency between EFB applications:

The application uses standard iOS widgets that are expected to be common within various applications. Some of the interface particularities will be learned during initial training.

Consistency with flight deck applications:

Operators and their competent authorities should evaluate on a case by case basis if applicable.

5.4.5 Messages and Use of Colours

Use of colour:

In general, Q-Pulse Docs satisfies the guidance provided by the AMC 20-25. The use of red (for the notifications icons) is limited and is not deemed to be confusing.

A particular colour scheme is used for the buttons within the application and is documented in the user manual. It is recommended that the meaning of those colours and of the buttons labels are addressed during the initial training on the application (see 5.12).

Messages:

Although Q-Pulse Docs complies with the AMC 20-25 on that point, there is no way to ensure at the application level only that interactions (visual and auditory) coming from other (non-EFB) applications, or from the OS, are disabled. Pop-ups, notifications and alarm sounds may be triggered unexpectedly depending on the configuration.

Thorough testing is therefore recommended to check the possible interactions of the suite of applications considered for use as part of the operator's EFB solution. Updates to the operating system (iOS) may also require a re-assessment of potentially unwanted messages or pop-ups over EFB applications.

Possible work-around solutions in case of interference include turning notifications and sound off in the crew procedures. Certain pop-ups will however not be de-configurable, e.g. low battery warnings. The use of wifi on ground may also be a source of spurious notification or pop-ups.

5.4.6 System Error Messages

Q-Pulse Docs is deemed compliant. Errors in the application trigger appropriate notifications.

The stability of the application has been good during the evaluation. In case "crashes" of the EFB applications should occur in-service, it is recommended that there is a process for the crew to report this to the EFB administrator.

Non-EFB applications should be assessed in addition assessed by the operator in order to avoid the triggering of undue error messages.

5.4.7 Data Entry Screening and Error Messages

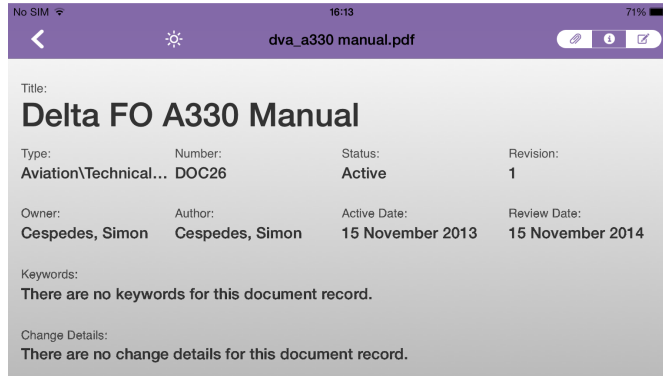
The application being simple, the number of entry fields is quite limited. Blank entries into the search field trigger an appropriate error message.

5.4.8 Error and Failure Modes

5.4.8.1 Flight Crew Error

The application being simple and intuitive, the potential for crew error is limited. It is recommended that the documents names and information (e.g. revision number, change information) loaded by the administrator are filled in appropriately so as to mitigate the risk of selection and viewing of an incorrect document or document revision.

In case of doubt, the pilot can access to detailed document information through a dedicated panel in the viewer:



5.4.8.2 Identifying Failure Modes

Failure identification is ensured by the use of error messages (see 5.4.6 & 5.4.7).

5.4.9 Responsiveness of Applications

During the limited hands-on trial by EASA the responsiveness of the application was satisfactory.

A system busy indicator (standard iOS widget) is implemented.

5.4.10 Off-Screen Text and Content

If a document is not visible in its entirety in the available display area, such as during “zoom” or “pan” operations, the existence of off-screen content is identified by scroll bars when the device touch screen is in use. The responsiveness of the touch screen allows for easy zooming and panning in the documents.

For documents that are displayed page by page (such as pdf documents), a single touch on the screen allows to check the position of the current page amid the whole document.

5.4.11 Active Regions

The application uses the default iOS HMI widgets and there is no ambiguity concerning the active regions.

5.4.12 Managing Multiple Open Applications and Documents

The application does not allow to open multiple documents at the same time.

5.4.13 Flight Crew Workload

The crew workload evaluation can be considered partially out of the scope of this document since it depends on operator specificities, like positioning of the device and standard procedures.

Operators and their competent authorities should evaluate the EFB positioning, stowing, and intended use during applicable phases of flight (including possible use of a viewable stowage device), to insure there is no unacceptable increase of flight crew workload or adverse safety implications.

This evaluation should be performed taking into account the specific operators SOPs, in an operationally representative context, and using adequate Human Factors methodology.

5.4.14 HMI - Performance and Mass & Balance applications

Not applicable.

5.5 Specific Considerations for Performance and Mass & Balance applications

Not applicable.

5.6 Flight Crew Operating Procedures

5.6.1 Procedures for using EFB systems with other flight crew compartment systems

Procedures for using the EFB with other flight deck systems is out of scope of this evaluation and remain under the operator's responsibility.

5.6.2 Flight crew awareness of EFB Software / Databases Revisions

Flight Crew must be made aware of the applicable revision status. This can be achieved through the verification in the information panel available for each document (see 5.4.8.1).

It is recommended that the crew is trained to ensure before flight that the necessary documents are properly loaded in the application and can be accessed without connectivity. Indeed, online documents can appear in the application and disappear later when connectivity is lost, if they were not downloaded earlier. See also 5.12.

5.6.3 Procedures to mitigate and/or control workload

The flight crew procedures are out of scope of this evaluation and remain under the operator's responsibility.

The procedures should be designed so as to mitigate and/or control additional workload created by using the EFB system. Refer to AMC 20-25 chapter 7.7.3.

5.6.4 Flight Crew Responsibilities for Performance Calculations

Not applicable.

5.6.5 Performance Calculations Procedures

Not applicable.

5.7 Compliance Monitoring

The operators compliance monitoring programme (required by Part-OPS, ORO.GEN.200) should include procedures related to the EFB system.

These procedures should ensure that the EFB operations and administration are conducted in accordance with all applicable requirements, standards and operational procedures.

5.8 EFB System Security

The operator's EFB Administration procedures must be capable of ensuring an appropriate level of EFB security as described in the AMC 20-25.

The operator should use technologies and/or procedures to assure that unauthorized content cannot enter the EFB system.

5.9 Electronic Signatures

Not applicable.

5.10 EFB Administration

The operator should appoint a person to the role of EFB Administrator. The EFB Administrator is responsible for hardware and software configuration management and for ensuring, in particular, that no unauthorised software is installed. The EFB Administrator is also responsible for ensuring that only a valid version of the application software and current data packages are installed on the EFB system.

The EFB Administrator should have received detailed training in both the ground systems hardware and the software applications used to configure the EFB.

Administration procedures for the configuration of the EFB system, its updating, operational feedback, quality assurance functions and software configuration control should be established by the operator and documented in an EFB Policy and Procedures Manual. Details of the content of a typical EFB Policy and Procedures Manual may be found in AMC 20-25 at Appendix G.

Although EFB administration remains an operator's responsibility, the paragraphs below address some aspects that were discussed during the evaluation and deemed important.

- The administration workflows are to be defined by the operator. The user manual provided by Gael Ltd provides assistance in setting up the application and the associated services.
- The administrator should be responsible to set up the documents structure properly, fill in the required information such as revision data, and test the correct synchronization and display of the documents in the application.
- It is also recommended that the administrator ensures that the documents are produced in a way to facilitate the navigation in the iPad application. This includes for instance, ensuring that the documents feature Table of Contents useable in the application (through the dedicated icon in the viewer), to jump easily from one chapter to another.

5.10.1 Considerations regarding Performance and M&B software administration

Not applicable.

5.10.2 EFB Policy and Procedures Manual

The EFB policy and procedures manual is under operator's responsibility. Refer to AMC 20-25 7.11.1.

5.10.3 System updates (iOS)

This evaluation is applicable to iOS 7.

Any new OS version should imply a complementary evaluation to verify that it has no adverse effect on the EFB applications.

It is recommended that operators implement administrator procedures to not update their devices to new major releases of OS until such time as Gael Ltd reports that no compatibility issues remain between the revised OS and the Q-Pulse Docs application.

In all cases the configuration management responsibilities are with the EFB administrator.

5.10.4 Non-EFB Software applications

These applications are out of the scope of this evaluation, however their use is subject to the applicable operational rules and to chapter 6.2.2.3 of the AMC 20-25.

It is recommended that the EFB administrator inhibits the possibility to install new applications, once the EFB is in the defined software configuration. This should be achieved with a passcode.

5.11 System Maintenance

The EFB system maintenance is under operator's responsibility. AMC 20-25 7.12 applies.

The operator is in particular responsible for the maintenance of the batteries, and should ensure that they are periodically checked and replaced as required.

5.12 Flight Crew Training

In addition to the areas provided in AMC 20-25 chapters 7.13 and E.1.3.1, it is recommended that the initial training include the following areas of emphasis:

- Layout of the application.
- Colour code and meaning of the document viewing buttons.
- Use of the search function and its filter to retrieve stored documents, in particular versus the "My Folders" tab - use of the blank search to retrieve all documents.
- Use of the information panel to ensure documents validity.
- Use of the sync function and activation/deactivation of the network connectivity (Wifi / 3G) per SOPs.
- Procedures to ensure before a flight that the necessary documents are loaded on the iPad and accessible without connectivity.

5.12.1 Training for Performance Calculation

Not applicable.

5.13 Operational Evaluation Test

Before the granting of an Operational Approval, the operator should ensure, and the NAA should verify by means of an Operational Evaluation Test, that the guidance and recommendations of AMC 20-25 and those contained in this OEB Report have been satisfied.

5.13.1 Initial Retention of Paper Back Up

Where paper is initially retained as back-up for the purpose of validating the paperless-solution provided by Q-Pulse Docs, the Operational Evaluation Test will consist of an in-service proving period typically performed via an operationally-appropriate number of test and evaluation flights. The purpose of the in-service proving period is for the operator to demonstrate to the NAA that the EFB system provides an acceptable level of accessibility; usability and reliability to those required by the applicable operational requirements (see OPS 1.135(b) and 1.1040(m) / AMC1 to CAT.GEN.MPA.180). In particular that:

- The operator's flight crew are able to operate the EFB applications without reference to paper;
- The operator's administration procedures are in place and function correctly;
- The operator is capable of providing timely updates to the applications on the EFB where a database is involved;
- The introduction of the EFB without paper back up does not adversely affect the operator's operating procedures and that alternative procedures for use when the EFB system is not available provide an acceptable equivalent;
- The six month period dedicated to this check should take the frequency of the flights into account.

The results of the demonstration may be documented in the form of a Report from the in-service proving period on the performance of the EFB system.

The operator may then be granted an Operational Approval of the EFB to allow removal of the paper back up by their NAA if they have shown that the EFB system is sufficiently robust.

5.13.2 Commencement of Operations Without Paper Back Up

Where an operator seeks credit to start operations without paper back up, in addition to the above, the Operational Evaluation Test should also consider the following elements:

- A detailed review of the EFB risk assessment;
- A simulator LOFT session to verify the use of the EFB under operational conditions including normal, abnormal and emergency conditions. A particular attention should be paid to the access time observed to access safety critical material and its adequacy with the tasks requirements;
- Observation by the competent authority of the initial operator's line flights.

The operator should demonstrate to the NAA that they will be able to continue to maintain the EFB to the required standard through the actions of the Administrator and the Quality Assurance Programme.

5.14 Final operational report

Operators should produce and retain a final operational report, which summarises all activities conducted and the means of compliance used, supporting the operational use of the EFB system. Refer to AMC 20-25 7.15 and Appendix I.

6 APPLICATION OF EFB EVALUATION REPORT

This EFB Software Evaluation Report is applicable to both operators and NAAs when considering an application for Operational Approval with use of Q-Pulse Docs. The OEB has found that the software as evaluated satisfy the corresponding guidance of AMC 20-25.

However, the EFB Risk Assessment, the crew and administrator procedures and evaluation of the hardware and its compliance with regulations remain a responsibility of the operators and their competent authority. The findings of this report do not constitute an Operational Approval and individual operators must obtain approval from their NAA prior to use of these applications.

7 ALTERNATE MEANS OF COMPLIANCE

Alternate means of compliance to the recommendations contained in this Report may be approved by National Authorities. If alternate means of compliance are proposed, operators may be required to establish that any proposed alternate means provides an equivalent level of safety to the recommendations of AMC 20-25 and this OEB Report. Analysis, demonstrations, proof of concept testing, differences documentation, or other evidence may be required.

8 LIST OF REQUIRED DOCUMENTS

Operators will need to develop, or have available, the following documents to support their application for Operational Approval:

- Aeroplane Flight Manual (if required – see AMC 20-25);
- Flight Crew Operations Manual;
- Flight Crew Training Manual;
- MEL or dispatch considerations;
- EFB Policy and Procedures Manual;
- Training syllabus and courseware for:
 - Flight Crew;
 - EFB Administrator and ground support personnel;
 - Maintenance.
- Software:
 - Data revision process;
 - Configuration Control process;
 - Quality Control and Quality Assurance processes.
- Relevant Maintenance documents for EFB :
 - Aircraft Maintenance Manual (Chapter 46);
 - Fault Reporting Manual;
 - Fault Isolation Manual;
 - Illustrated Parts Catalogue.
- Maintenance Procedures.