RWANDA
CIVIL AVIATION AUTHORITY

ADVISORY CIRCULAR
AC 13-002

APPLICATION & PROCESS:
CABIN CREW EFB APPROVAL

Purpose— The purpose of this advisory circular is to provide guidance to aircraft operators seeking approval of Rwanda Civil Aviation Authority (RCAA) for use of a Cabin-Electronic Flight Bag approval.

- The C-EFB must have the prior approval of the RCAA before use in aircraft passenger operations.
- That approval will be based on the completion of an evaluation and verification program that conforms to the guidance of this circular.

Table of Contents

- Advisory Circulars are intended to provide advice and guidance to illustrate a means, but not necessarily the only means, of complying with the Regulations, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material.
- Where an AC is referred to in a 'Note' below the regulation, the AC remains as guidance material,
- ACs should always be read in conjunction with the referenced regulations.

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SECTION 1 POLICY & GENERAL INFORMATION

1.1 STATUS OF THIS AC

This AC is an original issuance.

1.2 BACKGROUND

A. Traditionally, documentation and information available to crew members for use during operations have been presented mainly in paper format.

- These include the cabin crew portion of the operations manual (referred to as the cabin crew operations manual (CCOM)) and the operator's occurrence reporting forms.

B. Much of an operator's documentation and information can be made available in electronic format. Cabin crew members may have access to electronic versions of operator procedures, data and information services.

C. An electronic flight bag (EFB) is an electronic information management device that may help crew members perform flight-related tasks more easily and efficiently with less paper.

- An EFB reduces or replaces paper-based reference materials that crew members need to carry in their flight bags or that must be on board aircraft.

D. The use of EFBs was initially intended to cover an alternative method of storing, retrieving and using the manuals and information required to be on board by the applicable operational requirements.

- Subsequent technical developments have led to the hosting of software applications on EFBs, such as databases or real-time data coming from operations (e.g. weather information, passenger information lists).

E. Although EFBs were originally developed for flight crew members to perform flight management tasks, it is possible to implement EFBs for use in cabin operations.

- An EFB developed for cabin operations is referred to as a cabin electronic flight bag (C-EFB).
- The functions of a C-EFB may include but are not limited to: cabin crew operations manual, checklists, forms, passenger information, and real-time reporting.

1.3 APPLICABILITY

The requirement for prior approval of an C-EFB for use by cabin crew members is applicable to all Rwanda operators of—

1) Large and turbine-engine passenger aircraft in general aviation; and
2) Any passenger aircraft operated in commercial air transport that requires cabin crew members.

1.4 RELATED REGULATIONS

The following regulations are applicable to this AC—

- Part 6, Aircraft Instruments & Equipment
- RCAR Part 12, AOC Certification & Administration
- RCAR Part 13, Passenger Carrying Operations

This AC does not address EFB airworthiness issues; there are covered in AC 04-007.

1.5 RELATED PUBLICATIONS

For further information on this topic, operators are advised to review the following publications and regulatory requirements—

1) Rwanda Civil Aviation Authority
   - ♦ AC 10-016, Process & Application: EFB Authorization
   - ♦ AC 04-007, EFB Installation

Copies may be obtained from the RCAA-FSS.

2) International Civil Aviation Organization (ICAO)
   - ♦ Annex 6, Part 1, International Commercial Air Transport, Aeroplanes
   - ♦ Annex 6, Part 2, International General Aviation Operations-Aeroplanes
   - ♦ Annex 6, Part 3, International Operations of Helicopters

Copies may be obtained from Document Sales Unit, ICAO, 999 University Street, Montreal, Quebec, Canada H3C 5H7.

3) Federal Aviation Administration (FAA)
   - ♦ Order 8900.1, Flight Standards Information Management System (FSSMS)

Copies may be obtained through the Internet address of www.fsims.faa.gov.

1.6 DEFINITIONS & ACRONYMS

1.6.1 DEFINITIONS

The following definitions are used in this advisory circular and may differ from definitions contained in other references—

1) **Aircraft interface device (AID)**. A device or function that provides an interface between the EFBs and other aircraft systems which protects the aircraft systems and related functions from the undesired effects from non-certified equipment and related functions.
2) **Cabin crew member.** A crew member who performs, in the interest of safety of passengers, duties assigned by the operator or the pilot-in-command of the aircraft, but who shall not act as a flight crew member.
3) **Cabin electronic flight bag (C-EFB).** An electronic information system, comprised of equipment and applications for cabin crew, which allows for the storing, updating, displaying and processing of C-EFB functions to support flight and cabin operations or duties.
4) **Change management.** A formal process to manage changes within an organization in a systematic manner, so that changes which may impact identified hazards and risk mitigation strategies are accounted for, before the implementation of such changes.
5) **Crew member.** A person assigned by an operator to duty on an aircraft during a flight duty period.
6) **Critical phases of flight.** The period of high workload on the flight deck, normally being the periods between the beginning of taxiing until the aircraft is on the route climb phase and between the final part of descent to aircraft parking.
7) **Electronic flight bag (EFB).** An electronic information system, comprised of equipment and applications for flight crew, which allows for the storing, updating, displaying and processing of EFB functions to support flight operations or duties.
8) **EFB software application.** Software hosted on an EFB platform, providing one or more EFB functions.
9) **Flight crew member.** A licensed crew member charged with duties essential to the operation of an aircraft during a flight duty period.
10) **Hazard.** A condition or an object with the potential to cause or contribute to an aircraft incident or accident.
11) **Installed resources.** Hardware/software installed in accordance with airworthiness requirements.
12) **Independent EFB platforms.** Multiple EFB platforms that are designed in such a way that no single failure makes all of them unavailable.
13) **Non-transmitting portable electronic device.** A portable electronic device that is not equipped with a radio frequency transmitting function or a portable electronic device that has all of the device's radio frequency transmitting functions turned off or is in airplane mode with the transmitting capability also turned off.
14) **Operations manual.** A manual containing procedures, instructions and guidance for use by operational personnel in the execution of their duties.
15) **Operator.** The person, organization or enterprise engaged in or offering to engage in an aircraft operation.
16) **Passenger.** A person who is not an operating crew member.

17) **Portable electronic device (PED).** Any lightweight, electrically-powered equipment. These devices are typically consumer electronic devices capable of communication, data processing and/or utility. Examples range from hand held, lightweight electronic devices such as tablets, e-readers, and smart phones to small devices such as MP3 players and electronic toys.

Note: The definition of PED encompasses both transmitting and non-transmitting PEDs.

18) **PED interference event.** Unusual behavior of on-board electronic systems and equipment that may be suspected as originating from portable electronic device (PED) use. May also be referred to as an electromagnetic interference (EMI) event.

19) **Risk mitigation.** The process of incorporating defenses, preventive controls or recovery measures to lower the severity and/or likelihood of a hazard's projected consequence.

20) **Safety management system (SMS).** A systematic approach to managing safety, including the necessary organizational structures, accountability, responsibilities, policies and procedures.

21) **Transmitting portable electronic device (T-PED)**. A PED that contains an intentional transmitter, which has some or all of the device's radio frequency transmitting functions turned on. Intentional transmitters may include devices enabled with cellular technology, wireless radio frequency network devices, and other wireless-enabled devices such as remote control equipment (which may include toys), two-way radios, cellular/mobile/ smart phones and satellite phones.

1.6.2 ABBREVIATIONS & ACRONYMS

The following acronyms are used in this advisory circular—

1) **AC** = Advisory Circular
2) **AOC =** Air Operator Certificate
3) **CCOM** = Cabin crew operations manual
4) **C-EFB** = Cabin electronic flight bag
5) **EFB** = Electronic flight bag
6) **HMI** = Human-machine interface
7) **PED** = Portable electronic device
8) **TC** = Type certificate

SECTION 2 INTRODUCTION

2.1 WHAT IS AN EFB?

An EFB is any device, or combination of devices, actively displaying EFB applications. EFBs are characterized by the following—

- An EFB hosts applications, which are generally replacing conventional paper products and tools, traditionally carried in the pilot's flight bag. EFB applications include natural extensions of traditional flight bag contents, such as replacing paper copies of weather with access to near-real-time weather information.
- In order to qualify as an EFB application, the failure effect must be considered a minor hazard or have no safety effect.
- Acceptable EFB applications are listed in Appendices A and B of AC 10-016. These EFB applications may be overlaid or integrated.

- EFBs cannot replace any installed equipment required by operational or airworthiness regulations.
- EFB applications have no certification requirements for installation under aircraft type design (refer to AC 04-007).

2.2 C-EFB TYPES & FUNCTIONS

2.2.1 EFB TYPES

A. C-EFBs can be either portable or installed.

B. Portable EFBs are not part of the aircraft configuration and are considered as portable electronic devices (PEDs).

- They generally have self-contained power and may rely on data connectivity to achieve full functionality.
- Modifications to the aircraft to use portable EFBs require the appropriate airworthiness approval as outlined in AC 10-016 and AC 04-007.

C. Installed EFBs are integrated into the aircraft, subject to normal airworthiness requirements and under design control.

- The approval of these EFBs is included in the aircraft's type certificate (TC) or in a supplemental type certificate (STC).

2.2.2 C-EFB FUNCTIONS

A. Both safety and non-safety related functions are eligible as C-EFB functions. A C-EFB may include, but is not limited to, the following functions—

1) operations manuals, including the CCOM;
2) passenger information list;
3) passenger announcements;
4) aircraft system interaction (e.g. cabin defects);
5) documents and checklists (including quick reference handbooks);
6) reporting forms and functions (mandatory and operator-required reporting, safety, security, quality, service, fatigue, and flight operations);
7) medical service providers;
8) flight and duty time limitations;
9) training materials and digital learning access;
10) operator's email or other news communication;
11) operator's portal;
12) a copy of the C-EFB user manual;
13) on-board sales process;
14) layover information (e.g. hotel, embassy, doctors, security advices); and
15) labor contracts, if applicable.

B. C-EFB functions to be used for the safe operation of aircraft are considered to be those whose failure, malfunction or misuse would have an adverse effect on the safety of aircraft operations (e.g. increased cabin crew workload during critical phases of flight).

C. The applications below may be considered examples of software applications providing such functions, depending on their use, associated procedures and failure mitigation means—

1) CCOM;
2) special authorizations/approvals;
3) cabin defect logbook/cabin maintenance discrepancy reporting forms;
4) electronic checklists, including those for use during normal operations, abnormal and emergency situations;
5) mandatory occurrence reporting forms; and
6) Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods.

SECTION 3 HARDWARE

3.1 HARDWARE CONSIDERATIONS FOR INSTALLED C-EFBS

A. An installed C-EFB is a component that is incorporated into the aircraft type design and, as such, is subject to airworthiness authority approval.

B. Installed C-EFBs should be certified either during the airworthiness certification of the aircraft, through operational bulletins by the original equipment manufacturer, or through a third-party STC.

3.1.1 DATA CONNECTIVITY TO AIRCRAFT SYSTEMS

A. The capability of connecting an installed C-EFB to certified aircraft systems should be covered by an airworthiness approval.

B. Certified aircraft systems should be protected from adverse effects of an installed C-EFB system failure by using a certified aircraft interface device (AID).

C. An AID may be implemented as a dedicated device, or it may be implemented in non-dedicated devices, such as a C-EFB docking station, a network file server or other avionics equipment.

3.1.2 POWER TO THE C-EFB

A. Installed power provisions should comply with the applicable airworthiness requirements.

B. Connection of the C-EFB to a non-essential, or to the least critical power bus, is recommended, so failure or malfunction of the C-EFB, or power supply, will not affect the safe operation of an aircraft's critical or essential systems.

C. There should be a means other than a circuit breaker to disable installed C-EFBs in the event of unwanted operation (such as continuous flashing).

> Circuit breakers may not be used as switches.

3.2 HARDWARE CONSIDERATIONS FOR PORTABLE C-EFBS

3.2.1 PHYSICAL CHARACTERISTICS

A. Consideration should be given to the physical characteristics of the device selected for the C-EFB (e.g. a smart-phone or tablet).

> The physical characteristics of the device should be evaluated as part of the C-EFB risk assessment.

B. Some devices may prove to be cumbersome for normal use in the cabin.

> Information on the C-EFB risk assessment is found in Section 7 of this AC.

3.2.2 STOWAGE & SECURING

A. Stowage and securing require inherent means to prevent unwarranted C-EFB movement.

> The methods of stowage and securing should not create a hazard during aircraft operations (refer to paragraph 6.1.4 of this AC).

B. Stowage and securing means are required for portable C-EFBs, as installed C-EFBs are by definition integrated into the aircraft. Stowage and securing should be configured such that the C-EFB can be easily stowed and secured but remains readily accessible.

3.2.3 READABILITY

A. The C-EFB data should be legible under the full range of lighting conditions expected in the cabin.

B. Font style, color, formatting and background should also be legible.

C. The screen background should be considered in regard to color, wallpaper, etc. to ensure readability.

3.2.4 BASIC NON-INTERFERENCE TESTING

A. As previously noted, portable C-EFBs are considered to be PEDs. As such, any reference to PEDs in this section is also applicable to portable C-EFBs.

> ICAO Circular 340 contains guidance for the use of PEDs across all phases of flight.

B. In order to operate a portable C-EFB during flight, the operator should ensure that the C-EFB will not interfere in any way with the operation of aircraft systems.

3.2.5 POWER SUPPLY, CONNECTIVITY & COMPATIBILITY

A. The operator should ensure that power supply to the C-EFB, either a battery and/or externally supplied power, is compliant with the applicable standards for use in an aircraft and available to the extent required for the intended operation.

> The power source needs to be suitable for the device.

B. Installed power provisions should comply with the applicable airworthiness requirements. C-EFB design should consider the source of electrical power, the independence of the power sources for multiple C-EFBs, and the potential need for an independent battery source.

> The operator should identify designated outlet(s) for use by cabin crew members to charge C-EFBs on board the aircraft.

C. The operator may consider providing approved charging stations for use in flight. If so, the charging stations should meet all airworthiness requirements.

> Charging stations that are dedicated for crew use should not be accessible to or used by passengers.

3.2.6 CABLING

The operator should ensure that any cabling attached to the C-EFB, whether the C-EFB is in the dedicated mounting or handheld, does not present a hazard.

> Cabin crew members should only use approved, compatible cables.

3.2.7 TEMPERATURE RISE

A. Rechargeable lithium-type batteries are becoming more common as a source of principal power or standby/back-up power in C-EFBs.

- Overheating can occur during use or charging of the C-EFB.
- Therefore, the placement of the C-EFB should allow sufficient airflow around the unit.

B. Lithium-ion or lithium-polymer (lithium-ion polymer) batteries are two types of rechargeable lithium batteries commonly used to power C-EFBs.

3.2.8 DATA CONNECTIVITY

The following should be considered with regard to data connectivity—

1) between C-EFBs, if two or more C-EFBs in the cabin and/or in the flight deck are connected to each other, the operator should demonstrate that this connection does not negatively affect otherwise independent C-EFB platforms; and

2) to aircraft systems, refer to paragraph 3.1.1 of this AC.

3.2.9 ENVIRONMENTAL CONDITIONS

The operator should ensure that the C-EFB can be operable within the anticipated environmental conditions in the cabin, including foreseeable high or low temperatures, and after rapid decompression if the C-EFB is intended for use in such an event.

3.3 MOUNTING DEVICES

A. A mounting device is a device that can be used to secure a portable C-EFB. It may include docking stations, suction cups, etc.

- The mounting device may have aircraft power and data connectivity.
- It may require quick- disconnect for egress.

B. If the mounting device for the C-EFB is permanently attached to the aircraft structure, the installation should be approved in accordance with the appropriate airworthiness requirements. The following guidance may be considered for that purpose 0151

1) It should be confirmed that the intended C-EFB hardware in its mounting device does not obstruct visual or physical access to aircraft displays, controls or external vision and that its location does not impede ingress, egress and emergency escape paths nor pose any risk of injury to occupants (e.g. in the event of a hard landing).

2) There should be no mechanical interference between the C-EFB in its mounting device and any of the cabin display panels.

3) The mounting device should be able to lock in position easily. Crashworthiness considerations should be considered in the design of this device. This includes the appropriate restraint of any device, when in use.

4) A provision should be provided to secure, lock or stow the mounting device in a position out of the way of cabin crew member operations when not in use.

5) For fire safety reasons, the C-EFB hardware should be capable of being easily removed from the mounting device without tools or maintenance action by cabin crew members

C. A suction cup mounted device is not permanently attached to the aircraft structure and therefore does not require aircraft certification approval.

- EFBs mounted by suction cups are considered as portable EFBs.

D. While some operators may be able to adequately mitigate the risks associated with suction cup mounts for their operation, other operators may choose to have their EFB mounts certified as installed equipment, in accordance with the applicable aircraft certification requirements.

- For a certified mount installation for portable EFBs, the security of the mount, the visibility, the function of the mount, and egress considerations would be addressed as part of the certification process.

SECTION 4 SOFTWARE

4.1 CONSIDERATIONS FOR ALL C-EFB SOFTWARE APPLICATIONS

4.1.1 USABILITY

A. The C-EFB should provide an intuitive, user-friendly, and consistent user interface within and across the various software applications that it hosts.

- This should include, but not be limited to, data entry methods, color-coding philosophies and symbols used.

B. Software developers and operators are encouraged to evaluate the usability of an existing human-machine interface (HMI) before developing a new HMI.

C. The HMI should be evaluated for unforeseeable common human errors after its introduction into operation in the everyday environment to allow for required changes or enhancements of the given design.

4.1.2 STYLE OF PRESENTATION

Software considerations include, but are not limited to, the following and should be addressed by the operator—

- ease of access to common functions;
- consistency of symbols;
- terms and abbreviations;
- legibility of text;
- system responsiveness;
- methods of interaction;
- use of color;
- display of system status;
- error messages;
- management of multiple applications and documents;
- off-screen text and content; and
- use of active regions.

4.1.3 EASE OF ACCESS TO COMMON FUNCTIONS

A. C-EFB software should be designed to minimize cabin crew workload and provide ease of access to common functions.

Complex, multi-step data entry tasks should be avoided during critical phases of flight.

B. An evaluation of C-EFB intended functions should include a qualitative assessment of incremental cabin crew workload, as well as user-system interfaces and their safety implications.

C. If a C-EFB is to be used during critical phases of flight, such as during take-off and landing, or during abnormal and emergency situations, its use should be evaluated during simulated or actual aircraft operations under those conditions.

4.1.4 CONSISTENCY OF SYMBOLS

Symbols used in the C-EFB applications should be consistent with those used on the aircraft systems and equipment and in the paper-based documentation that they are intended to replace.

4.1.5 TERMS & ABBREVIATIONS

Terms and abbreviations used in the C-EFB applications should be consistent with those used in the paper-based documentation that they are intended to replace.

4.1.6 LEGIBILITY OF TEXT

Information displayed on the C-EFB should be legible to the intended user at the intended viewing distance(s) and under the full range of lighting conditions expected in the cabin, including daytime use in direct sunlight and night operation.

Consideration should be given to long-term display degradation because of abrasion and aging of the device.

- Brightness should be adjustable in fine increments.

4.1.7 SYSTEM RESPONSIVENESS

A. The system should provide feedback to the user when user input is accepted. If the system is busy with internal tasks that preclude immediate processing of user input (e.g. calculations, self-test, or data refresh), the C-EFB should display a “system busy” indicator (e.g. a clock icon) to inform the user that the system is occupied and cannot process inputs immediately.

B. The timeliness of system response to user input should be consistent with each application’s intended function (e.g. time-critical information should be prioritized by the system).

4.1.8 METHODS OF INTERACTION

A. In choosing and designing input devices, such as keyboards, touchscreens or cursor control devices, the operator should consider the type of entry to be made and the cabin environmental factors, such as turbulence and other normal vibrations affecting the usability of the input device.

B. For touchscreens, cabin crew members may need physical locations or structures (i.e. galley table top) to stabilize their arm, hand, and fingers in order to make accurate inputs.

The operator should verify that touchscreens do not result in unacceptable levels of cabin crew workload and error rates.

C. Input devices should provide feedback to indicate when they are operational. Since touchscreens provide little or no tactile feedback or control motion, visual and/or aural or other touch activation feedback is especially important.

D. Other touchscreen considerations include selecting the appropriate touch technology (e.g. resistive or capacitive), controlling screen contaminates that may reduce readability (e.g. skin oils and perspiration) and mitigating inadvertent operation.

4.2 SOFTWARE

4.2.1 USE OF COLOR

A. The color “red” should be used only to indicate a warning level condition.

B. “Amber” should be used to indicate a caution level condition.

C. Any other color may be used for items other than warnings or cautions, providing that the colors used differ sufficiently from the colors prescribed to avoid possible confusion.

The use of colors should take into consideration cabin crew members with color impairments.

4.2.2 DISPLAY OF SYSTEM STATUS

If an application is fully or partially disabled, or is not visible or accessible to the user, it may be desirable to have an indication of its status available to the user upon request.

It may also be desirable to prioritize these C-EFB status and fault messages.

4.2.3 ERROR MESSAGES

A. C-EFB messages and reminders should be integrated with (or compatible with) other cabin system alerts.

The C-EFBs should not cause a distraction through visual or audible notifications.

B. If additional messages are available but not currently displayed, there should be an indication of the additional messages.

If user-entered data are not of the correct format or type needed by the application, the C-EFB should not accept the data.

C. An error message should be provided that clearly communicates which entry is suspect and specifies what type of data are expected.

4.2.4 MANAGEMENT OF MULTIPLE APPLICATIONS & DOCUMENTS

A. The C-EFB should provide continuous indication of which application and/or document is active if the system supports multiple open documents or if the system allows multiple open applications.

B. The active application or document is the one currently displayed and responding to user actions.

- During normal operations, the user should be able to select which of the open applications or documents is currently active.
- In addition, the user should be able to find which open applications are running and switch to any one of these open applications easily.
- The user should also be able to open a new application quickly and easily.

C. When the user returns to an application running in the background, it should appear in the same state as when the user left the application, other than differences associated with the progress or completion of processing performed in the background.

4.2.5 OFF-SCREEN TEXT & CONTENT

A. If a document segment is not visible in its entirety in the available display area, such as during “zoom” or “pan” operations, the existence of off-screen content should be clearly indicated in a consistent manner.

B. For some intended functions, it may be unacceptable if off-screen content is not indicated.

- This should be evaluated based on the application and intended operational function.

4.2.6 USE OF ACTIVE REGIONS

A. Active regions are regions to which special user commands apply (e.g. hyperlinks or copying).

B. The active region can be text, a graphic image, a window, a frame, or another document object.

- For example, a text string might be selected for copying into a search query or a window might be activated in order to bring it to the front of other windows on the screen.

C. Active regions are also useful for selecting between frames on a frame-based visual display. The information in the active frame would respond to update commands entered by the user.

- If the display uses active regions, these regions should be clearly indicated.
- If users do not know how to use an active region, they will have trouble applying special commands to the intended object.

D. If users do not know that a particular region is active, they may enter inappropriate commands and become frustrated when these commands are not processed as expected.

4.3 ELECTRONIC SIGNATURES

A. Some forms will require a signature to signify acceptance or to confirm the authority.

The operator should have a process in place for an electronic recordkeeping system to ensure the integrity of the system.

B. In order to be accepted as an equivalent to a handwritten signature, an electronic signature used in C-EFB applications should assure the same degree of accessibility and security as the signature it replaces.

4.3.1 C-EFB SECURITY

A. The C-EFB system should be secure from malicious software, data hijack, unauthorized usage and fraudulent or criminal intent both on the ground and in the air.

Access to the system should be controlled and authenticated.

B. The operator should ensure that adequate security procedures are in place to protect the system software and data.

C. Adequate measures should also be in place for compilation, secure distribution and remote wiping of the data to the C- EFB.

D. Content should be protected on unsecured networks. Additional security procedures to protect hardware should be developed (e.g. device distribution, replacement and collection list, loss, theft, possibility of erasing device content remotely and storage when device is not in use).

4.4 UPDATES

A. If updates to the C-EFB software are necessary, the operator should ensure that the changes are properly tested in a controlled environment prior to upload for use in flight.

This includes updates to the operating system and software data.

B. The operator should have a process to ensure cabin crew members are informed and have received all system, applications and data updates (e.g. operating systems, tracking systems, notification systems, administrative systems).

C. The C-EFB should have a status page that shows if there are any updates to the C-EFB, if there were any updates performed and what these updates entail.

4.5 QUALITY ASSURANCE

The operator should ensure that the software developer has a quality assurance process in place. The software development and verification processes should be included and documented in the quality assurance process.

SECTION 5 C-EFB MANAGEMENT SYSTEM

5.1 GENERAL

5.1.1 C-EFB PROGRAM

The operator should have a C-EFB management system in place for its C-EFB programme that includes the following—

1) procedures and systems related to the C-EFB;
2) hardware configuration management;
3) software configuration management;
4) C-EFB security;
5) software update management; and
6) content management.

5.1.2 C-EFB MANAGEMENT SYSTEM

A. The C-EFB management system is the key link between the operator and the C-EFB system and software suppliers. It is responsible for hardware and software configuration management and for ensuring that no unauthorized software is installed. T

B. he C-EFB management system is also responsible for ensuring that only a valid version of the software application and current data packages are installed on the C-EFB system.

C. The C-EFB management system should ensure that the software applications and any updates supporting functions not directly related to operations conducted by cabin crew members on board aircraft (e.g. web browser, email client, picture management, etc.) do not adversely impact the operation of the C-EFB.

> There should be a means for the operator to carry out its own check of data content prior to load and release for operational use.

5.1.3 C-EFB MANAGEMENT PROCEDURES

A. The C-EFB management system should establish procedures to ensure that no unauthorized changes are made to C-EFB functions.

B. Procedures should be established for the development, maintenance, security and integrity of, and system updates and content downloads to, the C-EFB.

C. The required level of C-EFB security depends on the complexity of the system and data protection.

- A C-EFB policy and procedures manual may be part of the operator's operations manual.
- Procedures should be established for the maintenance of the C-EFB.

5.2 DEDICATED PERSONNEL

A. The operator should assign at least one person (e.g. a dedicated C-EFB manager, a cabin crew manager, etc.) who should maintain oversight of the complete C-EFB system, including the distribution of responsibilities within the operator's management structure. Complex C-EFB systems may require additional support.

B. The operator should ensure that each person involved in the C-EFB management system receives appropriate training in his or her role and has a good working knowledge of the proposed system hardware, operating system and relevant software applications.

Information on C-EFB operating procedures and training is found in Section 6.

5.3 TECHNICAL SUPPORT

The C-EFB management system should also include dedicated technical support for all users. Procedures should include a situation when cabin crew members may need assistance outside the technical support operating hours.

- The operator should ensure that cabin crew members have access to necessary information during operations.

5.4 USER MANUAL

The operator should develop a user manual. The user manual for the C-EFB should contain the following sections, as a minimum—

1) an introduction;
2) a table of contents;
3) general guidelines (e.g. security and confidentiality aspects, actions in the event of lost devices, crew member responsibilities, on-board usage);
4) a manual overview;
5) a process for updating and any software prerequisites;
6) viewing and functionality;
7) search and navigation;
8) design features;
9) information about care (e.g. hardware, cabling, converters, device maintenance, damage prevention, etc.);
10) troubleshooting;
11) frequently asked questions;
12) technical support;
13) a process for incorporating CCOM revisions and updates; and
14) a glossary or an index.

SECTION 6 CABIN CREW OPERATING PROCEDURES & TRAINING

6.1 PROCEDURES

6.1.1 OPERATING PROCEDURES

The operator should develop procedures for the C-EFB related to the following—

1) the user's role and responsibilities;
2) the phases of flight when the usage of the C-EFB is not permitted;
3) stowage and securing specifications;
4) battery power management;
5) revisions and updates;
6) inclusion of the operator's reporting system and forms, where applicable;
7) damage prevention;
8) loss, damage, theft or software failure;
9) replacement or repair; and
10) reporting of C-EFB failures or faults.

6.1.2 USER'S ROLE & RESPONSIBILITIES

The operator procedures should address the individual cabin crew member's role and responsibilities with regard to C- EFB use. These include, but are not limited to, the following—

1) the requirements for C-EFB availability and accessibility;
2) usage of the C-EFB during flight;
3) use and download of other or external applications; and
4) data protection measures for the device.

6.1.3 PHASES OF FLIGHT WHEN THE USAGE OF THE C-EFB IS NOT PERMITTED

The procedures should include specification of the phases of flight during which cabin crew members may not use the C-EFB, if applicable (e.g. during critical phases of flight, unless required for safety-related tasks).

6.1.4 STOWAGE & SECURING SPECIFICATIONS

A. The procedures should include specifications of when and how all portable C-EFBs must be stowed and secured.

- This includes during critical phases of flight and in turbulence to ensure the safety of the cabin occupants.

B. Secured portable C-EFBs should remain accessible to the cabin crew members throughout the flight.

6.1.5 BATTERY POWER MANAGEMENT

A. If battery-powered C-EFBs will utilize aircraft power for recharging the C-EFB battery, the operator should establish a procedure to ensure safe recharge of the battery (e.g. minimum percentage charge of the battery before the flight to be sufficiently charged to support the operation, charging on board, use of a power bank).

B. In addition, the operator should identify designated outlet(s) for use by cabin crew members to charge C-EFBs on board the aircraft. Means to operate the power source should be

documented per the procedures in the operator's CCOM, including connectivity and compatibility.

C. The operator should also establish procedures to respond to PED or stand-alone lithium battery fires.

6.1.6 REVISIONS & UPDATES

The operator should have a procedure in place to allow cabin crew members to confirm the revision number and date of C-EFB software applications or databases.

Procedures should specify what actions to take if the software applications or databases loaded on the C-EFB are out of date.

6.1.7 INCLUSION OF THE OPERATOR'S REPORTING SYSTEM & FORMS

If the operator includes its reporting system and forms as part of the C-EFB applications, it should establish procedures regarding their use.

- This includes mandatory and voluntary reports, as part of the safety management system, including real-time reporting, where applicable.

6.1.8 DAMAGE PREVENTION

The operator should establish procedures for preventing damage to the C-EFBs and to the aircraft.

- This includes, but is not limited to, guidelines regarding the use of uncertified cabling, crew monitoring of the device while it is charging, and exposure to water and temperature.

6.1.9 LOSS, DAMAGE, THEFT OR SOFTWARE FAILURE

The operator should have procedures in place to address device loss, damage, theft or software failure, particularly to protect safety and security sensitive information contained in the C-EFB. This should include, but is not limited to—

1) the reporting process (e.g. when, why and how to report to the operator);
2) the device replacement process; and
3) the backup procedure for software failure or unavailability of the device (e.g. use of hard copies).

6.1.10 REPLACEMENT & REPAIR

The operator procedures should address individual cabin crew members' actions and responsibilities with regard to replacing or repairing their assigned C-EFB device.

6.1.11 REPORTING OF C-EFB FAILURES OR FAULTS

A reporting system for C-EFB failures should be established. Procedures should be in place to inform maintenance personnel and cabin crew members about a failure or fault of the C-EFB, including actions to isolate it until corrective action is taken.

6.2 WORKLOAD & CABIN CREW COORDINATION

A. In general, using a C-EFB should not increase the crew's workload during critical phases of flight. For other flight phases, cabin crew operating procedures should be designed to mitigate and/or control additional workload created by using a C-EFB.

B. Workload should be distributed between cabin crew members to ensure ease of use and continued monitoring of other cabin crew tasks.

6.3 TRAINING

6.3.1 TYPE OF TRAINING

A. The type of C-EFB training will depend on the nature and complexity of the C-EFB system. Training should address any gaps in the level of proficiency that the user may have with technology and the specific device to be used.

B. The operator may use different delivery methods for C-EFB training, including classroom instruction, hands-on exercises (to familiarize users with the device) and/or computer-based training (digital learning methods).

6.3.2 MINIMUM INITIAL TRAINING

Initial C-EFB training should include the following, as a minimum—

1) the user's role and responsibilities;

2) basics on how to use the C-EFB (e.g. navigating throughout the C-EFB, turning the device on and off, logging in and out, adjusting screen settings and brightness, charging the device, screen maintenance, etc.);

3) information on safe practices (cable removal, usage of protective cases, converter practices, usage of aircraft power outlets, temperature exposure, preservation of long-term battery life, procedure when faced with lithium battery fire, etc.);

4) clear instruction (e.g. step by step) on how and when to update the C-EFB content, software, operating system, applications, and security aspects, as well as the importance of keeping the device up to date;

5) instruction on operating the C-EFB in normal, abnormal and emergency situations;

6) the protection of sensitive safety and security information (e.g. passcode security, passenger information, etc.); and

7) how to handle and report the failure of C-EFB component(s).

6.3.3 ADDITIONAL TRAINING

The operator should provide additional training for users on any new or modified functions of the device and applications. It may offer supplemental training to maintain and reinforce cabin crew knowledge and proficiency of the C-EFB.

SECTION 7 C-EFB RISK ASSESSMENT

7.1 GENERAL

The C-EFB risk assessment is a process to evaluate the risks associated with the use of each C-EFB function. The operator should use this process to develop appropriate risk mitigation strategies to manage risks to an acceptable level.

The operator should perform a risk assessment prior to the entry into operation of any C-EFB system and the results of the risk assessment should be reviewed periodically.

7.2 RISK ASSESSMENT

7.2.1 RISKS TO ADDRESS

The risk assessment should evaluate the risks associated with the use of a C-EFB by addressing the following, as a minimum—

1) evaluate the physical characteristics of the C-EFB, including size (e.g. physical size of the device, screen size, font size), stowage, securing and accessibility (e.g. a C-EFB that is too small may fall behind or under monuments such as class dividers or closets, or be obstructed by other items or easily lost);

2) identify potential losses of function or malfunction (detected and undetected erroneous output) and associated failure scenarios;

3) analyse the operational consequences of these failure scenarios;

4) ensure the C-EFB system (hardware and software) achieves at least the same level of accessibility, usability and reliability as the paper-based system that it is replacing;

5) ensure the C-EFB will not cause interference with on-board electronic systems and the aircraft equipment on which it will be permitted for use (through aircraft PED tolerability testing);

6) analyse human factors and ergonomics considerations related to the C-EFB (e.g. to minimize human errors); and

7) establish risk mitigation strategies.

7.2.2 DIGITAL VS PAPER

A. When the C-EFB system is intended for introduction alongside a paper-based system, only the failures that would not be mitigated by the use of the paper-based system need to be addressed.

B. In all other cases a, complete risk assessment should be carried out, especially when an accelerated introduction of a new C-EFB system with a reduced trial period or paperless entry-into-service is intended.

7.2.3 OTHER RISK CONSIDERATIONS

Manufacturer defects, product recalls and processes for continued operation should be considered in the risk assessment.

7.2.4 RISK ASSESSMENT TRIAL PERIOD

A. The risk assessment should be defined before the beginning of the trial period and should be amended accordingly, if necessary, at the end of the trial period.

B. The results of the trial should establish the configuration and use of the C-EFB system (refer to Section 8).

7.3 RISK MITIGATION STRATEGIES

7.3.1 ALTERNATIVES & FORMS

A. Based on the outcome of the C-EFB risk assessment, the operator should determine a series of risk mitigation strategies against C-EFB failure.

B. The operator should consider establishing a reliable alternative means of providing information that is available on the C-EFB system.

C. If applicable, particular attention should be given to forms and data that are required by the RCARs, as per operator policy, and/or that are required to be submitted within specified time frames.

7.3.2 EXAMPLE STRATEGIES

The risk mitigation strategies can be one or a combination of the following examples—

1) system design (including hardware and software);

2) an alternative C-EFB, possibly supplied from a different power source;
3) C-EFB applications hosted on more than one platform;
4) paper backup (e.g. CCOM);
5) alternative procedures;
6) training; and
7) administration support (e.g. the operator should ensure that cabin crew members have access to necessary information during operations).

7.3.3 STRATEGIES FOR FAILURE

In order to address the accessibility, usability and reliability of the C-EFB system, the operator should include risk mitigation strategies for failure of the C-EFB system, such as—

1) complete system failure;
2) individual application failures;
3) corruption or loss of data;
4) battery testing and recharge; and
5) erroneously displayed information.

7.4 CHANGES TO THE C-EFB

If any updates of the C-EFB are necessary, appropriate testing of the changes should be performed prior to use in flight.

For all other types of modification (e.g. hardware), the operator should apply its change management process as approved by the RCAA.

SECTION 8 C-EFB EVALUATION PROCESS

8.1 GENERAL

A. A C-EFB evaluation process outlined here be applied for the implementation and use of C-EFBs.

This process should also be used in instances where the RCAA does not require a specific approval.

B. This process is designed to lead to the issue of a specific approval, where such is required, and consists of a phased approach.

8.2 INITIAL DISCUSSION WITH THE RCAA (PHASE 1)

During this initial phase, the RCAA and the operator should reach a common understanding of what needs to be evaluated, including—

The RCAA has job aids that may be used by the operator during EFB preparation and evaluation.

1) the role of the RCAA;
2) the applicable requirements;
3) whether trials should take place, when and how they must be conducted and documented; and
4) any actions the operator is responsible for during each phase of the process.

8.3 APPLICATION (PHASE 2)

8.3.1 RCAA REVIEW

A. Phase 2 begins when the operator submits an implementation plan to the RCAA for evaluation.

B. The RCAR will review the plan for completeness and compliance with the RCARs and this AC.

C. The RCAA inspector designated to review the plan may coordinate with other inspectors and RCAA offices, as necessary.

D. Once the RCAA is satisfied with the submitted plan, the operator will follow that plan to produce a complete C-EFB programme.

8.3.2 PLAN CONTENTS

The following should be taken into account, as part of the plan—

1) the introduction of a new C-EFB programme by the operator;

2) changes to an existing C-EFB programme;

3) an existing, approved EFB programme (e.g. for the flight crew); or

4) previous experience within the RCAA or among other Rwanda operators with EFB implementation.

8.3.3 PAPER VS DIGITAL

The operator may choose to keep a paper backup as a means of mitigation against failure when transitioning from paper to electronic format.

- A paper backup may also be maintained as a mitigation following the full implementation of C-EFBs.
- As part of the implementation plan, the operator should clarify the intent of the operation (i.e. with or without paper backup or a combination of paperless and paper).

8.3.4 SUBMISSION OF IMPLEMENTATION PLAN

The operator should submit the following information in the implementation plan, as applicable—

1) C-EFB infrastructure and management plan;

2) C-EFB hardware and application specifications;

3) C-EFB operator procedures and manual revisions;

4) C-EFB training programme;

5) C-EFB risk assessment; and

6) proposed risk mitigation strategies.

8.4 RCAA TECHNICAL EVALUATION (PHASE 3)

A. During this phase, the RCAA will use a checklist to conduct a review of the application submitted by the operator.

B. Additional cabin evaluations should not be required when adding a new C-EFB device to an existing approval unless there is a change in C-EFB functions where the RCAA would determine whether an additional cabin evaluation is required.

Where an operator seeks to start operations with a new C-EFB system, the RCAA will participate in practical simulation evaluation(s) of the C-EFB.

- When a new aircraft is added to an existing C-EFB approval, the suitability of the C-EFB for that aircraft will be addressed.

C. The RCAA will examine the technical content and quality of the proposed C-EFB programme and other supporting documents and procedures.

8.5 OPERATIONAL VERIFICATION (PHASE 4)

8.5.1 OPERATIONAL EVALUATION

A. The operator should conduct an operational evaluation that verifies whether all the required elements have been satisfied.

Phase 4 starts when the RCAA agrees for the operator to formally begin use of the C-EFB combined with paper backup for an established period of time.

B. The operator must notify the RCAA of its intention to conduct an operational evaluation.

8.5.2 PAPER BACKUP?

A. During this phase, operators transitioning from paper to C-EFB may maintain paper backup for all electronic information, as a risk mitigation strategy.

B. Operators starting C-EFB operations without paper backup must have adequate mitigations in place to access the information in case of C-EFB failures.

8.5.3 OPERATIONAL EVALUATION RESULTS

A. The operator should share the operational evaluation results with the RCAA. These results will be relevant in the RCAA final decision regarding the implementation of C-EFBs.

B. Final considerations by the RCAA should result in one of the following outcomes—

1) Unsatisfactory results. If the RCAA finds the proposed C-EFB reliability and/or function to be unacceptable, it should contact the operator for corrective action. C-EFB deficiencies should be corrected and the C-EFB function revalidated prior to approval being issued.

2) Satisfactory results. If the RCAA finds the proposed C-EFB reliability and/or function to be acceptable based on validation data, then the approval may be issued.

8.6 ISSUANCE OF APPROVAL DOCUMENTS (PHASE 5)

A. During the final phase, the RCAA grants a C-EFB approval to the operator. When the specific C-EFB approval is granted to the operator, the operations specifications are updated with a C-EFB entry.

B. The operations specifications reference the location in the operations manual where more details of the approved C- EFB applications can be found.

End of Advisory Circular