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GCAA ADVISORY CIRCULAR

FLIGHT OPERATIONS
AC NO: GCAA AC/FO-10

SUBJECT: # ELECTRONIC FLIGHT BAG

DATE INITIATED: 01-10-2018
INITIATED BY: Director Aviation Safety Regulation

Note: Advisory Circulars (ACs) are not mandatory in nature, but provide means such as guidance, methods, procedures and practices acceptable to the Authority for complying with regulations, standards, rules, directives and other requirements in a systematic manner. These are not necessarily the only means of compliance. ACs may also contain explanations of regulations, other guidance material, best practices or information useful to the aviation community. Unless incorporated into a regulation by reference, ACs are not regulatory and do not create or change a regulatory requirement. A change of a regulatory requirement may come in the form of a Directive. An Advisory Circular is not a Directive.

1. PURPOSE

The Purpose of this Advisory Circular. This Advisory Circular (AC) contains guidance on the operational use of Electronic Flight Bags (EFB). It is intended for all operators conducting commercial flight operations under Part III of the Guyana Civil Aviation [Air Navigation] Regulations (GCARs) and Part 9 of the Guyana Aviation Requirements (GARs), who want to replace required paper information or utilise other select applications as part of EFB functionality. This AC sets forth an acceptable means, but not the only means, to obtain Guyana Civil Aviation Authority (GCAA) (the Authority) authorisation for the operational use of EFBs utilising both portable devices or installed equipment evaluated by the operator as their means to display operating information with an equivalent level of accessibility, usability, and reliability to the means they replace. This AC will assist operators in starting and managing the required elements of an EFB programme as a means to support their authorisation for use. In this AC, "installed equipment" indicates equipment or EFB components, which are installation approved under aircraft type design.

2. ELECTRONIC FLIGHT BAG PROGRAMME

Operators seeking authorisation to use EFB on their aircraft will utilise the language within this AC to develop an EFB programme. The programme specifics (for example, operating procedures, pertinent training modules, checklists, operations manuals, training manuals, maintenance programmes, minimum equipment lists (MEL), other pertinent documents, and reporting procedures) are developed and incorporated into operator policy before the Authority grants authorisation.

3. REQUIREMENTS

This AC describes an acceptable means, but not the only means, for operators conducting flight operations seeking authorisation for the operational use of EFB applications. This AC is not mandatory and does not constitute a regulation. However, if you use the means described in this AC, you must follow it in all important respects. The term "must" is used to indicate mandatory requirements when following the guidance in this AC. The terms "should" and "recommend" are used when guidance is recommended, but not required to comply with this AC.

4. AUDIENCE

This Advisory Circular should be used by operators seeking design and use guidance for hosting EFB applications on both portable devices and installed equipment.

5. CANCELLATION

Not applicable.

6. EFFECTIVE DATE

This ***Advisory Circular*** takes effect from the ***1st Day of October 2018*** and remains valid until cancellation or revocation by the Director General (DG) Guyana Civil Aviation Authority.

7. CHANGES

Not Applicable.

8. RELEVANT REFERENCES

a. ICAO Annex 6 Part 1, Para 6.25; Part 2, Para 2.4.17 and Part 3, Para 4.12.

b. ICAO Doc. 10020 Electronic Flight Bag.

9. CONTACT INFORMATION

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10. DEFINITION

a. ***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.

b. ***Critical Phases of Flight.*** As defined by the State of the Operator, e.g. take-off, approach and landing.

c. ***Electronic Flight Bag (EFB).*** An EFB is any device, or combination of devices, actively displaying EFB applications. EFBs are characterised by the following:

(i) 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.

(ii) In order to qualify as an EFB application, the failure effect must be considered a minor hazard or have no safety effect. EFBs cannot replace any installed equipment required by operational or airworthiness regulations.

(iii) EFB applications have no certification requirements for installation under aircraft type design. Acceptable EFB applications are listed in Appendices A and B of this AC. These EFB applications may be overlaid or integrated.

d. ***EFB Software Application***. Software function hosted on an EFB platform.

e. ***EFB Management***. Contains all procedures related to the operator's EFB management system as listed in the section "EFB management".

f. ***Installed Resources***. Hardware/software installed in accordance with airworthiness requirements.

g. ***Independent EFB Platforms***. Multiple EFB platforms that are designed in such a way that no single failure makes all of them unavailable.

h. ***Operator***. A person, organization or enterprise engaged in or offering to engage in an aircraft operation.

i. ***Portable Electronic Device (PED)***. Typically, lightweight consumer electronic device which is functionally capable for communications, data processing and/or utility.

j. ***Standard Operating Procedure (SOP)***. Flight crew operating procedures as described in the flight operations manuals.

k. ***Transmitting PED***. A PED containing one or more devices intentionally emitting radio frequencies (WIFI, GSM, Bluetooth, etc.).

11. TYPES OF ELECTRONIC FLIGHT BAG (*EFBS CAN BE EITHER INSTALLED OR PORTABLE*)

11.1 Installed EFB

11.1.1 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), as the case may be.

11.2 Portable EFB

11.2.1 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 regulatory approval from the Authority.

12. APPROVAL/CERTIFICATION PROCESS/PROCEDURE

12.1 Installed EFB

12.1.1 Installed EFBs would have been assessed and approved by the Civil Aviation Authority of the State of Manufacture or State of Design, as the case may be.

12.1.2 Installed EFBs can also be certified either during the certification of the aircraft, through Service Bulletin by the Original Equipment Manufacturer (OEM), or through a third party STC.

12.1.3 Operators must comply with the requirements of Section 17 "***Flight Crew Training***", Section 18 "***EFB Risk Assessment***", Section 20 the requirements for "***EFB Policy and Procedures Manual***" and all other relevant sections of this AC.

12.2 Portable EFB

12.2.1 Operators applying for use of portable EFB on their aircraft have to make a written application to the Authority, satisfy all applicable sections of this AC and go through a five (5) phase process described in Section 19 of this AC.

13. HARDWARE CONSIDERATIONS FOR INSTALLED EFBS AND MOUNTING DEVICES

13.1 Mounting Devices

13.1.1 If the mounting is permanently attached to the aircraft structure, the installation will be approved in accordance with the appropriate civil aviation regulations.

13.1.2 The following guidance may be considered for that purpose:

a. The mounting method for the EFB should allow easy access to the EFB controls and a clear unobstructed view of the EFB display by the pilot when strapped in the normal seated position. It should be located such that the effects of glare and/or reflections are minimised. This may be accomplished by providing some adjustment by the flight crew to compensate for glare and reflections.

b. It should be confirmed that the intended EFB hardware mounted in the device does not obstruct visual or physical access to aircraft displays, controls, or external vision and that its location does not impede crew ingress, egress and emergency egress paths.

c. There should be no mechanical interference between the EFB in its mounting device and any of the flight controls in terms of full and free movement, under all operating conditions and no interference with buckles, oxygen hoses, etc.

13.2 Data Connectivity

13.2.1 The capability of connecting the EFB to certified aircraft systems has to be covered by an airworthiness approval by the Authority. Certified aircraft systems should be protected from adverse effects of EFB system failures by using a certified AID. An AID may be implemented as a dedicated device, e.g. as defined in ARINC 759, or it may be implemented in non-dedicated devices such as an EFB docking station, a network file server or other avionics equipment.

13.3 Power to the EFB

13.3.1 Installed power provisions should comply with the applicable airworthiness regulations. Connection of EFB to a non-essential, or to the least critical power bus, is recommended, so failure or malfunction of the EFB, or power supply, will not affect safe operation of aircraft critical or essential systems. An electrical load analysis (ELA) is required to be done and submitted to the Authority.

14. HARDWARE CONSIDERATIONS FOR PORTABLE EFBS AND MOUNTING DEVICES

14.1 Installation and Attachment

14.1.1 Portable EFBs can be used as either handheld equipment or mounted in a fixed or moveable mount attached to the aircraft structure or temporarily secured (e.g. kneeboard, suction cup, etc.).

14.1.2 Portable EFB hardware components:

a. Must be capable of being easily removed from or attached to their mounts by flightcrew member personnel without tools or maintenance action.

b. Can be temporarily connected to an existing aircraft power port for battery recharging.

14.2 Physical Characteristics

The size and practicality of the EFB should be evaluated as some devices may prove to be cumbersome for normal use on a flight deck.

14.3 Readability

The EFB data should be legible under the full range of lighting conditions expected on the flight deck, including direct sunlight.

14.4 Environmental

The EFB has to be operable within the foreseeable cockpit operating conditions including foreseeable high/low temperatures, and after rapid depressurisation if the EFB is intended for use in such an event.

14.5 Basic Non-Interference Testing

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

14.5.2 In order to operate a portable EFB during flight, the user/operator is responsible for ensuring that the EFB will not interfere in any way with the operation of aircraft equipment.

14.5.3 The following methods are means to test portable EFBs that are to remain powered (including being in standby mode) throughout the flight, in order to ensure that they will not electromagnetically interfere with the operation of aircraft equipment:

a. ***Method 1:***

(i) ***Step 1*** is an electromagnetic interference (EMI) test using RTCA/DO-160, Section 21, Category M. An EFB vendor or other source can conduct this test for an EFB user/operator. An evaluation of the results of the RTCA/DO-160 EMI test can be used to determine if an adequate margin exists between the EMI emitted by the EFB and the interference susceptibility threshold of aircraft equipment. If this step determines that adequate margins exist for all interference, then the test is complete. However, if this step identifies inadequate margins for interference, then ***Step 2*** testing must be conducted.

(ii) ***Step 2*** testing is a complete test in each aircraft using standard industry practices. This should be done to the extent normally considered acceptable for non-interference testing of a portable EFB in an aircraft for all phases of flight. Credit may be given to other aircraft of the same make and model equipped with the same avionics as the one tested.

b. ***Method 2:***

(i) As an alternative, Step 2 of Method 1 can be used directly in order to determine non-interference of the EFB.

14.6 Additional Testing for Transmitting Portable EFBs

14.6.1 In order to activate the transmitting functions of a portable EFB during flight in conditions other than those that may be already certified at aircraft level (e.g. tolerance to specific transmitting PED models) and hence documented in the aircraft flight manual or equivalent, the user/operator is responsible to ensure that the device will not interfere with the operation of the aircraft equipment in any way. The following is a method to test transmitting portable EFBs that are to remain powered (including being in standby mode) during flight.

14.6.2 This test consists of two separate test requirements:

a. ***Test Requirement 1.*** Each model of the device should have an assessment of potential electro-magnetic interferences (EMI) based on a representative sample of the frequency and power output of it. This EMI assessment should follow a protocol such as the applicable processes set forth in RTCA/DO-294, *Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDs) on Aircraft*. This frequency assessment must confirm that no interference of aircraft equipment will occur as a result of intentional transmissions from these devices.

b. ***Test Requirement 2***. Once an EMI assessment has determined that there will be no interference from the EFB's intentional transmissions (Test Requirement 1), and basic non-interference testing has been conducted with the device not deliberately transmitting, non-interference testing should be conducted with the transmit function being operative. The position of the transmitting device is critical to non-interference testing; hence, locations of the EFB and of the transmitter (if applicable) should be clearly defined and adhered to.

14.7 Power Supply, Connection and Source

14.7.1 The operator should ensure that power to the EFB, either by battery and/or externally supplied power, is available to the extent required for the intended operation.

14.7.2 The power source needs to be suitable for the device. The power source may be a dedicated power source or a general purpose source already fitted.

14.7.3 The EFB can be temporarily connected to an existing aircraft power port for battery recharging.

14.7.4 The means to turn off the power source, other than a circuit breaker, should be reachable by the pilot when strapped in the normal seated position (e g. access to unplug the EFB or a separate hardware or software switch clearly labelled for the power source, and must be capable of being easily removed from or attached to their mounts by flightcrew member personnel without tools or maintenance action.)

14.8 Batteries

14.8.1 The operator should ensure that the batteries are compliant to the applicable standards for use in an aircraft.

14.8.2 The operator should consider introducing procedures to handle thermal runaways or similar battery malfunctions potentially caused by EFB batteries (e.g. lithium-based batteries). At least the following issues should be addressed:

a. Risk of leakage;

b. Safe storage of spares including the potential for short circuit; and

c. Hazards due to on-board continuous charging of the device, including battery overheat.

14.9 Cabling

The operator needs to ensure that any cabling attached to the EFB, whether in the dedicated mounting or when hand held, does not present an operational or safety hazard.

14.10 Temperature Rise

Operating the proposed EFB device may generate heat. The placement of the EFB should allow sufficient airflow around the unit, if required.

14.11 Data Connectivity Between EFBs

If two or more EFBs on the flight deck are connected to each other, then the operator should demonstrate that this connection does not negatively affect otherwise independent EFB platforms.

14.12 Data Connectivity to Aircraft Systems

Refer to paragraph 13.2.1 of this AC.

14.13 External Connectivity

Some EFB may have the provision for external ports other than power or data connectivity with aircraft systems (e.g. an antenna or a data connection to operator ground network). External connectivity leading to a change to the aircraft type design should require an airworthiness approval from the Authority. The extent of this information is dependent on the complexity of the interface to the aircraft systems.

14.14 Stowage

All handheld EFBs need to be stowed during critical phases of flight to ensure the safety of the occupants of the flight deck. Stowage needs to be configured such that the EFB can be easily stowed securely but remain readily accessible in flight. The method of stowage should not cause any hazard during aircraft operations.

14.15 Viewable Stowage

14.15.1 A portable EFB not mounted in a mounting device may be used during all phases of flight provided that it is secured on the flight crew (e.g. kneeboard) or in/to an existing aircraft part (e.g. suction cups) with the intended function to hold acceptable light mass portable devices viewable to the pilot at her/his required duty station. This viewable stowage device is not necessarily part of the certified aircraft configuration. Its location should be documented in the EFB policy and procedures manual.

14.15.2 Some types of viewable stowage securing means may have characteristics that degrade sensibly with ageing or due to various environmental factors. In that case, it should be ensured that the stowage characteristics remain within acceptable limits for the proposed operations. Securing means based on vacuum (e.g. suction cups) have a holding capacity that decreases with pressure. It should be demonstrated that they will still perform their intended function at operating cabin altitudes.

14.15.3 In addition, it should be demonstrated that if the EFB moves or is separated from its stowage, or if the viewable stowage is unsecured from the aircraft (as a result of turbulence, manoeuvring, or other action), it will not interfere with flight controls, damage flight deck equipment, or injure flight crew members.

15. HUMAN FACTOR ASSESSMENT/CONSIDERATION

15.1 Human Interface

15.1.1 The operator should carry out an assessment of the human-machine interface and aspects governing crew coordination when using the EFB. Whenever possible, the EFB user interface philosophy should be consistent (but not necessarily identical) with the flight deck design philosophy.

15.1.2 The review of the complete system should include but not limited to:

a. General considerations including workload, usability, integration of the EFB into the flight deck, display and lighting issues, system shutdown, and system failures;

b. Physical placement issues, including stowage area, use of unsecured EFBs, design and placement of mounting devices;

c. Considerations for interference with anthropometric (***the systematic measurement of the physical properties of the human body, primarily dimensional descriptors of body size and shape***) constraints, cockpit ventilation, and speaker sound;

d. Training and procedures considerations, including training on using EFB applications, EFB policy and procedures manual, fidelity of EFB training device, and mechanisms for gathering user feedback on EFB use; and

e. Hardware considerations.

16. CREW OPERATING PROCEDURES

16.1 General Requirement

16.1.1 The operator should have procedures for using the EFB in conjunction with the other flight deck equipment.

16.1.2 If an EFB generates information similar to that generated by existing flight deck systems, procedures should clearly identify:

a. Which information source will be primary;

b. Which source will be used as secondary information;

c. Under what conditions to use the secondary source; and

d. What actions to take when information provided by an EFB does not agree with that from other flight deck sources, or, if more than one EFB is used, when one EFB disagrees with another.

16.1.3 If normal operational procedures require an EFB for each flight deck crew member, the setup should comply with the definition of independent EFB platforms.

16.1.4 Operators should include the requirements for EFB availability in the Operations Manual and/or as part of the minimum equipment list. (***Note: Operators using an EFB must have an EFB Policy and Procedures Manual.)***

16.2 Revisions and Updates

16.2.1 The operator should have a procedure in place to allow flight crews to confirm the revision number and/or date of EFB application software including where applicable, database versions (e.g. update to the latest aeronautical charts).

16.2.2 Flight crews should not have to confirm the revision dates for other databases that would not adversely affect flight operations in case of outdated data. Procedures should specify what actions to take if the software applications or databases loaded on the EFB are out-of-date.

16.3 Workload and Crew Coordination

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

16.3.2 Workload should be distributed between flight crew members to ensure ease of use and continued monitoring of other flight crew functions and aircraft equipment. The procedures should include specification of the phases of flight at which the flight crew may not use the EFB, if applicable.

16.4 Reporting

16.4.1 A reporting system for EFB failures should be established. Procedures should be in place to inform maintenance and flight crews about a fault or failure of the EFB, including actions to isolate it until corrective action is taken.

17. FLIGHT CREW TRAINING

17.1 Requirement for EFB Use

17.1.1 The use of the EFB should be conditional on appropriate training. Training should be in accordance with the operator's SOP (including abnormal procedures) and should include:

a. An overview of the system architecture;

b. Pre-flight checks of the system;

c. Limitations of the system;

d. The use of each operational software application;

e. Restrictions on the use of the system, including when some or all of the EFB functions are not available;

f. The conditions (including phases of flight) under which the EFB may not be used;

g. Procedures for cross-checking data entry and computed information;

h. Human performance considerations on the use of the EFB;

i. Additional training for new applications, new features of current applications, or changes to the hardware configuration;

j. Recurrent training and proficiency checks; and

k. Any area of special emphasis raised during the EFB evaluation with the Authority.

18. EFB RISK ASSESSMENT

18.1 General Requirements

18.1.1 The EFB risk assessment is a process that should be performed to assess the risks associated with the use of each EFB function and should allow the operator to keep the risks to an acceptable level by defining the appropriate mitigation means.

18.1.2 This risk assessment should be performed before the beginning of the approval process (if applicable) and its results should be reviewed on a periodic basis.

18.1.3 The guidance on safety risk assessment is contained in the ICAO *Safety Management Manual (SMM)* (Doc 9859).

18.2 EFB Failures and Mitigation Means

18.2.1 Based on the outcome of the EFB risk assessment, the operator should determine the need for software architectural features, people, procedures, and/or equipment to eliminate, reduce, or control risks associated with an identified failure in a system.

18.2.2 Mitigation against EFB failure or impairment may be accomplished by one or a combination of:

a. System design;

b. Separate and backup power sources for the EFB;

c. Electronic fallback solutions to the last known, stable configuration (e.g. before an update);

d. Redundant EFB applications hosted on independent EFB platforms; and

e. Paper products carried by selected crewmembers, complete set of sealed paper backups in the flight deck, and/or procedural means.

19. OPERATIONAL EVALUATION PROCESS

19.1 Definition of the Scope of the Evaluation Process

19.1.1 The scope of the operational evaluation plan will depend upon the applicant's experience with EFBs. Considerations should include whether the operator has:

a. No EFB experience, thus requiring a "new application and approval process"; or

b. Initiated the process of establishing an EFB programme; or

c. An existing approved EFB programme established.

19.1.2 An operator implementing EFB functions may choose to start a paperless flight deck operation without paper backup or combination of solutions with limited on-board paper backup. The operator may also choose to keep the paper backup as a cross-check against the EFB information and as a means of mitigation against failure, when transitioning from paper to electronic format.

19.2 Evaluation/Approval/Certification

19.2.1 The process of evaluation/certification is designed to lead to specific operational approval and consists of five (5) phases:

a. Phase 1 – ***Pre-Application*** (initial discussion with the Authority);

b. Phase 2 – ***Formal Application*** (formal submission of application, EFB policy/procedures manual and other supporting documents);

c. Phase 3 – ***Authority Review*** (review of formal application, manuals and documents);

d. Phase 4 – ***Operational Evaluation*** (the Authority evaluate the use and application of the EFB system while operator demonstrate same); and

e. Phase 5- ***EFB Operations Specification and Approval*** (approval of EFB use and amendment of AOC Ops Specs to include EFB – see Appendix C of the AC for sample Ops Specs and entry).

19.3 Phase 1: Pre-Application - Initial Discussion with the Authority

19.3.1 During this phase, the Authority and the operator must reach a common understanding of what needs to be evaluated, the applicable requirements, whether trials should take place and when and how they must be conducted and documented, the role of the Authority, and what documents and actions the operator is responsible for during each phase of the approval process.

19.4 Phase 2: Formal Application

19.4.1 This Phase begins when the operator submits a formal application and compliance plan to the Authority for evaluation. The plan is reviewed for completeness and compliance to applicable Regulations and/or Director General's requirements.

19.4.2 Once the Authority is satisfied with the submitted plan, the operator follows that plan to produce a complete EFB programme. The operator must clarify the intent of the operation (with or without paper backup or a combination of paperless and paper).

19.4.3 The applicant will typically submit information in the application package such as:

a. EFB operational suitability report (if applicable);

b. EFB hardware and application specifications;

c. EFB operator policy and procedures manual;

d. EFB training programme;

e. EFB evaluation report; and

f. EFB risk assessment.

19.5 Phase 3: Authority Review

19.5.1 The Authority shall use a checklist (see Appendix D of this AC for the checklist) to conduct a review of the application submitted by an operator.

19.5.2 Where an operator seeks to start operations with a new EFB system, the Authority should participate in the simulator evaluation or flight evaluation of an EFB. Additional simulator or flight evaluations are not required for adding a new EFB to an existing approval unless there is a substantial change in EFB intended functions. When a new aircraft is added to an existing EFB approval, the suitability of the EFB for that aircraft must be addressed. The Authority should examine the technical content and quality of the proposed EFB programme and other supporting documents and procedures.

19.6 Phase 4: Operational Evaluation

19.6.1 The operator should conduct an operational evaluation which should allow verifying that the above elements have been satisfied. The operator should notify the Authority of its intention to conduct an operational evaluation by sending a plan and keep a receipt of this notification in the aircraft during the test period.

19.6.2 During this validation phase, operators transitioning from paper to EFB should maintain paper backup for all electronic information. The validation phase begins when the operator formally begins use of the EFB combined with paper backup for an established period of time. Appendix B may be used for data collection during the validation phase.

19.6.3 Operators starting EFB operations without paper backup should have adequate mitigations means in place to access the information in case of EFB failures.

19.6.4 Final considerations of the Authority when approving an EFB application:

a. ***Unacceptable Validation Results***. If the Authority finds the proposed EFB reliability and/or function to be unacceptable, the Authority shall contact the operator for corrective action. EFB deficiencies shall be corrected and the EFB function revalidated prior to approval being issued.

b. ***Acceptable Validation Results***. If the Authority finds the proposed EFB reliability and/or function to be acceptable based on validation data, then the specific approval may be issued.

19.7 Phase 5: EFB Operations Specification and Approval

19.7.1 The Authority shall update the AOC Operations Specifications with an EFB entry. The operations specification will reference the location in the operations manual where more details of the approved EFB applications can be found (see Appendix C).

20. EFB POLICY AND PROCEDURES MANUAL

20.1 General Information

20.1.1 Below are listed the typical contents of an EFB Policy and Procedures Manual that can be fully or partly integrated in the AOC Operations Manual or kept as a separate manual but referenced in the Operations Manual.

20.1.2 The structure and content of the EFB Policy and Procedures Manual must correspond to the size of the operator, the complexity of its activities and the complexity of the EFB used.

20.2 EFB Policy and Procedures Manual Structure and Contents

Chapter 1 - Introduction

- EFB general philosophy.
- EFB limitations.
- EFB Approved Hardware and Software Applications.

Chapter 2 -EFB Management

- Responsibilities.
- Data management.
- Updates and changes management.

Chapter 3 - Hardware Description

- EFB system architecture.
- Hardware configuration control

Chapter 4 - Software Description

- Operating system description.
- List and description of applications hosted

Chapter 5 - Flight Crew Training

Chapter 6 - Operating Procedures

Chapter 7 - Maintenance Considerations

Chapter 8 - Security Considerations

Approved by:

Lt. Col. (Ret'd.) Egbert Field M.A.
Director General Civil Aviation
Guyana Civil Aviation Authority

APPENDIX: A
TYPE "A" EFB APPLICATIONS

A1. TYPE "A" EFB APPLICATIONS

A1.1 Airport diversion policy guidance, including a list of special designated airports and/or approved airports with emergency medical service (EMS) support facilities.

A1.2 Flight management system (FMS)/flight management guidance system (FMGS) problem report forms.

A1.3 Aircraft parts manuals (e.g. IPC).

A1.4 Required very high frequency omnidirectional range (VOR) check records.

A1.5 Minimum Equipment Lists (MEL).

A1.6 Configuration Deviation Lists (CDL).

A1.7 Nonessential Equipment and Furnishings Lists (NEFL).

A1.8 Noise abatement procedures for arriving and departing aircraft.

A1.9 Operations Manuals.

A1.10 Aeronautical Information Publications (AIP).

A1.11 Aeronautical Information Manual (AIM).

A1.12 Pilot flight and duty-time logs.

A1.13 Flightcrew member-required rest logs.

A1.14 Captain's report (i.e., captain's incident reporting form).

A1.15 Flightcrew member survey forms (various).

A1.16 EMS reference library (for use during medical emergencies).

A1.17 Trip scheduling and bid lists.

A1.18 Aircraft captain's logs.

A1.19 Anti-terrorism profile data.

A1.20 Hazardous materials (Dangerous Goods) lookup tables.

A1.21 Incidents of interference to aircraft electronic equipment from devices carried on board aircraft.

A1.22 Current fuel prices at various airports.

A1.23 Computer-based training modules, check pilot, and flight instructor records.

A1.24 Airline Policy and Procedures Manuals (PPM).

A1.25 Service Bulletins (SB)/published Airworthiness Directives (AD), etc.

APPENDIX: B
TYPE "B" ELECTRONIC FLIGHT BAG (EFB) APPLICATIONS

B.1 TYPE B EFB APPLICATIONS

B1.1 Airplane Flight Manuals (AFM) (or Rotorcraft Flight Manuals (RFM)) and Airplane Flight Manual Supplement (AFMS) (or Rotorcraft Flight Manual Supplement (RFMS)).

B1.2 Flight attendant (F/A) manuals.

B1.3 Flight Operations Manuals (FOM).

B1.4 For smaller aircraft, pilot's operating handbooks (POH), including POH Section IX Supplements.

B1.5 Company FOMs.

B1.6 Maintenance manuals.

B1.7 Aircraft maintenance reporting manuals.

B1.8 Company standard operating procedures (SOP).

B1.9 Aircraft operating and information manuals (performance information, Weight and Balance (W&B), systems, limitations, etc.).

B1.10 Aircraft performance data manuals (fixed non-interactive material).

B1.11 Airport performance restrictions manual (e.g., a reference for takeoff and landing performance calculations).

B1.12 W&B manual, if a separate manual (fixed non-interactive material).

B1.13 W&B calculations.

B1.14 Takeoff, en route, approach and landing, missed approach, go-around, etc., performance calculations. Data derived from algorithmic data or performance calculations based on software algorithms.

B1.15 Other aircraft performance data manuals, including specialized performance data for use in conjunction with advanced wake vortex modeling techniques, and land-and-hold-short operations (LAHSO) predictions, etc. (fixed, non-interactive material for planning purposes).

B1.16 Operations specifications (Ops Specs), management specifications (M Specs), or letters of authorisation (LOA).

B1.17 Power settings for reduced thrust settings.

B1.18 Runway limiting performance calculations.

B1.19 Cost index modeling/flight optimisation planning software

B1.20 Master flight plan/updating.

B1.21 Interactive plotting for oceanic and remote navigation.

B1.22 Maintenance discrepancy signoff logs (maintenance discrepancy logs need to be downloaded into a permanent record at least weekly).

B1.23 Cabin maintenance discrepancy reporting forms/location codes (maintenance discrepancy logs need to be downloaded into a permanent record at least weekly).

B1.24 Electronic aeronautical charts (e.g., arrival, departure, en route, area, approach, and airport charts) which may be static/pre-composed (raster), or dynamic/data-driven (vector).

Note: A depiction of EFB own-ship may be included on this EFB application if the aircraft has a navigation moving map display (navigation display) providing concurrent display of the active flight plan, aircraft position, and aircraft trajectory (for example, heading is a heading is selected). The EFB application may display additional, unique data elements, such as airspace boundaries, but must have sufficient common data to allow the flightcrew member to resolve discrepancies.

B1.25 Electronic checklists (ECL), including normal, abnormal, and emergency. EFB ECLs cannot be interactive with other aircraft systems.

B1.26 Applications making use of the Internet and/or other Aeronautical/Airline Operational Control (AOC) or company maintenance-specific data links to collect, process, and then disseminate data for uses such as spare parts and budget management, spares/inventory control, and unscheduled maintenance scheduling, etc. (maintenance discrepancy logs need to be downloaded into a permanent record at least weekly).

B1.27 Weather and aeronautical information. **Note:** A depiction of EFB own-ship may be included on this EFB application if the aircraft has a weather radar display providing concurrent display of proximate weather hazards. The EFB application may display additional, unique data elements, such as turbulence or data outside the range of the weather radar, but must have sufficient common data to allow the flightcrew member to resolve discrepancies.

B1.28 Aircraft cabin and exterior video surveillance displays.

B1.29 Aircraft's Category II (CAT II)/Category III (CAT III) landing records.

B1.30 Aircraft flight log and servicing records.

B1.31 Autopilot approach and auto-land records.

B1.32 Cockpit observer briefing cards.

B1.33 Oceanic navigation progress logs.

B1.34 Approved electronic signature using Public Key Infrastructure (PKI) or private key technology.

B1.35 Cabin maintenance write-ups (maintenance discrepancy logs need to be downloaded into a permanent record at least weekly).

B1.36 Maintenance personnel signoff of discrepancy form (maintenance discrepancy logs need to be downloaded into a permanent record at least weekly).

B1.37 Aircraft Maintenance Manuals (AMM).

B1.38 Notices to Airmen (NOTAM).

B1.39 Required dispatch or flight release documentation.

B1.40 Icing holdover time tables.

B1.41 International Civil Aviation Organization (ICAO) Doc 9481, Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods.

APPENDIX: C
SAMPLE OPERATIONS SPECIFICATIONS

OPERATIONS SPECIFICATIONS
(Subject to the approved conditions in the operations manual)

ISSUING AUTHORITY CONTACT DETAILS[1]

Telephone[2]: _____ Fax: _____ Email: _____

AOC#[2]: _____ Operator Name[3]: _____ Issue Date[4]: _____ Expiry Date[4]: _____

Dba Trading Name: _____ Signature[4]: _____

Aircraft Model[5]: MSN[5]: Registration[5]

Types of Operation: Commercial Air Transportation ☐ Passengers ☐ Cargo ☐ Other[6]: _____

Area(s) of Operation[7]:

Special Limitations[8]:

SPECIAL APPROVAL	YES		DESCRIPTION[9]	REMARKS
Dangerous Goods	☐	☐		
Low Visibility Operations				
Approach and Landing	☐	☐	CAT[10]: _____ RVR: ____ m DH: ____ ft	
Take-off	☐	☐	RVR[11]: _____ m	
Operational Credit(s):	☐	☐	[12]	
RVSM[13] ☐ N/A	☐	☐		
EDTO[14] ☐ N/A	☐	☐	Threshold Time[15]: _____ minutes Maximum Diversion Time[15]: _____ minutes	
AR Navigation Specifications for PBN Operations	☐	☐	[16]	
Continuing Airworthiness	X	X	[17]	
EFB	X	X	[18] ***Specifically approved EFB hardware and software applications for A/C Type (Type1 and or Type2) are contained in the Operations Manual (state reference).***	
Other[19]	☐	☐		

[18]* ***List of EFB functions with any applicable limitations here.***

Note: Sample EFB entries in Operations Specifications are shown in Item[18] on sample Ops Specs above.

NOTES: (The notes below explains how to fill out the Operations Specifications)

1. Telephone and fax contact details of the authority, including the country code. Email to be provided if available.
2. Insert the associated AOC number.
3. Insert the operator's registered name and the operator's trading name, if different. Insert "Dba" before the trading name (for "doing business as").
4. Issuance and expiry date of the operations specifications (dd-mm-yyyy) and signature of the authority representative.
5. Insert the Commercial Aviation Safety Team (CAST)/ICAO designation of the aircraft make, model and series, or master series, if a series has been designated (e.g. Boeing-737-3K2 or Boeing-777-232). The CAST/ICAO taxonomy is available at: http://www.intlaviationstandards.org/. Also insert aircraft manufacturer's serial number/constructor's number and aircraft nationality and registration marks.
6. Other type of transportation to be specified (e.g. emergency medical service).
7. List the geographical area(s) of authorised operation (by geographical coordinates or specific routes, flight information region or national or regional boundaries).
8. List the applicable special limitations (e.g. VFR only, day only).
9. List in this column the most permissive criteria for each approval or the approval type (with appropriate criteria).
10. Insert the applicable precision approach category (CAT II, IIIA, IIIB or IIIC). Insert the minimum RVR in metres and decision height in feet. One line is used per listed approach category.
11. Insert the approved minimum take-off RVR in metres. One line per approval may be used if different approvals are granted.
12. List the airborne capabilities (i.e. automatic landing, HUD, EVS, SVS, CVS) and associated operational credit(s) granted.
13. "Not applicable (N/A)" box may be checked only if the aircraft maximum ceiling is below FL 290.
14. If extended diversion time operations (EDTO) approval does not apply based on the provisions in Chapter 4, 4.7, select "N/A". Otherwise a threshold time and maximum diversion time must be specified.
15. The threshold time and maximum diversion time may also be listed in distance (NM), as well as the engine type.
16. Performance-based navigation (PBN): one line is used for each PBN AR navigation specification approval (e.g. RNP AR APCH), with appropriate limitations listed in the "Description" column.
17. Insert the name of the person/organization responsible for ensuring that the continuing airworthiness of the aircraft is maintained and the regulation that requires the work, i.e. within the AOC regulation or a specific approval (e.g. EC2042/2003, Part M, Subpart G).
18. List the EFB functions with any applicable limitations.
19. Other authorizations or data can be entered here, using one line (or one multi-line block) per authorisation (e.g. special approach authorisation, MNPS, approved navigation performance).

APPENDIX: D
SPECIFIC OPERATIONAL APPROVAL CHECKLIST

D1. INTRODUCTION

D1.1 The checklists below constitute an example of what may be used during Phase 3 of the EFB operational evaluation process.

D1.2 The items in this checklist are designed so that some questions may be not applicable (check "N/A"). Questions answered as "NO" are meant to allow identifying deficiencies that should be corrected and revalidated prior to approval being issued. Questions answered as "YES" are meant that it is acceptable to the Authority.

ITEM	INSPECTION AREA	ACCEPTABLE		
		YES	NO	N/A
	PART: 1 - HARDWARE			
	Have the installed EFB resources been certified by a CAA to accepted aviation standards either during the certification of the aircraft, service bulletin by the original equipment manufacturer, or by a third party STC?			
	Has the operator assessed the physical use of the device on the flight deck to include safe stowage, crashworthiness (mounting devices and EFBs, if installed), safety and use under normal environmental conditions including turbulence?			
	Will the display be readable in all the ambient lighting conditions, both day and night, encountered on the flight deck?			
	Has the operator demonstrated that the EFB will not electromagnetically interfere with the operation of aircraft equipment?			
	Has the EFB been tested to confirm operation in the anticipated environmental conditions (e.g., temperature range, low humidity, altitude, etc.)?			
	Have procedures been developed to establish the level of battery capacity degradation during the life of the EFB?			
	Is the capability of connecting the EFB to certified aircraft systems covered by an airworthiness approval?			
	When using the transmitting functions of a portable EFB during flight, has the operator ensured that the device does not electromagnetically interfere with the operation of the aircraft equipment in any way?			
	If two or more EFBs on the flight deck are connected to each other, has the operator demonstrated that this connection does not negatively affect otherwise independent EFB platforms?			
	Can the brightness or contrast of the EFB display be easily adjusted by the flight crew for various lighting conditions?			
	PART: 2 – INSTALLATION/MOUNTING			
	Has the installation of the mounting device been approved in accordance with the appropriate airworthiness regulations?			
	Is it evident that there are no mechanical interference issues between the EFB in its mounting device and any of the flight controls in terms of full and free movement, under all operating conditions and no interference with other equipment such as buckles, oxygen hoses, etc.?			
	Has it been confirmed that the mounted EFB location does not impede crew ingress, egress and emergency egress path?			
	Is it evident that the mounted EFB does not obstruct visual or physical access to aircraft displays or controls?			
	Does the mounted EFB location minimize the effects of glare and/or reflections?			
	Does the mounting method for the EFB allow easy access to the EFB controls and a clear unobstructed view of the EFB display?			
	Is the EFB mounting easily adjustable by flight crew to compensate for glare and reflections?			
	Does the placement of the EFB allow sufficient airflow around the unit, if required?			
	PART: 3 - SOFTWARE APPLICATION			
	(fill in name of software application)			
	Is the application considered an EFB function (see chapter 4)?			
	Has the software application been evaluated to confirm that the information being provided to the pilot is a true and accurate representation of the documents or charts being replaced?			
	Has the software application been evaluated to confirm that the computational solution/s being provided to the pilot is a true and accurate solution (e.g., weight and balance, performance, etc.)?			
	Does the software application have adequate security measures to ensure data integrity e.g. preventing unauthorized manipulation?			
	Does the EFB system provide, in general, a consistent and intuitive user interface, within and across the various hosted applications?			
	Has the EFB software been evaluated to consider HMI and workload aspects?			
	Does the software application follow Human Factors guidance?			
	Can the flight crew easily determine the validity and currency of the software application and databases installed on the EFB, if required?			

ITEM	INSPECTION AREA	ACCEPTABLE		
		YES	NO	N/A
	PART: 3 - SOFTWARE APPLICATION (CONT'D)			
	Power Connection / Batteries:			
	Is there a means other than a circuit breaker to turn off the power source (e.g., can the pilot easily remove the plug from the installed outlet)?			
	Is the power source suitable for the device?			
	Have guidance/procedures been provided for battery failure or malfunction?			
	Is power to the EFB, either by battery and/or supplied power, available to the extent required for the intended operation?			
	Has the operator ensured that the batteries are compliant to acceptable standards?			
	Cabling:			
	Has the operator ensured that any cabling attached to the EFB, whether in the dedicated mounting or when hand held does not present an operational or safety hazard (e.g., it does not interfere with flight controls movement, egress, oxygen mask deployment, etc.)?			
	Stowage:			
	If there is no mounting device available, can the EFB be easily stowed securely and readily accessible in flight?			
	Is it evident that stowage does not cause any hazard during aircraft operations?			
	Viewable Stowage:			
	Has the operator documented the location of its viewable stowage?			
	Had the operator ensured that the stowage characteristics remain within acceptable limits for the proposed operations?			
	Has the operator demonstrated that if the EFB moves or is separated from its stowage, or if the viewable stowage is unsecured from the aircraft (as a result of turbulence, manoeuvring, or other action), it will not interfere with flight controls, damage flight deck equipment, or injure flight crew members?			
	PART: 4 - MANAGEMENT			
	EFB Management:			
	Is there an EFB management system in place?			
	Does one person possess an overview of the complete EFB system and responsibilities within the operator's management structure?			
	Are the authorities and responsibilities clearly defined within the EFB management system?			
	Are there adequate resources assigned for managing the EFB?			
	Are third parties (e.g. software vendor) responsibilities clearly defined?			
	Crew Procedures:			
	Is there a clear description of the system, its operational philosophy and operational limitations?			
	Are the requirements for EFB availability in the Operations Manual and/or as part of the minimum equipment list (MEL)?			
	Have crew procedures for EFB operation been integrated within the existing Operations Manual?			
	Are there suitable crew cross-checks for verifying safety-critical data (e.g., performance, mass & balance calculations)?			
	If an EFB generates information similar to that generated by existing flight deck systems, do procedures identify which information will be primary?			
	Are there procedures when information provided by an EFB does not agree with that from other flight deck sources, or, if more than one EFB is used, when one EFB disagrees with another?			
	Are there procedures that specify what actions to take if the software applications or databases loaded on the EFB are out-of-date?			
	Are there procedures in place to prevent the use of erroneous information by flight crews?			
	Is there a reporting system for system failures?			
	Have crew operating procedures been designed to mitigate and/or control additional workload created by using an EFB?			
	Are there procedures in place to inform maintenance and flight crews about a fault or failure of the EFB, including actions to isolate it until corrective action is taken?			
	EFB Risk Assessment:			
	Has an EFB Risk Assessment been performed?			
	Are there procedures/guidance for loss of data and identification of corrupt/erroneous outputs?			
	Are there contingency procedures for total or partial EFB failure?			
	Is there a procedure in the event of a dual EFB failure (e.g., use of paper checklist or a third EFB)?			
	Have the EFB dispatch requirements (e.g. minimum number of EFB on board) been incorporated into the Ops Manual?			
	Have MEL or procedures in case of EFB failure been considered and published?			
	Training:			
	Is the training material appropriate with respect to the EFB equipment and published procedures?			
	Does the training cover the list of bulleted items in Section 8 "Flight Crew Training"?			
	Hardware Management Procedures:			
	Are there documented procedures for the control of EFB hardware configuration?			
	Do the procedures include maintenance of EFB equipment?			

ITEM	INSPECTION AREA	ACCEPTABLE		
		YES	NO	N/A
	PART: 4 – MANAGEMENT (CONT'D)			
	Software Management Procedures:			
	Are there documented procedures for the configuration control of loaded software and software access rights to the EFB?			
	Are there adequate controls to prevent corruption of operating systems, software, and databases?			
	Are there adequate security measures to prevent system degradation, malware and unauthorised access?			
	Are procedures defined to track database expiration/updates?			
	Are there documented procedures for the management of data integrity?			
	If the hardware is assigned to the flight crew, does a policy on private use exist?			

---END---