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05 / 2011
23 DEC

ELECTRONIC FLIGHT BAG (EFB)

1. INTRODUCTION

- 1.1 This Aeronautical Information Circular is issued in the exercise of the powers conferred under Section 24o of the Civil Aviation Act 1969.

2. PURPOSE

- 2.1 This AIC is provided for information and guidance to the operator applying for operational approval for Electronic Flight Bag (EFB) operations.

3. BACKGROUND

- 3.1 **EFB** is an electronic information management device that helps flight crew perform flight management tasks more easily and efficiently with less paper. It is a general purpose computing platform intended to reduce, or replace, paper-based reference material often found in the Pilot's carry-on Flight Bag, including the Aircraft Operating Manual, Flight Crew Operating Manual, and Navigation Charts (including moving map for air and ground operations). In addition, the EFB can host purpose-built software applications to automate other functions normally conducted by hand, such as performance take-off calculations.

- 3.2 An EFB system consist of two components which is a hardware platform that runs the software programmes or applications.

- 3.3 The hardware component can be categorized into Class 1, Class 2 and Class 3 EFB systems.

- 3.4 The software programmes or applications are divided into Type A, Type B and Type C.

4. HARDWARE CLASSES AND SOFTWARE PROGRAMMES OR APPLICATIONS

- 4.1 All installations and evaluations of Class 1, 2 and 3 hardware and Type A, B and C software will be carried out in accordance to Airworthiness Notice No.78 (AN 78) issued by Airworthiness Sector of Department of Civil Aviation, Malaysia.

5. ELECTRONIC FLIGHT BAGS INSTALLATIONS AND RELATED EVALUATION REQUIREMENTS

5.1 Class 1 Electronic Flight Bags Hardware

5.1.1 Class 1 EFB Hardware :-

- a. can be use on the ground and during flight;
- b. can be connected to aircraft's power through a certified power source;
- c. can recharge batteries on-board the aircraft;
- d. require quick disconnect from power and/ or data sources of egress;
- e. has read-only data connectivity to other aircraft systems; and
- f. has receive/transmit data connectivity if installed.

5.1.2 Evaluation of Class 1 EFBs will be carried out to confirm that the EFB with the installed software :-

- a. meets basic human factors and functionality criteria;
- b. can be properly stowed for take-off and landing; and
- c. does not interfere with other aircraft systems or equipment.

5.2 Class 2 Electronic Flight Bags Hardware

5.2.1 Class 2 EFB Hardware :-

- a. is attached to the aircraft by a mounting device; and
- b. may connect to aircraft power and data ports during normal operation and use.

5.2.2 Evaluation of Class 2 EFBs will be carried out to confirm that the EFB with installed software:

- a. is suitable equipment for use on board an aircraft;
- b. meets basic human factors and functionality criteria;
- c. can be properly stowed for take-off and landing; and
- d. does not interfere with other aircraft systems or equipment.

5.3 Class 3 Electronic Flight Bags Hardware

5.3.1 Class 3 EFB hardware is installed equipment and requires DCA Airworthiness design approval for all hardware, mounting and connectivity aspects. When certification processes for EFBs first appeared all software aspects of a Class 3 EFB were to be approved together with the hardware aspects.

6. EFB SOFTWARE TYPES AND INSTALLATION

6.1 Type A Electronic Flight Bags Software Applications

6.1.1 A List of examples of EFB hosted software applications is as per Appendix A. Type A applications include pre-composed, fixed presentations of data currently presented in paper format.

6.2 Type B Electronic Flight Bags Software Applications

6.2.1 A list of examples of EFB Type B applications is as per Appendix B, which include dynamic, interactive applications that can manipulate data and the presentation of that data.

6.3 Type C Electronic Flight Bags Applications

6.3.1 Type C applications are those which are ineligible for classification for Type A or B and which are required to go through a full aircraft certification approval process.

7. AIR OPERATOR ELECTRONIC FLIGHT BAGS OPERATIONAL IMPLEMENTATION PROCEDURES

7.1 Operators incorporating EFBs into their operations should carefully review the contents of this AIC to determine applicable requirements. For the most part the level of complexity associated with the operational implementation will depend on the class of hardware and type of software used and the intended application (e.g.: replace all paper approach charts with electronic charts).

7.2 Regardless of hardware class or software type, the operational implementation will require a structured sequence of events and actions to satisfy both the operator and the regulator that aircraft equipped with an EFB(s) can be operated safely.

7.3 All software applications and information contained in the EFB intended for operational use must be current and up-to-date.

7.4 From a process perspective it is envisaged that the operator will:

- a. decide on the class and type of EFBs to use, based on a number of factors including the use of this AIC;
- b. discuss any implementation concerns with their respective Desk Officer/ Airworthiness;
- c. contact the appropriate Aircraft Certification authority, if the implementation requires changes or modifications to the aircraft;
- d. complete all necessary assessment, evaluations, document updates, training, etc.;
- e. submit changes to *Company Operations Manual* (COM) to Desk Officer for approval/acceptance.

7.5 Operational evaluations are required to be carried out for a reasonable period of time. The air operator is responsible for ensuring that these evaluations are conducted. This includes discussing with DCA, Malaysia the content, methodology and level of DCA involvement. These evaluations will normally be conducted by individuals with the requisite skill set hired by the air operator. If the air operator does not have individuals with the necessary skill set to conduct these evaluations, they may use an external individual or organization having the appropriate skills.

8. WITHDRAWAL OF OPERATIONAL APPROVAL

8.1 The operator shall develop its maintenance programme for EFB system including conduct of regular evaluation and audit.

8.2 Any defect or operational anomaly must be investigated and rectified promptly. Failure to comply with the terms of approval may result in DCA, Malaysia withdrawing the operational approval.

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Below is a non-exhaustive list of examples of Type A EFB applications.

1. Flight Crew Operating Manuals (FCOM);
2. Company Standard Operating Procedures (SOP);
3. Airport diversion policy guidance, including a list of Special Designated Airports and/or approved airports with emergency medical service (EMS) support facilities;
4. Operations Specifications (Op Specs);
5. Cockpit observer briefing cards;
6. Aircraft Flight Manuals (AFM) and Aircraft Flight Manual Supplements (AFMS);
7. For smaller aircraft, Pilot Operating Handbooks (POH);
8. Aircraft performance data (fixed, non-interactive material for planning purposes);
9. Airport performance restrictions manual (such as a reference for take-off and landing performance calculations);
10. Other aircraft performance data, including specialized performance data for use in conjunction with advanced wake vortex modelling techniques, land-and-hold-short operations (LAHSO) predictions, etc. (fixed, non-interactive material for planning purposes);
11. Maintenance manuals;
12. Aircraft maintenance reporting manuals;
13. Aircraft flight log and servicing records;
14. Autopilot approach and autoland records;
15. Flight Management System/Flight Management and Guidance System problem report forms;
16. Aircraft parts manuals;
17. Service bulletins/published Airworthiness Directives, etc.;
18. Minimum Equipment Lists (MEL);
19. Configuration Deviation Lists (CDL);
20. Airport-specific rules and regulations;
21. Airport/Facility Directory (A/FD) data (e.g., fuel availability, LAHSO distances for specific runway combinations, etc.);
22. Noise abatement procedures for arriving and departing aircraft;
23. Published (graphical) pilot Notices to Airmen (NOTAM);
24. International Operations Manuals, including regional supplementary information and International Civil Aviation Organization (ICAO) differences;

25. Aeronautical Information Publications (AIP);
26. Aeronautical Information Manual (AIM);
27. Oceanic navigation progress logs;
28. Pilot flight and duty-time logs;
29. Flight crew required rest logs;
30. Flight crew qualification logs
31. Captain's report (i.e., captain's incident reporting form);
32. Flight crew survey forms (various);
33. Flight Attendant Manuals;
34. EMS reference library (for use during medical emergencies);
35. Trip scheduling and bid lists;
36. Aircraft's captain's logs;
37. Aircraft's CAT II/CAT III landing records;
38. Antiterrorism profile data;
39. Hazardous Materials (HAZMAT)/oxidizer look-up tables;
40. Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods (ICAO Doc 9481-AN/928);
41. Customs declaration and agriculture inspection/clearance form;
42. Incidents of interference to aircraft electronic equipment from devices carried aboard aircraft;
43. Current fuel prices at various airports;
44. Check pilot and flight instructor records;
45. Aircraft operating and information manuals (performance information, weight and balance, systems, limitations, etc.);
46. Flight operations manuals including emergency procedures;
47. Airline policies and procedures manuals;
48. Aircraft Maintenance Manuals;
49. Pilot-in-Command (PIC) currency requirements;
50. Passenger information requests - some are directed to the gate or to the agent meeting the flight (e.g., special meal requests, wheel chair requirements, unaccompanied minors, gate information for connecting flights, flights being held for connecting passengers, etc.);
51. Cabin maintenance write-ups. (Maintenance discrepancy logs need to be downloaded into a permanent record at least weekly).

Below is a non-exhaustive list of examples of Type B EFB applications.

1. Take-off, en route, approach and landing, missed approach, go-around, performance calculations. Data derived from algorithmic data or performance calculations based on software algorithms;
2. Power settings for reduced thrust settings;
3. Runway limiting performance calculations;
4. Cost index modelling;
5. Master flight plan/updating;
6. Interactive Plotting for Class II navigation;
7. Mission rehearsals;
8. Weight and balance calculations;
9. Maintenance discrepancy sign-off logs;
10. Cabin maintenance discrepancy reporting forms;
11. Non-interactive electronic approach charts in a pre-composed format from accepted sources;
12. Panning, zooming, scrolling, and rotation for approach charts;
13. Pre-composed or dynamic interactive electronic aeronautical charts (e.g., en route, area, approach, and airport surface maps) including, but not limited to, centering and page turning but without display of aircraft/own-ship position;
14. Electronic checklists, including normal, abnormal, and emergency. Operational Use & Modification of Electronic Checklists, for additional guidance. EFB electronic checklists cannot be interactive with other aircraft systems;
15. Applications that make use of the Internet and/or other Aircraft Operational Communications (AOC);
16. AOC or company maintenance-specific data links to collect, process, and then disseminate data for uses such as spare parts and budget management, can be properly stowed for take-off and landing; and discrepancy logs need to be downloaded into a permanent record at least weekly);
17. Weather and aeronautical data
18. Cabin-mounted video and aircraft exterior surveillance camera displays.