Volume 4 Aircraft Equipment and Operational Authorization

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VOLUME 4 AIRCRAFT EQUIPMENT AND OPERATIONAL AUTHORIZATIONS

CHAPTER 15 ELECTRONIC FLIGHT BAG PROGRAM EVALUATION AND AUTHORIZATION

Section 1 Evaluation and Authorization

4-1641 REPORTINGSYSTEM(S). The following tracking codes are used to document inspector activities during the evaluation of an Electronic Flight Bag (EFB) program.

A. Program Tracking and Reporting Subsystem (PTRS). Use the following PTRS activity codes to record EFB-related oversight activities: 1443, 3443, and 5443.

B. Safety Assurance System (SAS). For Title 14 of the Code of Federal Regulations (14 CFR) parts 121 and 135 operations, the principal inspector (PI) or aviation safety inspector (ASI) will utilize this guidance related to SAS Elements 1.2.2 (OP) Manual Management, 2.1.1 (OP) Training of Flight Crewmembers, 2.2.1 (OP) Airman Duties/Flight Deck Procedures, and 5.2.1 (OP) Crewmember Duties/Cabin Procedures.

4-1642 PURPOSE. This section provides references, information, and guidance to be used to evaluate an operator's initial application for operations specification (OpSpec)/management specification (MSpec)/Letter of Authorization (LOA) A061 or to evaluate a significant modification to an existing EFB program.

4-1643 APPLICABILITY. This guidance applies to 14 CFR parts 91 subpart K (part 91K), 121, 125, and 135 PIs in coordination with the appropriate cabin safety inspector (CSI) and dispatch safety inspector (DSI).

4-1644 BACKGROUND.

A. EFB Program. An EFB is any device, or combination of devices, running EFB software applications. Operators seeking EFB program authorization will utilize the language within Advisory Circular (AC) 120-76, Authorization for Use of Electronic Flight Bags, to develop an EFB program. The program specifics (i.e., operating procedures, pertinent training modules, checklists, operations manuals, training manuals, maintenance programs, minimum equipment lists (MEL), other pertinent documents, and reporting procedures) are developed and incorporated into operator policy before the Federal Aviation Administration (FAA) grants authorization. FAA authorization for an EFB program is granted through the issuance of OpSpec/MSpec/LOA A061.

B. EFB Program Authorization. The initial authorization for an EFB program establishes a baseline for an operator's authorized use of EFB hardware and software. The authorization recognizes the operator's ability to manage their EFB program with an appropriate level of FAA involvement. PIs are given authority to tailor the formality and process of an assessment appropriate to the scope of the modifications proposed by the operator.

4-1645 RESOURCES. The following are resources to be referenced in the evaluation process.

A. AC 120-76. This Flight Standards (FS) AC addresses considerations for EFB hardware, EFB software applications, and all the required and applicable elements that should be incorporated into an EFB program. AC 120-76 provides a means of addressing many elements that an operator may incorporate into an EFB program. Some elements are necessary to every program (e.g., EFB program catalog), and others are optional elements (e.g., electronic charts). An operator may elect to provide an alternate means; however, such action may require further FAA evaluation at the discretion of the Principal Operations Inspector (POI).

B. Aircraft Evaluation Division. The Aircraft Evaluation Division evaluates installed EFB equipment and approved EFB software applications for operational suitability and may recommend additional training, checking, and currency considerations. Evaluation of portable EFB hardware or nonapproved commercial off-the-shelf (COTS) EFB software applications will be at the discretion of the division.

C. FlightStandardization Board (FSB)Reports and Operational Suitability Reports (OSR). FSB Reports and OSRs may contain information that can help an inspector evaluate an EFB program application. FSB Reports or OSRs containing recommendations pertaining to EFBs for a particular model aircraft are controlling. FSB Reports and OSRs are published on the FAA's Flight Standards Information Management System (FSIMS) (http://fsims.faa.gov) "Publications" tab under the "MMEL & AEG Guidance Documents," "Flight Standardization Board (FSB) Reports" section.

D. Letter of Operational Suitability (OSL). An OSL may be issued by the Aircraft Evaluation Division to a hardware manufacturer or Type B software developer. These letters do not grant operational authorization, but indicate some previous FAA evaluation of performance. OSLs are not published on FSIMS because they are not complete operational evaluations. Normally, these letters are distributed by the manufacturer, but can also be obtained directly from the division.

E. FS Assistance. The following FS divisions can be contacted regarding EFB policy:

- Air Transportation Division at 202-267-8166.
- Aircraft Maintenance Division at 202-267-1675.
- Flight Technologies and Procedures Division at 202-267-8790.
- General Aviation and Commercial Division at 202-267-1100.

F. OpSpec Guidance. Volume 3, Chapter 18, Section 3 provides administrative guidance for the issuance of A061.

4-1646 INITIAL EFB PROGRAM EVALUATION. An operator seeking to use EFBs in its flight operations must develop an EFB program and submit an application for OpSpec/MSpec/LOA A061. PIs must use the five-phase process described in Volume 3, Chapter 1, Section 1 as a guideline for the evaluation and authorization of initial EFB program applications. PIs may also utilize the checklists within Volume 4, Chapter 15, Section 2 to

validate an operator's initial EFB program application. The following is additional guidance for initial EFB program evaluation.

A. Review Published Guidance. FAA personnel responsible for evaluating any part of an A061 application must read AC 120-76; Volume 3, Chapter 18, Section 3 (A061); and this guidance (Volume 4, Chapter 15, Sections 1 and 2) in their entirety to ensure an understanding of the FAA's EFB policy. The AC and the Order 8900.1 sections are complementary documents. Inspectors must use the AC as the primary reference to assess an EFB program application. Inspectors responsible for accepting and evaluating an application can use the checklist in Volume 4, Chapter 15, Section 2 as an additional aid to help identify specific requirements defined in the AC.

NOTE: PIs must contact the Flight Technologies and Procedures Division for assistance with the evaluation of any proposed EFB function not listed in appendix A or B of AC 120-76. The Flight Technologies and Procedures Division may also be contacted to assist in evaluations of applications outlining a means other than what is described in the AC.

B. EFB Program Catalog. The EFB program catalog is one of the most important aspects of an EFB program and PIs should make sure the catalog and the processes associated with it are well-defined and demonstrated. The catalog is a reference of the EFB hardware (make and model (M/M)) and EFB software applications used by crewmembers on each aircraft make, model, and series (M/M/S). An EFB program must have a process defined to keep the catalog current. In addition, a record of all EFB program catalog revisions must be maintained by the operator. PIs must have access to the current catalog, when requested, to facilitate the performance of surveillance and oversight functions.

C. EFB Program Modifications. POIs must verify that an operator's proposed EFB program has the processes in place to identify, incorporate, and evaluate minor EFB program changes, as defined by AC 120-76. POIs must have a reasonable expectation with the process because EFB program authorization is intended to allow operators to manage their EFB program with a limited level of FAA involvement. Operators must demonstrate their ability to autonomously manage minor changes while identifying appropriate times for FAA involvement (i.e., significant changes). Operators must update the program catalog with all minor and significant program changes.

D. Demonstrations.

1) The POI must observe and verify the operator's ability to manage an EFB program and conduct flight operations in a planned demonstration period. The demonstration phase for an initial EFB program must:

- Include at least 6 months of flight operations.
- Allow observation and data collection of the EFB use in actual flight operations.

- Allow observation of EFB program management processes, to include the ability to evaluate program modifications, revise software applications, and manage the EFB program catalog.
- Begin with the issuance of A061 with a temporary authorization condition (see details in subparagraph E below).

2) The demonstration concludes when the POI determines the operator has provided sufficient proof to satisfy the FAA's requirement for meeting all the plan objectives, or when the operator is unable to complete them satisfactorily.

E. Temporary Authorization. Issuance of OpSpec/MSpec/LOA A061 with a temporary authorization condition is required when the POI requires demonstration in actual flight operations. When operations are being conducted with a temporary authorization, the operator must have an additional independent means of acquiring required information in-flight (i.e., a backup) in the event of a failure or common mode error of the evaluated items. The backup strategy and the EFB are not used simultaneously during the demonstration period, but the backup strategy must be available. Once OpSpec/MSpec/LOA A061 is issued without temporary authorization, the backup may be removed.

4-1647 EVALUATING MODIFICATIONS TO EFB PROGRAMS. Once an operator receives authorization for an EFB program, they may elect to modify the hardware, software applications, procedures, or aircraft associated with the program. PIs may also utilize the checklists within Volume 4, Chapter 15, Section 2 to validate, as applicable, an operator's EFB program modification.

A. Minor Modifications. Operators issued A061 are allowed to incorporate and evaluate minor changes into their EFB programs. An authorized EFB program must have a process for the operator to determine if a modification is minor. All minor modifications incorporated by an operator must be recorded in the EFB program catalog, and operators must keep a record of all revisions to the catalog.

B. Significant Modifications. The POI must conduct a formal assessment of any modification to an EFB program that is not considered minor. POIs are encouraged to use Volume 4, Chapter 15, Section 2 as a general outline for the evaluation and authorization of new modifications. Because an operator can seek to modify their authorized EFB program in a variety of ways, it is impracticable to define a standard assessment to fit all possible requests. The POIs must work with the operator to define/develop an assessment with the formality, timeline, and demonstration parameters appropriate to the modification requested. Past operator experience and performance should also be considered.

4-1648 LIMITED EVALUATIONS. An operator may desire to conduct a limited evaluation of a program modification in actual flight operations for business/safety case purposes. POIs can authorize these evaluations by issuing a remark in A061. In general, this should only be a consideration if all other means (e.g., simulator testing) of evaluating an EFB program modification are considered inadequate. These types of evaluations should be small in scope (i.e., approximately 15 percent or less of total pilots and/or flight attendants (F/A)), performed by experienced crewmembers, and have defined test parameters. The FAA and the operator must reach a common understanding of what will be necessary to achieve the goals of the evaluation and define the limitations and conditions (if necessary).

RESERVED. Paragraphs 4-1649 through 4-1652.

EFB Hardware & Software Evaluation

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VOLUME 4 AIRCRAFT EQUIPMENT AND OPERATIONAL AUTHORIZATIONS

CHAPTER 15ELECTRONIC FLIGHT BAG PROGRAM EVALUATIONAND AUTHORIZATION

Section 2 Electronic Flight Bag (EFB) Program Checklist

4-1653REPORTING SYSTEM(S). The following tracking codes are used to document inspector activities during the evaluation of an Electronic Flight Bag (EFB) program.

A.Program Tracking and Reporting Subsystem (PTRS). Use PTRS activity codes to record EFB-related oversightactivities: 1443, 3443, and 5443.

B.Safety Assurance System (SAS). For Title 14 of the Code of Federal Regulations (14 CFR) parts 121 and 135 operations, the principal inspector (PI) or aviation safety inspector (ASI) will utilize this guidance related to SAS Elements 1.2.2 (OP) Manual Management, 2.1.1 (OP) Training of Flight Crewmembers, 2.2.1 (OP) Airman Duties/Flight Deck Procedures, and 5.2.1 (OP) Crewmember Duties/Cabin Procedures.

4-1654GENERAL. This section contains questions for use by PIs to review an operator's EFBprogram. In general, these questions are specific to initial installations and training for a given aircraft. When an operator proposes changes to their EFB program, these questions may also be referenced, when applicable.

Figure 4-80. Checklist 1—Electronic Flight Bag (EFB) Hardware & Software Evaluation

NOTE:Checklist 1 contains a list of questions for PIs to use during a tabletop evaluation of the EFB focusing on the EFB hardware and software applications. The checklist starts with EFB hardware questions, then presents general user interface questions, and ends with specific EFB software application questions (ifapplicable). The checklist is designed so any question answered as "No" requires a comment, and in some cases may be "Not Applicable."

Electronic Flight Bag (EFB)Hardware

1. Is the display brightness and contrast adjustable?	☐ No	☐ Yes
2. Is the display brightness acceptable when it adjusts automatically?	☐ No	☐ Yes
3. Are there any display artifacts,such as jagged lines,impairing functionality?	☐ No	☐ Yes
4. Are controls labeled appropriately to describe their intended function?	☐ No	☐ Yes
5. Is the display readable under all flight deck illumination conditions?	☐ No	☐ Yes
6. Are touch-sensitive areas clearly indicated on the touch screen?	☐ No	☐ Yes
7. Can EFB inputs be made quickly and accurately in any operational environment (e.g., inturbulence)?	☐ No	☐ Yes
8. Can touch screen inputs and selections be made without obscuring critical information on the display?	☐ No	☐ Yes
9. Is the touch screen resistant to scratching, hazing, or other damage that can occur through normal use and exposure?	☐ No	☐ Yes

10. Are inadvertent or multiple activation of controls minimized?	☐ No	☐ Yes
11. Does the EFB start up in a predictable state?	☐ No	☐ Yes
12. Can the EFB be rebooted when power is cut to the EFB?	☐ No	☐ Yes
13. Does the EFB function correctly when rebooted?	☐ No	☐ Yes
14. Are all the EFB failure modes easy to see and identify?	☐ No	☐ Yes
15. Is the failure annunciation/message appropriate for the EFB function which failed?	☐ No	☐ Yes
16. Are EFB recovery means easy to remember and apply when the EFB fails?	☐ No	☐ Yes
17. Has the operator provided evidence of electromagnetic compatibility (EMC) testing if utilizing portable EFB hardware?	☐ No	☐ Yes
18. Has the operator provided evidence that the device will continue operation after a rapid decompression event?	☐ No	☐ Yes

Provide the Number and a Comment for Each EFB Hardware Question Checked as "No."

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General User Interface

19. Is the revision information and currency expiration date available and presented clearly?	☐ No	☐ Yes
20. Does the device respond immediately to user inputs?	☐ No	☐ Yes
21. Is the processing speed always appropriate for normal use?	☐ No	☐ Yes
22. Are appropriate busy or progress indicators displayed when processing is delayed?	☐ No	☐ Yes
23. Is the user interface, including functions and navigation, consistent throughout the EFB?	☐ No	☐ Yes
24. Is all information needed displayed and easily accessible? Is there missing or difficult to find information?	☐ No	☐ Yes
25. Are common actions and time-critical functions easy to access?	☐ No	☐ Yes
26. Are there standard ways to perform common actions?	☐ No	☐ Yes
27. Are the displays and controls used on the EFB similar across software applications? Area common set of controls and graphical elements used across software applications?	☐ No	☐ Yes
28. Can all colors be distinguished under the various lighting conditions?	☐ No	☐ Yes
29. Is color coding implemented with a secondary code, such as shading or highlighting, when used to display critical information?	☐ No	☐ Yes
30. Are the colors red and yellow used appropriately—only for warnings and cautions?	☐ No	☐ Yes
31. Is the text easily readable?	☐ No	☐ Yes
32. Do the characters stand out against the display background?	☐ No	☐ Yes
33. Are upper case and italic text used infrequently?	☐ No	☐ Yes
34. Is text used in low-light conditions appropriate in size and easy to read?	☐ No	☐ Yes
35. Is it easy to zoom in on text or graphics when they are too small?	☐ No	☐ Yes
36. Is it obvious when information is out of view and can it easily be brought into view?	☐ No	☐ Yes
37. Is the spacing between characters appropriate?	☐ No	☐ Yes

38. Is the vertical spacing between lines appropriate?	☐ No	☐ Yes
39. Are icons and symbols legible?	☐ No	☐ Yes
40. Are icon and symbol functions obvious?	☐ No	☐ Yes
41. Are the icons and symbols distinguishable from one another?	☐ No	☐ Yes
42. Is each icon's meaning explained by a label or other means?	☐ No	☐ Yes
43. Are the EFB icons and symbols consistent with their paper equivalents?	☐ No	☐ Yes
44. Are alerts and reminders consistent across all EFB software applications?	☐ No	☐ Yes
45. Are reminders implemented so as not to distract?	☐ No	☐ Yes
46. Is the failure message appropriate for the EFB function that failed?	☐ No	☐ Yes
47. Is it easy to reset parameters to their default when they have been customized?	☐ No	☐ Yes
48. Is EFB customization controlled through an administrative control process?	☐ No	☐ Yes

Provide the Number and a Comment for Each General User Interface Question Checked as"No."

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General EFB Software Applications

49. Can required information be found quickly and accurately within all EFB software applications?	☐ No	☐ Yes
50. Is the information within EFB software applications organized consistently?	☐ No	☐ Yes
51. Is the layout of information appropriate for all EFB software applications?	☐ No	☐ Yes
52. Is required information easy to read?	☐ No	☐ Yes
53. Is it easy to tell which EFB software application is currently open/active?	☐ No	☐ Yes
54. Is it easy to switch betweenEFB softwareapplications?	☐ No	☐ Yes
55. Does each EFB software application function as intended?	☐ No	☐ Yes
56. Is access or links to related information appropriately supported?	☐ No	☐ Yes
57. Are similar types of information accessed in the same way?	☐ No	☐ Yes
58. Is it easy to returnto the place where the user started from?	☐ No	☐ Yes

Provide the Number and a Comment for Each General EFB Software Applications Question Checked as"No."

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Electronic Documents (If Applicable)

59. Is it easy to find the information needed in a document?	☐ No	☐ Yes
60. Is it easy to tell which documents are open?	☐ No	☐ Yes

61. Is it easy to move between documents quickly?	☐ No	☐ Yes
62. Is it easy to tell what document is currently in view?	☐ No	☐ Yes
63. Is there a list of available documents to choose from?	☐ No	☐ Yes
64. Is the document search function appropriate?	☐ No	☐ Yes
65. Are tables readable and usable?	☐ No	☐ Yes
66. Are figuresreadable and usable?	☐ No	☐ Yes

Electronic Charts (If Applicable)

67. Is there a way to pre-select specific charts for easy access during a particular flight? 68. Is it easy to search for a chart? 69. Is it easy to access charts when a last-minute change is necessary? 70. If the chart application uses aircraft location to facilitate access to charts, is this function appropriate (i.e., either approved by Aircraft Certification Service (AIR) or explicitly allowed by the current edition of Advisory Circular (AC)120-76)? 71. Is the information layout for fixed charts consistent with the paper equivalent? 72. Is it easy to switch between a decluttered and normal display if decluttering is supported? 73. Is there a clear indication when any chart elements are suppressed? 74. Can the display be easily returned to its default position after zooming, panning, or decluttering?	☐ No	☐ Yes

Provide the Number and a Comment for Each Electronic Documentsand Charts Question Checked as"No."

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Electronic Checklists (ECL) (If Applicable)

75. Are normal checklists available in the appropriate order of use?	☐ No	☐ Yes
76. Can checklists be accessed individually for review or reference?	☐ No	☐ Yes
77. During abnormal conditions, are relevant checklists easy to access?	☐ No	☐ Yes
78. During abnormal conditions, does the device indicate which checklists and/or checklist items are required and which are optional?	☐ No	☐ Yes
79. Is it clear where to find all checklists, whether on the EFB or on paper?	☐ No	☐ Yes
80. Is the location of a paper document provided when it is referredto by the ECL?	☐ No	☐ Yes
81. Does each checklist have a constantly visible title distinct from other checklists?	☐ No	☐ Yes
82. Is it easy to select a checklist from a set of open checklists?	☐ No	☐ Yes
83. Is there a reminder to review incomplete items when closing an incomplete checklist?	☐ No	☐ Yes
84. Can an incomplete checklist be closed after acknowledging it is not complete?	☐ No	☐ Yes
85. Does the ECL discourage two or more checklists from being used simultaneously?	☐ No	☐ Yes
86. Is progress through the ECL clear?	☐ No	☐ Yes

87. It is easy to reset the ECL to start over again?	☐ No	☐ Yes
88. Does the checklist provide appropriate reminders for tasks requiring a delayed action?	☐ No	☐ Yes
89. Does the checklist clearly highlight decision branches?	☐ No	☐ Yes
90. Can you return to the checklist from links or related information in one step?	☐ No	☐ Yes
91. Is there an indicator of which item in the checklist you are working on?	☐ No	☐ Yes
92. Is the checklist's active item clearly indicated?	☐ No	☐ Yes
93. Can the status of an item be easily changed?	☐ No	☐ Yes
94. Does the next item automatically become active when the previous one is complete?	☐ No	☐ Yes
95. Can the current item be deferred without completing it?	☐ No	☐ Yes
96. Is it easy to view other items, even in a long checklist, without changing the active item?	☐ No	☐ Yes
97. Is it easy to move between items within a checklist?	☐ No	☐ Yes
98. Is there a clear indication all items, as well as the whole checklist, are complete when finished?	☐ No	☐ Yes

Provide the Number and a Comment for Each ECLQuestion Checked as"No."

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Performance Calculations (If Applicable)

99. Does the device identify entries having an incorrect format or type and does it generate an appropriate error message?	☐ No	☐ Yes
100. Does the error message clarify the type and range of data expected?	☐ No	☐ Yes
101. Are units for performance data clearly labeled?	☐ No	☐ Yes
102. Do the labels used in the EFB match the language of other operator documents?	☐ No	☐ Yes
103. Is all the information necessary for a given task presented together or easily accessible?	☐ No	☐ Yes
104. Can the crews modify performance calculations easily, especially when making last-minute changes?	☐ No	☐ Yes
105. Are outdated results of performance calculations deleted when modifications are entered?	☐ No	☐ Yes
106. Does the display and/or crew training provide information to the crew on the assumptions on which the calculations are based?	☐ No	☐ Yes
107. Are crews trained to identify and review default values and assumptions about the aircraft status or environmental conditions?	☐ No	☐ Yes
108. Are the assumptions made about any calculation as clear to pilots as similar information would be on a tabular chart?	☐ No	☐ Yes

Provide the Number and a Comment for Each Performance CalculationsQuestion Checkedas"No."

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EFB Operational Evaluation

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Figure 4-81. Checklist 2—Electronic Flight Bag (EFB) Operational Evaluation

NOTE:Checklist 2 contains a list of questions for PI consideration during an operational evaluation of the EFB program, to include its documentation, procedures, and training. The first five pages contain questions to be answered in a training or operational environment by crewmembers, instructor/evaluators, or other operational personnel. The last two pages contain sample crew performance questions addressed in a simulation environment. The checklist is designed so any question answered as "No" requires a comment and in some cases may be "Not Applicable."

General Electronic FlightBag (EFB)Hardware

1. Is there a backup source in the flight deck for EFB information? 2. Is the EFB display readable under all typical flight-deck lighting conditions? 3. Are there appropriate Master Minimum Equipment List (MMEL)/minimum equipment list (MEL) items to handle EFB failures?	☐ No ☐ No ☐ No	☐ Yes ☐ Yes ☐ Yes
4. Have EFB failure items been incorporated into Federal Aviation Administration (FAA)-required/accepted checklists?	☐ No	☐ Yes
5. Are crews able to adjust and lock the EFB for optimal viewing?	☐ No	☐ Yes
6. Are the EFB hardware components usable and suitably durable for the flight deck?	☐ No	☐ Yes

Provide the Number and a Comment for Each General EFB Hardware Question Checked as "No."

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EFB Stowage

7. Is there a stowage area for the EFB?	☐ No	☐ Yes
8. Is the stowage securing mechanism simple to operate?	☐ No	☐ Yes
9. Is the stowage securing mechanism unobtrusive when not in use?	☐ No	☐ Yes
10. Does the EFB stowage allow appropriate visual and physical access to flight controls, displays, and emergency egress path?	☐ No	☐ Yes
11. Does the viewable stowage allow pilots a sufficientlyclear view of critical outside references?	☐ No	☐ Yes
12. Can the EFB be moved easily to and from the stowage area without blocking access to flight displays/controls?	☐ No	☐ Yes
13. Are the device and/or the stowage area unlikely to be damaged under normal use?	☐ No	☐ Yes

Unsecured EFB (If Applicable)

14. Is there appropriate access to flight controls/displays when the unsecured EFB is in use?	☐ No	☐ Yes
15. Is there an acceptable place to put an unsecured EFB when in use?	☐ No	☐ Yes
16. Is there an acceptable place to put an unsecured EFB when *not*in use?	☐ No	☐ Yes

17. Can the kneeboard EFB be positioned so the pilot has full control authority? 18. Is the kneeboard EFB comfortable for the pilot to wear under normal conditions?	☐ No	☐ Yes

Provide the Number and a Comment for Each EFB Stowage and Unsecured EFB Question Checked as "No."

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Workload

19. Is the EFB installation appropriate for use in high workload phases of flight?	☐ No	☐ Yes
20. Does stowing the EFB require excessive head-down time or workload?	☐ No	☐ Yes
21. Is the workload acceptable when there is an EFB failure?	☐ No	☐ Yes
22. Are other than critical EFB messages inhibited during high workload phases of flight?	☐ No	☐ Yes
23. Is the workload acceptable when configuring electronic charts while flying a procedure?	☐ No	☐ Yes
24. Are there procedures to mitigate EFB workload?	☐ No	☐ Yes
25. Are there appropriate procedures for using EFB in high workload phases of flight?	☐ No	☐ Yes

Software Applications

26. Does the EFB use terms, icons, colors, and symbols consistent with other flight deck s yste ms?	☐ No	☐ Yes
27. Does using the electronic checklist (ECL) produce the same crew actions the paper equivalent would?	☐ No	☐ Yes
28. If the EFB shows own-ship in flight, is there an operationally similar function presented on an installed display? Can the flightcrew differentiate between the information on the EFB and the information on the installed display? 29. Is there a clear indication of the revision date(s) of the software that are on the EFB?	☐ No	☐ Yes
	☐ No	☐ Yes

Provide the Number and a Comment for Each Workload and Software Applications Question Checked as "No."

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EFB Cybersecurity

30. Are cybersecurity controls in place to mitigate against the risk of unauthorized modifications to an EFB's operating system architecture, its specific hosted applications, and any of the databases or datalinks used to enable its hosted applications?	☐ No	☐ Yes
31. Are cybersecuritycontrolsin place to ensure administrative management of portable electronic devices (PED), which have been authorized foruse as a portable EFB? (Note: This includes, but is not limited to, identifying the individual or aircraft to which the PED is assigned, as well as ensuring operating system architecture and associated hosted software applications are updated in a timely manner.)	☐ No	☐ Yes

EFB Procedures

32. Are there procedures for starting up and shutting down the EFB? 33. Are there appropriate procedures for allthe EFB failure modes? 34. Are there EFB procedures for when other aircraft system failures could render the EFB unusable?	☐ No	☐ Yes
35. Are there procedures for using EFB backup information?	☐ No	☐ Yes
36. Are there procedures for establishing which source of information is primary?	☐ No	☐ Yes
37. Are there procedures specifying what data to use when data is redundant or different from the EFB?	☐ No	☐ Yes
38. Are there procedures for removal of a kneeboard EFB during emergency landing or egress (if applicable)?	☐ No	☐ Yes
39. Are there procedures for updating passwords and for device lockout?	☐ No	☐ Yes

Provide the Number and a Comment for Each EFB Cybersecurity and Procedures Question Checked as"No."

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Procedures for Keeping EFB Content/Data Current

40. Are there procedures to ensure data is accurate and current for each software application?	☐ No	☐ Yes
41. Are changes to content/data appropriately documented? 42. Are there procedures to notify crews of EFB updates? 43. Are there procedures to ensure the correct information is installed when EFBs use information specific to the aircraft type or tail number?	☐ No	☐ Yes
44. Are operational control procedures consistent with regulations concerning preventative mai ntena nce?	☐ No	☐ Yes
45. Is there a procedure to avoid corruption/errors during changes to the EFB device?	☐ No	☐ Yes
46. Is there a procedure to ensure all EFBs have the appropriate content/data installed when there are multiple EFBs on the flight deck?	☐ No	☐ Yes
47. Is there a procedure to ensure EFB data in use is approved for use inflight?	☐ No	☐ Yes
48. Is there a procedure for when the database is not approved for use in flight?	☐ No	☐ Yes
49. Is there a procedure to ensure all customized values are cleared from the EFB?	☐ No	☐ Yes

Procedures for User Feedback

50. Is there a procedure for EFB users to provide feedback?	☐ No	☐ Yes
51. Is there a procedure for the operator to monitor feedback, correct EFB deficiencies, and/or notify the EFB manufacturer?	☐ No	☐ Yes
52. Are there procedures or built-in limits preventing the setting of customized color schemes conflicting with flight deck color conventions?	☐ No	☐ Yes

53. Is there a policy regarding the use of supplemental audio and/or video in flight?	☐ No	☐ Yes
54. Is the EFB audio set to minimize any interference with higher priority communications?	☐ No	☐ Yes

Procedures for Specific EFB Software Applications (If Applicable)

55. Are there specific policy/procedures for using the electronic charts application? 56. Does the	☐ No	☐ Yes
policy specify what other EFB software applications can be used while a procedure using the electronic charts is actively being flown?	☐ No	☐ Yes
57. Are there procedures on how to use the electronic charts when the EFB uses aircraft status data to configure chart elements?	☐ No	☐ Yes
58. Are there procedures to ensure navigation/approach charts required for the flight are installed and available?	☐ No	☐ Yes
59. Is there a procedure to identify the controlling copy of Weight and Balance (W&B)?	☐ No	☐ Yes
60. Is there a procedure to establish responsibility for completion of W&B software applications?	☐ No	☐ Yes
61. Are there procedures to maintain required W&B records?	☐ No	☐ Yes
62. Is there a procedure to ensure EFB performance data can be stored outside the EFB?	☐ No	☐ Yes
63. Are there procedures for crosschecking EFB performance data to identify data entry errors?	☐ No	☐ Yes

Provide the Number and a Comment for Each EFB Procedure Question Checked as "No."

_____
_____
_____
_____

EFB Training

64. Are there appropriate EFB training, checking, and currency requirements?	☐ No	☐ Yes
65. Does the EFB training program address all EFB intended functions and EFB software applications?	☐ No	☐ Yes
66. Is there training on how touse unique features of the software applications?	☐ No	☐ Yes
67. Are crews proficient on the EFB at the completion of EFB training?	☐ No	☐ Yes
68. Is EFB training customized for new users?	☐ No	☐ Yes
69. Is the manufacturer's EFB documentation sufficient?	☐ No	☐ Yes
70. Does the EFB training device provide an appropriate degree of fidelity when the actual EFB is not used?	☐ No	☐ Yes
71. Does the EFB training device simulate the key aspects of the task?	☐ No	☐ Yes
72. Does the EFB training appropriately address the meaning of icons and symbols?	☐ No	☐ Yes
73. Does EFB training address security considerations (e.g., passwords, device lockout)?	☐ No	☐ Yes

Training for Charts (If Applicable)

74. Is training on the use of electronic charts appropriate?	☐ No	☐ Yes
75. Is there training on unique features of the electronic charts?	☐ No	☐ Yes
76. Is there training on differences in map scale, orientation, and data quality between the electronic charts and other flight deck displays?	☐ No	☐ Yes
77. Is there training on the limitations of own-ship position when it is displayed?	☐ No	☐ Yes
78. Is there training on policies pertaining to use of the electronic charts?	☐ No	☐ Yes
79. Can crews use the electronic charts as well as paper charts?	☐ No	☐ Yes
80. Can crews use the electronic charts to orient themselves and track their progress as they fly required procedures?	☐ No	☐ Yes

Training for ECL Systems (If Applicable)

81. Is there appropriate training on how to use ECLs?	☐ No	☐ Yes
82. Is there training on how to use unique features of the ECLs (e.g., how the EFB indicates a checklist item has been deferred)?	☐ No	☐ Yes
83. Is there training on which checklists are supported electronically and which are not?	☐ No	☐ Yes
84. Is there training on the limitations of ECL automation when it uses aircraft status data?	☐ No	☐ Yes

Training for Flight Performance Calculations (If Applicable)

85. Is there appropriate training on how and when to use the flight performance software application?	☐ No	☐ Yes
86. Is there training on critical performance calculation assumptions (e.g., runway length, W&B)?	☐ No	☐ Yes
87. Is there training to review default values for aircraft status and environmental conditions?	☐ No	☐ Yes
88. Is there training onhow to enter information required by the performance software applications?	☐ No	☐ Yes
89. Is there training on how to interpret and use results of the flight performance calculatio ns?	☐ No	☐ Yes
90. Is there training on where to obtain values when their normal sources are not available?	☐ No	☐ Yes
91. Is there training on coordinating the roles of dispatchers and crewmember?	☐ No	☐ Yes
Provide the Number and a Comment for Each Training Question Checked as "No."	☐ No	☐ Yes

_____
_____
_____

Crew Performance: Preflight Planning

Do crews with the EFB perform as well or better than crews with paper documents when:

92. Calculating aircraft W&B, takeoff, climb, and maneuvering speeds?	☐ No	☐ Yes
93. Crews maintain critical data for immediate reference?	☐ No	☐ Yes
94. There is a runway change and a need to reference deicing fluid requirements or an MEL item?	☐ No	☐ Yes
95. There are time-critical adjustments prior to block out/taxi and takeoff?	☐ No	☐ Yes

Crew Performance: Takeoff

Do crews with the EFB perform as well or better than crews with paper documents when: 96. There is a takeoff on

a runway requiring a briefing for a special operator engine-out procedure?	☐ No	☐ Yes
97. There is acomplex Standard Instrument Departure (SID) with an abnormal or an emergency during the departure climb-out?	☐ No	☐ Yes
98. There is an emergency requiring a return to the departure or alternate departure airport?	☐ No	☐ Yes
99. One EFB fails, requiring one pilot to rely on the EFB of the other pilot immediately after takeoff?	☐ No	☐ Yes

Provide the Number and a Comment for Each Preflight Planning and Takeoff Question Checked as "No."

_____
_____
_____
_____

Crew Performance: Cruise

Do crews with the EFB perform as well or better than crews with paper documents when:

100. There is an engine failure/fire withpossible condition of destination below weather minimums?	☐ No	☐ Yes
101. There is electrical smoke in the cockpit requiring use of smoke mask/goggles while completing checklists or using EFB for approach briefing?	☐ No	☐ Yes

Crew Performance: Descent

Do crews with the EFB perform as well or better than crews with paper documents when:

102. There are conditions requiring reference to Surface Movement Guidance and Control System (SMGCS) taxi routing or a complex clearance?	☐ No	☐ Yes
103. Reported runway conditions require reference to operational limitations?	☐ No	☐ Yes

Crew Performance: Approach/Landing

Do crews with the EFB perform as well or better than crews with paper documents when:

104. There is arunway change or the need to recompute landing weight and V speeds during approach?	☐ No	☐ Yes
105. There are poor weather conditions or airports with complex taxi routes?	☐ No	☐ Yes
106. There is a request for a specific taxiway turn during rollout after landing?	☐ No	☐ Yes

Crew Performance: Destination Ground Operations

Do crews with the EFB perform as well or better than crews with paper documents when: 107. There is an

EFB partial failure or erroneous output requiring maintenance discrepancy to be entered?	☐ No	☐ Yes

Provide the Number and a Comment for Each Crew Performance Question Checked as "No."

_____
_____
_____
_____

EFB Line Evaluation Job Aid

3

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Figure 4-82. Checklist 3—Electronic Flight Bag (EFB) Line Evaluation Job Aid

USED FOR DATA COLLECTION DURING VALIDATION PERIOD

This tool provides a starting point for EFB line operations evaluations. Use of this tool can be customized as appropriate for the situation. This is a final check to ensure there are no problems with the EFB design/interface, training, or procedures prior to the authorization for use.

The questions below encompass the operations and safety evaluation. In cases where a system shows weaknesses or limitations, mitigations must be developed in consultation with the applicant.

In some cases, an EFB may add to the complexity of flight operations. The key questions to be answered are:

1) Can the flight be conducted as safely with an EFB as with the methods/products it is intended to replace?

2) Does the EFB add an *unacceptable* level of complexity for any critical activity or phase of flight?

In order to answer these questions, it is helpful to consider more specific aspects of EFB usage, which are covered in Sections II through V below. Space is also provided in Section I to record general notes about the system and the evaluation.

I. Describe system configuration and flight conditions:

_____
_____
_____
_____

II. Overview. The main aspects to be assessed are encompassed by the following questions:

1.	a. Was training adequate to ensure the crewmember(s)could perform in a safe and efficient manner?	☐ No	☐ Yes
	b. Were individual crewmember knowledge and skills adequate to allow normal coordinated flight deck activities?	☐ No	☐ Yes
	c. Was crewmember knowledge regarding observed software applications adequate?	☐ No	☐ Yes
2.	Are adequate procedures in place to ensure the EFB is integrated into the crew/operator's system (e.g., normal and abnormal/emergency operations and maintenance functions)?	☐ No	☐ Yes
3.	Were the EFB hardware or software applications adequate and appropriate during the flight? If there were any problems, particularly in a critical phase of flight, describe in the notes space below.	☐ No	☐ Yes
4.	Could the crewmember(s) recover from usage errors without undue distraction or discussions? If usage errors were frequent or a distraction, describe in notes space below.	☐ No	☐ Yes
5.	Was the workload required for completing a task with the EFB equal to or less than the workload for completing the task with the conventional method? Consider the use of the EFB both in isolation as well as with those functions used concurrently with other aircraft systems. If no, specify phase of flight and task for any marginal or unacceptable increases in workload in notes space below.	☐ No	☐ Yes

Describe any problems checked as "No" above:

_____
_____
_____
_____

III. General.

6.	Was each crewmember able to use the controls for menu and functionality without frequent errors?	☐ No	☐ Yes
7.	Was the device appropriate and operational when exposed to environmental factors (e.g.,turbulence, cold weather, vibration)?	☐ No	☐ Yes
8.	a. Was the device free of significant limitations in regard to display (e.g., off-axis view angles or various different lighting conditions)?	☐ No	☐ Yes
	b. Does the device haveeasy and adequate dimming functions in low-light (nighttime) conditions?	☐ No	☐ Yes
	c. Is the device adequately backlit and/or viewable by flight deck lighting in low-light (nighttime) conditions?	☐ No	☐ Yes
	d. Is the device clearly visible in bright sunlight conditions?	☐ No	☐ Yes
9.	Was the device display clear (adequate resolution)? Confirm the display was never misinterpreted because of viewing limitations. If so, record issues in notes space below.	☐ No	☐ Yes
10.	Did the crewmember(s) ensure proper EFB stowage (including viewable stowage) per standard operating procedures (SOP)? Temperature limitations acknowledged?	☐ No	☐ Yes
11.	Does the display continue to be usable after prolonged use in the flight deck environment (if applicable)?	☐ No	☐ Yes
12.	Are normal functions (e.g., shutdown, startup) adequate to ensure crewmembers are not required any undue attention or concern?	☐ No	☐ Yes
13.	Were procedures adequate for identifying currency of EFB data?	☐ No	☐ Yes
14.	Could the crewmember(s) easily find and use required items and functions?	☐ No	☐ Yes
15.	Were the abbreviations and/or icons easy to understand?	☐ No	☐ Yes
16.	Could the crewmember(s) easily switch between critical software applications?	☐ No	☐ Yes
17.	If critical (e.g., abnormal or emergency checklists) software applications are authorized in the EFB configuration basis, is their useat least equal to or better than previously approved methods?	☐ No	☐ Yes ☐ N/A
18.	Was the time to complete normal tasks appropriate?	☐ No	☐ Yes
19.	Wereaudio features adjustable and appropriate for the flight deck or cabin environment and did they notcause crewmember distraction?	☐ No	☐ Yes ☐ N/A

Describe any problems checked as "No" above:

_____
_____
_____
_____

IV.Electronic Charts, Documents, and Checklists.

20.	Were all necessary documents (including charts, checklists, and manuals) found, identified, and easily viewed by the crewmember(s) without undue distraction?	☐ No	☐ Yes
21.	Was information contained in electronic charts, documents, and checklists complete, equal in quality to previously provided products, and easily accessible and understandable?	☐ No	☐ Yes
22.	Was crewmember knowledge of chart/document/checklist selection and viewing adequate?	☐ No	☐ Yes
23.	Could the crewmember(s) easily rearrange content on the screen to meet needs (e.g.,by zooming, panning, or otherwise customizing the view)?	☐ No	☐ Yes
24.	Could the crewmember(s) use the EFB concurrently with an installed display and differentiate the information?	☐ No	☐ Yes
25.	Did the crewmember(s) exhibit adequate knowledge of EFB functions to efficiently brief and fly required procedures?	☐ No	☐ Yes
26.	Did the crewmember(s) exhibit adequate knowledge of the software applications revision process procedure/method ensuring appropriate database accuracy and currency?	☐ No	☐ Yes
27.	a. Did the crewmember(s) exhibit adequate knowledge of contingency procedures?	☐ No	☐ Yes
	b. In the event of a failure of a single device?	☐ No	☐ Yes
	c. In the event both devices fail?	☐ No	☐ Yes
28.	Were crewmember(s) able to monitor necessary electronic chart displays during critical phases of flight?	☐ No	☐ Yes
29.	Did the EFB allow quick entry of updates for last-minute changes (e.g., flight plan/runway changes)?	☐ No	☐ Yes
30.	For electronic checklists (ECL), was it easy to track completed items?	☐ No	☐ Yes
			☐ N/A

Describe any problems checked as "No" above:

_____
_____
_____
_____

V. Flight Performance Data/Calculations.

31.	Could the crewmember(s) interpret and use flight performance data/calculations efficiently and accurately?	☐ No	☐ Yes ☐ N/A
32.	Did the device allow quick entry of updates for last-minute changes (e.g., flight plan/runway changes)?	☐ No	☐ Yes ☐ N/A
33.	Are crewmembers aware of any software application limitations and do they understand only approved calculation methods may be used as a primary means of computation?	☐ No	☐ Yes ☐ N/A

Describe any problems checked as "No" above:

_____
_____
_____
_____

VI.General Conclusions.

34.	Were any unique safety issues or events caused or exacerbated by using the EFB during this evaluation?	☐ No	☐ Yes
35.	Can the flight be conducted as safely with an EFB as with the methods/products it is intended to replace?	☐ No	☐ Yes
36.	Does the EFB add an unacceptable level of complexity for any critical activity or phase of flight?	☐ No	☐ Yes

Assigned Aircraft: _____Date: _____

Observer Name(Print):_____Observer Signature: _____

RESERVED. Paragraphs 4-1655through 4-1665.