1. Objective

1.1. This section contains specific policy, guidance, and procedures to be used by principal operations inspectors (PI) for processing an operator's request for "authorization to use" an Electronic Flight Bag (EFB).

1.2. All PI specialties should coordinate the review of an operator's EFB program. Once the PIs have completed their review of an EFB application, and have determined that the request is valid, authorization to use an EFB will be made by approving the appropriate section(s) of the Operations Manual. The final result will be an authorization to use an EFB without issuing any sort of approval to any particular hardware system or software application.

1.3. The CAAI evaluation process for an EFB follows the general process for approval and acceptance as described in 1.1.030.

1.4. This is a common directive for Airworthiness and Operations.

1.4.1. Close coordination between AW and OPS inspectors executing this directive is required.

1.4.2. During Certification, the nominated PM will be the lead inspector in executing this directive. In other cases the PI and PMI will nominate the lead inspector.

1.4.3. Any amendments to this directive must be made to both AW Inspector Handbook and OPS Inspector Handbook

2. General

2.1. This process for EFB authorization is to be used in combination with the current edition of CAAI AP 1.1.046, Guidelines for the Certification, Airworthiness, and Operational Approval of Electronic Flight Bag Computing Devices. The processes described in this section may also be used to determine if an EFB may be substituted for aeronautical charts and data used within aircraft operated under ANR.OPS Chap. 8.

2.2. Wherever references are made to Aircraft Evaluation Group (AEG) or Flight Standardisation Board (FSB) they reference the bodies responsible for aircraft designed in the US. Other states of deign may have equivalent applicable bodies.

2.3. Evaluation Process for Class 1 or 2 EFBs Using Type A and/or B Software. The evaluation process described in this section is applicable to Class 1 or

2 EFBs using Type A and/or B software applications. Aircraft Evaluation Group (AEG) involvement in the authorization to use Class 1 or 2 EFBs is at the AEG's discretion. AEG involvement may be expected when an EFB has new or novel functions not addressed in this guidance and/or when there are concerns about EFB use and standardization. When an AEG report exists for a particular Class EFB or Type A and/or B application, that AEG report is controlling for the determination of operational suitability.

2.4. Evaluation Process for Class 3 Hardware and/or Class C Software.

Class 3 hardware and/or Type C software applications are evaluated by the AEG in conjunction with type certification (TC), amended TC, Supplemental Type Certificate (STC), or Technical Standard Order Authorization (TSOA) processes. The AEG determines operational suitability and pilot training, checking, and currency requirements. The AEG determination of suitability for Class 3 EFB hardware may be referenced in the Flight Standardization Board (FSB) report for the particular model aircraft or other AEG report of operational suitability. If Class 3 EFB hardware is not addressed in an AEG report, the FSB chairman for the affected aircraft should be contacted to determine if the AEG has accomplished an operational suitability evaluation. Authorization for EFB Class 3 with Type C software application is subject to existing operator requirements for implementing new or modified certificated equipment, including compliance with FSB reports for differences training, checking, and currency. The operator must address the development of procedures and training associated with EFBs prior to receiving authorization to use each EFB Class 3 and Type C software application.

2.5. **EFB HARDWARE CLASSES.**

Figure 1, Flow Chart for Determining EFB Hardware Class, is provided to aid in the determination of the EFB hardware classes. The EFB must meet the following hardware specifications to be used in an aircraft during flight operations. It is the user's/operator's responsibility to document compliance with these specifications for each EFB and aircraft operating combination.

2.5.1. **Class 1 "Portable".**

These EFBs are portable, commercial off-the-shelf (COTS) devices that are part of a pilot/crewmembers flight kit. Class 1 EFBs are not mounted to the aircraft, connected to the aircraft systems for data, or connected to a dedicated aircraft power supply. An EFB attached to a kneeboard, suction cup(s), or other temporary securing solution by a means acceptable to the administrator, is still considered a Class 1 EFB because it is not mounted to the aircraft. For the purposes of this section, mounted is defined as any portable device that is attached to a permanently installed mounting device. A permanently installed

mounting device requires an installation approval (STC) Class 1 EFBs that have Type B software applications for aeronautical charts, approach charts, or electronic checklists (ECL) must be secured to a temporary securing solution or viewable during critical phases of flight, and must not interfere with flight control movement. This requirement does not preclude a flightcrew member from temporarily removing the EFB from its secured and viewable location to aid in complying with operational requirements or to review other authorized Type B software applications (e.g., the pilot/crewmember temporarily holding the Class 1 EFB to review the electronic Airplane Flight Manual (AFM)). The need for aeronautical charts, approach charts, and ECLs to be immediately available for viewing in all phases of flight is essential for an electronic format to be equivalent to the paper format being replaced. The ability to have departure and arrival charts, approach charts, and airport diagrams continuously in view is essential for situational awareness (SA) during critical phases of flight and very important to runway incursion prevention during takeoff, landing, and taxi operations. This viewability requirement is consistent with current CAAI policy that pilot/crewmembers have approach charts and airport diagrams viewable during those respective operations. For the purposes of this section, critical phases of flight include all ground operations involving taxi, takeoff and landing, and all other flight operations conducted below 10,000 ft except cruise flight. Note: taxi is defined as “movement of an aircraft under its own power on the surface of an airport

2.5.2. **Class 2** "Portable"

These EFBs are portable, COTS devices that are part of a pilot’s flight kit. Class 2 EFBs are typically mounted to a permanently installed mounting device and may be connected to a data source (wired or wireless), hardwired power source, or an installed antenna. A permanently installed mounting device requires an installation approval (STC). Yoke mounting of an EFB is not recommended and all of the yoke mounting components (e.g., mounts, brackets, clips, etc.) for the EFB must be incorporated into the aircraft type design. To be considered portable, tools must not be required to remove a Class 2 EFB from the permanently installed mount in the flight deck. Class 2 EFBs that have Type B software applications for aeronautical charts, approach charts, or ECL must be secured and viewable during critical phases of flight, and must not interfere with flight control movement. This requirement does not preclude a flightcrew member from temporarily removing the EFB from its secured and viewable location to aid in complying with operational requirements or to review other authorized Type B software applications (e.g., pilot temporarily holding the Class 2 EFB to perform quick reference handbook (QRH)

operational tasks). Any EFB hardware not accessible by flightcrew and not considered portable must have an installation approval.

NOTE: Normally, portable EFBs are limited to hosting Type A and B software applications or Technical Standard Order (TSO) functions limited to a minor failure effect classification. However, Type C software associated with the provision of own-ship position on airport moving map displays (AMMDs) may be hosted on Class 2 portable EFBs or Class 3 installed EFB. See the current edition of AC 20-159 for details.

2.5.3. **Class 3 "Installed".**
These hardware devices are installed with design approval are discussed further in subparagraph 4.3.3. The hosted Type A or B software applications are not subject to CAAI certification on a Class 3 EFB. Type A or Type B software applications must not interfere with aircraft systems or other CAAI approved software applications (Type C) holding design approval by the Aircraft Certification Service (AIR).

3. Reference Material, Forms & Job-Aids

3.1. Reference Material

3.1.1. ANR (Ops.) 6B, 78A(f) 386(b), 539.

3.1.2. AP 1.1.046

3.1.3. FAA Advisory Circular (AC) 120-76

3.1.4. FAA AC 91.21-1, Use of Portable Electronic Devices Aboard Aircraft

3.1.5. FAA AC 20-159, Obtaining Design and Production Approval of Airport Moving Map Display Applications Intended for Electronic Flight Bag Systems

3.2. Forms

3.2.1. F 1.1.046A - EFB Hardware Description Template

3.2.2. F 1.1.046B - Checklist 1 EFB Tabletop Evaluation

3.2.3. F 1.1.046C - Checklist 2 EFB Operational Evaluation

3.2.4. F 1.1.046D – Intentionally left blank

3.2.5. F 1.1.046E - EFB Evaluation Report Information Template

3.2.6. F 1.1.046F - EFB Line Evaluation Checklist

4. Process

4.1. **HARDWARE SPECIFICATIONS.** Class 1 and Class 2 EFBs.
Major components such as motherboards, processors, Random-Access Memory (RAM), video cards, hard drives, power supplies, and connections (modem, wireless, etc.) must be configuration controlled. Any change to these components will require the EFB to be re-evaluated to demonstrate that the EFB still meets its intended function, non-interference, and

reliability requirements. Figure 1, Hardware Description Template, is a template that has been provided to facilitate the documentation of these components.

4.1.1. **Display.**

The following display requirements are specified when a Type B application is available on an EFB during certain critical phases of flight (e.g., taxi, takeoff, approach, and landing).

4.1.1.1 Legibility.

The screen size and resolution must be proven to display information in a comparable manner to the aeronautical charts and data it is intended to replace. The screen must display an approach chart in an acceptable aeronautical chart format similar to a published paper approach chart. The screen must be large enough to show an entire instrument approach procedure chart at once, with the equivalent degree of legibility and clarity as a paper chart. This requirement is not meant to preclude panning and zooming features, but is intended to prevent a workload increase during the approach phase of flight. Alternate representations of approach charts will need to be evaluated and approved by the FSB process for functionality and human factors.

4.1.1.2 Brightness.

The display must be proven to be readable in all anticipated lighting conditions by each pilot/crewmember and in each aircraft in which it is to be used. The display must have a dimming capability that would prevent the EFB from being a distraction or impairment to night vision in a night flight deck environment. The display must also be demonstrated to be readable on the flight deck in direct sunlight. Display brightness must be equally adjustable whether the EFB is operating on battery or aircraft power. Users should be able to adjust the screen brightness of an EFB independently of the brightness of other displays on the flight deck. When automatic brightness adjustment is incorporated, it should operate independently for each EFB on the flight deck. Buttons and labels should be adequately illuminated for night use. All controls must be properly labeled for their intended function.

4.1.1.3 Viewing Angle.

The display must be viewable from an offset angle to preclude difficulty in positioning the EFB on the aircraft flight deck. When screen protectors are used, they must be maintained and be proven not to impede viewing of the screen. (See FAA AC 120-76, for additional information on viewing angle.)

4.1.1.4 Stylus.

For a stylus screen, there must be an easily accessible stowage

position for the stylus and an accessible spare stylus (or substitute stylus) must be available.

4.1.1.5 Digitizer Pen.

When a digitizer pen is used to operate the EFB, the digitizer pen must have an easily accessible stowage position and be tethered. A spare digitizer must be immediately available and adjusted for use on each EFB.

4.1.1.6 Touch-screen.

If a touch-screen is used it must be evaluated for ease of operation. The touch-screen must be responsive and not require multiple attempts to make a selection, but not be so sensitive that erroneous selections occur.

4.1.2. **Rapid Decompression (RD) Testing.**

RD testing is required to determine an EFB's functional capability when Type B software applications are used in pressurized aircraft where no alternate procedures or paper backup are available. RD testing is not required when only Type A applications are used on the EFB. The information from the RD test is used to establish the procedural requirements for the use of that EFB in a pressurized aircraft. RD testing should follow the guidelines in Radio Technical Commission for Aeronautics (RTCA) Document (DO)-160, Environmental Conditions and Test Procedures for Airborne Equipment, for RD testing up to the maximum operating altitude of the aircraft in which the EFB is to be used. It is the operator's responsibility to provide the PI with documented results of the RD testing.

Note: RD testing must be accomplished on at least one representative sample of each make and model of hardware device used as an EFB. Representative testing is an appropriate level of testing for modern solid state devices. The testing of operational EFBs should be avoided when possible to preclude the infliction of unknown damage to the unit during testing

4.1.2.1 Pressurized Aircraft.

Rapid decompression testing for Class 1 and/or 2 EFBs must be conducted when Type B applications are used in lieu of paper-based aeronautical charts in pressurized aircraft in flight. When a Class 1 or 2 EFB is turned *on* and operates reliably during the RD test, no mitigating procedures need to be developed beyond redundancy. When a Class 1 or 2 EFB is turned *off* during the RD test and is fully functional following the RD, then procedures must be in place to ensure one of the two EFBs on board the aircraft remains *off* or

configured so no damage will be incurred should an RD occur in flight above 10,000 feet mean sea level (MSL).

4.1.2.2 Unpressurized Aircraft.

RD testing is not required for a Class 1 or 2 EFB used in an unpressurized aircraft. The EFB must be demonstrated to reliably operate up to the maximum operating altitude of the aircraft. If EFB operation at maximum operating altitude is not attainable, procedures must be established to preclude operation of the EFB above the maximum demonstrated EFB operation altitude while still maintaining availability of required aeronautical information.

4.1.3. **Electromagnetic Interference/Non-Interference Testing.**

It is the user's/operator's responsibility to determine that the operation of a portable electronic device (PED) will not interfere, in any way, with the operation of aircraft equipment. The current edition of FAA AC 91.21-1, Use of Portable Electronic Devices Aboard Aircraft, addresses non-interference testing for non-critical phases of flight only and is not adequate when Type B applications are used for all phases of flight. FAA AC 91.21-1 and the additional guidance for non-interference contained in this order are required for Class 1 and 2 EFBs.

4.1.3.1 PEDs.

In order to operate a PED in other than a non-critical phase of flight, the user/operator is responsible for ensuring that the PED will not interfere in any way with the operation of aircraft equipment. The following methods are applicable to Class 1 and 2 EFBs with Type B applications required for use during all phases of flight. Either Method 1 or Method 2 may be used for non-interference testing.

4.1.3.1.1. Method 1 for compliance with PED non-interference testing for all phases of flight is completed in the 2 following steps.

- Step 1 is to conduct an electromagnetic interference (EMI) test in accordance with RTCA/DO-160, section 21, paragraph M. This Step 1 test can be conducted for an EFB user/operator by an EFB vendor or other source. The results of the RTCA/DO-160 EMI test must be evaluated to determine an adequate margin exists between the EMI emitted by the PED and the interference susceptibility threshold of aircraft equipment. If Step 1 testing determines adequate margins exist for all interference, both "front door" and "back door" susceptibility, then method 1 is complete. If Step 1 testing identifies inadequate margins for interference, either "front door" or "back door" susceptibility, then Step 2 testing must be completed; and

- Step 2 testing is specific to each aircraft model in which the PED will be operated, but testing only the specific equipment and/or equipment operation. Step 2 testing must be conducted in an actual aircraft and may be credited to similarly equipped aircraft of the same make/model as tested. Step 2 testing must show that no interference of aircraft equipment occurs from the operation of the PED.

4.1.3.1.2. Method 2 for compliance with PED non-interference testing for all phases of flight is a complete test in each aircraft using an industry standard checklist. This industry standard checklist must be of the extent normally considered acceptable for non-interference testing of a PED in an aircraft for all phases of flight. Testing for a particular aircraft make/model may be credited to other similarly equipped aircraft of the same make/model.

4.1.3.2 Transmitting Portable Electronic Devices (T-PED).

In order to operate a T-PED in other than a non-critical phase of flight, the user/operator is responsible to ensure the T-PED will not interfere with the operation of the aircraft equipment in any way. The following method is applicable to all Class 1 or 2 EFBs with Type B applications required for use during all phases of flight. Non-interference testing for T-PEDs consists of two separate test requirements.

4.1.3.2.1. Test Requirement 1.

Each T-PED must have a frequency assessment based on the frequency and power output of the T-PED. This frequency assessment must consider Federal Communications Commission (FCC) frequency standards and be in accordance with applicable processes set forth in RTCA/DO-294B, Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDs) on Aircraft. This frequency assessment must confirm that no interference of aircraft or ground equipment will occur as a result of intentional transmissions from these devices.

4.1.3.2.2. Test Requirement 2.

Once a frequency assessment determines there will be no interference from the T-PED's intentional transmissions, each T-PED must then be tested while operating using either Method 1 or Method 2 for basic non-interference testing requirements described above. This basic non-interference testing is applicable to both a T-PED that is integrated into an EFB and a T-PED that is remote to an EFB. When a T-PED is integrated into an EFB, the basic non-interference testing must be completed both with and without the T-PED function

being operative. If a T-PED is located remote from the EFB, the T-PED basic non-interference testing is independent from the EFB non-interference testing. T-PED position is very critical to T-PED non-interference testing, therefore the operating/testing locations of a T-PED must be clearly defined and adhered to in T-PED operating procedures.

4.1.4. **Antennas**.

4.1.4.1 Satellite Weather Antennas.

A satellite weather antenna may be built into a Class 1 or 2 EFB or external to the EFB. A portable satellite antenna is considered ancillary PED equipment and must be included in EFB evaluation and testing. Installed antennas for satellite weather may be used to provide signal reception for EFB intended functions. When a satellite receiver is installed separate from the portable EFB, it must meet appropriate installation requirements.

4.1.4.2 Global Positioning System (GPS) Antennas.

A GPS antenna may be built into a Class 1 or 2 EFB or external to an EFB. A portable GPS antenna is considered ancillary PED equipment and must be included in EFB evaluation and testing. An installed GPS antenna may be used to provide signal reception to an EFB and must support the intended function of the EFB.

- GPS data may be used for map centering when en route charts are displayed on an EFB. Map centering may be used as an en route chart feature only and may not be used when an approach chart is displayed;
- “Own-ship position” may never be displayed on a Class 1 or 2 EFB in flight; and
- A GPS installation in compliance with FAA AC 20-159 is required for the depiction of own-ship position on an airport moving map display.

NOTE: If a portable GPS is used to provide position information to an EFB, the portable GPS is subject to the same requirements as the EFB. The EFB must demonstrate its intended functions with the GPS both enabled and disabled. In addition, the EFB must be non-interference tested with the portable GPS attached and operative, as well as with the portable GPS not attached (unless the EFB is considered inoperative without the portable GPS). Class 1 or 2 EFBs may use position information from a portable GPS only for en route map centering or page-turning, but must not display own-ship position on the EFB. (Exception: See AC 20-159 for use of own-ship position on an AMMD.)

4.1.5. **Power Sources.**

4.1.5.1 Battery Primary.

For Class 1 or 2 EFB s where the primary power source is a battery, useful battery life must be established and documented for the EFB. When procedures are not established for aircraft power to provide battery recharging during flight operations, at least one fully charged spare battery must be provided for each EFB that is providing a paperless source of aeronautical information pertinent to flight. When EFB battery charging is not possible in the aircraft, additional fully charged EFB batteries must be available to ensure operational performance for the planned duration of the flight, plus one hour.

4.1.5.2 Battery Maintenance.

EFB battery maintenance needs to be addressed as either a maintenance or operating procedure to ensure battery life, change intervals, and safety. EFB batteries, including those carried as spares, must be maintained in an appropriate state of charge. Batteries must be replaced at the EFB manufacturer's recommended interval.

4.1.5.2.1. **Lithium Battery Capacity.** EFBs employing rechargeable lithium batteries are more vulnerable to overcharging and over-discharging, which can result in overheating, thermal runaway, and eventually fire. In support of safe aircraft operations, rechargeable lithium batteries should never exceed 300 watt-hours (Wh) in a portable (Class 1 or Class 2) EFB or battery backup device. This 300Wh limit is the maximum capacity allowed per battery by Department of Transportation (DOT) regulations for carriage in air travel found in Title 49 of the Code of Federal Regulations (49 CFR) part 175, § 175.10. Most rechargeable lithium batteries marketed to consumers are well below 100Wh, which is generally sufficient for most operational uses. To calculate the number of watt-hours a battery provides, divide the milliamp hours (mAh) by 1000 and multiply the amount of voltage (V) (e.g., 5400mAh/1000 x 11.1V = 60Wh). If unsure of the watt-hour rating of a battery, contact the manufacturer.

4.1.5.3 **Lithium Battery Testing.** The aircraft operator must have documented evidence of required testing for portable (Class 1 or Class 2) EFBs utilizing lithium batteries, as well as procedures for their maintenance, storage, and functional checks. These procedures should meet or exceed Original Equipment Manufacturer (OEM) recommendations. Procedures must address battery lifespan, proper storage, handling, and safety. There should be methods to ensure the rechargeable lithium type batteries are sufficiently charged at proper intervals and have periodic functional checks to ensure they do not experience degraded charge retention capability or other

damage due to prolonged storage. Battery lifespan must be addressed to ensure replacement at proper intervals (i.e., specified time period for replacement, battery no longer holds minimum voltage after charge, minimum percentage of charge retention compared to original capacity, etc.) per the OEM's recommendations. Procedures should include precautions to prevent mishandling of the battery, which could cause a short circuit or other unintentional exposure or damage that could result in personal injury or property damage. All replacements for rechargeable lithium batteries must be sourced from the OEM and repairs must not be made. It is the aircraft operator's responsibility to provide the PI with documentation concerning lithium battery testing compliance, purchase documents linked to each battery to demonstrate battery life compliance, and documented lithium battery maintenance, storage, and functional check procedures that meet or exceed the OEM recommendations (refer to the current edition of AC 120-76 for additional information on lithium battery safety, testing standards, maintenance, storage, and functional checks).Aircraft Power Secondary.

Where the EFB primary power source is a battery, procedures may be established to use aircraft power for battery recharging during flight operations. In this case, aircraft power is secondary and not considered essential to EFB operation because the EFB will operate without aircraft power.

4.1.5.4 Aircraft Power Primary (Class 2 Only).

When an EFB uses aircraft power as the primary power source, design approval is required for this connection and power source by TC, amended TC or STC. This type of EFB power source will normally be hardwired to the EFB mounting device or directly to aircraft power source through a connector.

4.1.6. **Data Connectivity (Class 2 Only).**

EFB data connections to aircraft data sources require design approval by TC, amended TC, or STC to ensure the aircraft systems are protected from any EFB failure modes. These data connections should be "read only," except for non-essential Airline Administrative Communications (AAC) or Airline Operational Communications (AOC) systems. Data connection from the aircraft navigation system may not be used to display own-ship position on a Class 1 or 2 EFB in flight. Aircraft navigation system source data may be used for AMMD position on taxi diagrams in accordance with AC 20-159.

4.1.7. **Data Loading/Database Changes.**

Class 1 or 2 EFBs must have a reliable means for revising the EFB databases. Database currency is determined by what required aeronautical information the EFB is replacing. Each method of data

revision must ensure integrity of the data being loaded and not negatively impact the reliability of EFB operation. Procedures must exist to protect the EFB from corruption, especially when internet and/or wireless means are used. Database revision must not include application software or operating system changes. Application software and/or operating system program changes must be controlled and tested prior to use in flight. Database and/or application software changes may not be performed during operations (taxi, takeoff, in-flight, landing).

NOTE: External drives for data loading are considered ancillary EFB equipment and not subject to specific requirements beyond those identified for data loading/database revision above.

4.1.8. **Mounting Devices (Class 2 Only).**

The EFB, when attached to its appropriately designed mounting device, must be evaluated to ensure operational suitability in all ground and flight operations and conditions. When attached to its mounting device, the EFB must not interfere with flightcrew duties and must be easily and safely stowed when not in use. In addition, the attached EFB must not obstruct flightcrew primary and secondary fields of view, nor impede safe egress. (See FAA AC 120-76.)

4.2. **EFB SOFTWARE SPECIFICATIONS.**

Figure 2, Flowchart for Determining EFB Software Application Type, is provided to aid in the determination of the EFB software application type.

4.2.1.1 **Type A.**

Type A software applications are those paper replacement software applications primarily intended for use on the ground or during noncritical phases of flight when pilot/crewmember workload is reduced. Type A software applications are considered to have a failure condition classified as *"minor"* or *"no safety effect"* for all phases of flight. In the current edition of AC 120-76, Appendix 1 lists examples of Type A software applications Type A software applications for Weight and Balance (W&B) present existing information found in the applicable AFM or POH. Type A W&B software applications may accomplish basic mathematics but must not use algorithms to calculate results. Type A W&B software applications must retrieve and apply existing published information.

4.2.1.2 Type A software applications for aircraft performance present existing information found in the applicable AFM or POH. Type A software applications for performance may retrieve and apply existing published information. Type A performance software applications must not use algorithms to calculate results.

4.2.2. **Type B.**

Type B software applications are those paper replacement software applications primarily intended for use during critical phases of flight or have software applications and/or algorithms that must be tested for accuracy and reliability. Type B software applications are considered to have a failure condition classified as *"minor"* or *"no safety effect"*, and only as an aid to situational awareness (e.g., not appropriate for surface navigation, surface alerting, time-based operations, guidance, maneuvering, and control functions, etc.). The current edition of AC 120-76, Appendix 2, lists examples of Type B software applications.

4.2.2.1 Type B aeronautical chart software applications display aeronautical charts in electronic format. These software applications must be available for use during all phases of flight. These software

applications do not require paper printing of aeronautical charts and the viewable electronic format allows chart manipulation.

4.2.2.2 Type B ECL software applications provide cockpit checklists in compliance with regulatory requirements. These software applications must be available for use during all phases of flight. ECL (systems) must be tested for flight operations suitability and must not adversely impact pilot/crewmember workload.

4.2.2.3 Type B W&B software applications use algorithms or approved data to calculate W&B results. Type B W&B software applications are produced for a specific aircraft and, therefore, must be tested and proven accurate by the applicant.

4.2.2.4 Type B aircraft performance software applications use algorithms or approved data to calculate performance results. Type B aircraft performance software applications are produced for a specific aircraft and, therefore, must be tested and proven accurate by the applicant.

4.2.3. **Type C.**

Type C software applications are approved software for airborne and surface functions with a failure condition categorized as *"major", "hazardous"* or *"catastrophic".* These are "non-EFB" software applications found in avionics and include intended functions for communications, navigation, and surveillance requiring FAA design, production, and installation approval. Type C software applications for airborne and surface functions with a failure condition classification of *"major"* or higher, must be installed on equipment as part of aircraft type design by TC, amended TC, or STC. Type C software applications receiving a TSOA with a failure condition categorized as *"minor"* or *"no safety effect"* may be authorized for use on a Class 2 portable EFB or Class 3 installed EFB without an FAA installation approval for the software (refer to the current edition of AC 20-159 for AMMD software applications and installation eligibility guidance).

4.3. **OPERATIONAL SUITABILITY REQUIREMENTS.**

The user/operator is responsible for ensuring that a Class 1 or 2 EFB along with Type A and B applications will reliably perform its intended function while not interfering with other aircraft equipment or operations.

4.3.1. **Application Documentation.**

The user/operator must present application documentation to the PI demonstrating that the EFB meets its intended function. The attached flow charts illustrated in Figures 1 and 2 will assist the user/operator with the identification and documentation of EFBs. Determining the operational suitability of a particular EFB is the responsibility of the

user/operator and may be subject to specific guidelines from the applicable AEG reports.

4.3.1.1 When an operator has completed the evaluation of a Class 1 or 2 EFB, the operator must submit an application requesting authorization to use the EFB. The PI will review the application submitted by the operator and authorize/not authorize the use of the EFB based on the findings of the PI Review Checklist 3, illustrated in F 1.1.046B, EFB Review Checklist.

4.3.1.2 When a new aircraft model is added to an existing EFB authorization, the suitability of the EFB for that aircraft must be addressed as part of aircraft conformity using this evaluation process. When a new EFB is added to an existing EFB authorization, the suitability of the new EFB must be addressed using this same evaluation process.

4.3.2. **Operational Evaluation of Class 1 or 2 Hardware/Type A or B Software.**

The user/operator must evaluate the EFB for suitability of intended functions in each aircraft model.

4.3.2.1 The user/operator must use the checklist as illustrated in F 1.1.046C, Checklist 1- Tabletop EFB Evaluation, to evaluate the operational suitability of the proposed EFB intended functions and aircraft model suitability. The intended functions of software applications must be appropriate to the individual aircraft make and model.

- Electronic Documents,
- Electronic Checklist Software,
- W&B Software,
- Performance Software,
- Electronic Aeronautical Chart Software, and
- Weather Information.

4.3.2.2 The user/operator should use the checklist shown in F 1.1.046D, Checklist 2- EFB Operational Evaluation, to develop a flight scenario for final EFB testing when initial EFB use is being evaluated. Operators requesting initial EFB authorization must include their PI in the flight/simulator evaluation of an initial EFB implementation. Operational evaluations for subsequent additions of EFBs or aircraft models need not conduct flight/simulator evaluations provided intended functions remain substantively the same as previously evaluated EFBs.

4.3.3. **Operational Suitability of Class 3 Hardware/Type C Software.**
Class 3 hardware and/or Type C software applications are evaluated by the AEG in conjunction with a TC, amended TC, or STC certification process. The AEG determines operational suitability and pilot training, checking, and currency requirements. The AEG determination of suitability for Class 3 EFB hardware may be referenced in the FSB report (FSB reports are found at opspecs.com) for the particular model aircraft or other AEG report of operational suitability. If Class 3 EFB hardware is not addressed in an AEG report, the FSB chairman for that aircraft should be contacted to determine if the AEG has completed an operational suitability evaluation. Class 3 EFB and Type C software application authorization is subject to existing operator requirements for certified equipment. The operator must address the development of procedures and training associated with EFBs prior to receiving authorization to use each Class 3 EFB and Type C software application.

4.4. **EFB PROCEDURES.**
The operator's operations and maintenance procedures must be specific to each EFB and the operations conducted. The operator's manual must identify each model of EFB authorized and each model of aircraft.

4.4.1. **EFB Configuration Control.**
Standard EFB configuration control must be established and base lined (i.e., initial hardware and software version at time of application) along with procedures to ensure the EFB configuration control is maintained during system updates/revisions. Class 1 or 2 EFB configuration affects usability and battery life through setup of suspend/sleep modes. All classes of EFBs must have established standard operating procedures (SOP) to ensure reliable use of hardware and software. Procedures must be established for EFB database revision. This should include verification of continued intended function prior to use in flight operations following an EFB database revision.

NOTE: Software updates, especially in the EFB operating system, must have extensive test procedures prior to use in flight operations. Software revision procedures must be comprehensive to ensure continued reliability of the EFB and verification of reliable intended function.

4.4.2. **Normal and Abnormal Operating Procedures.**
4.4.2.1 Normal procedures for flight operations must be developed for all flight operations with EFBs. Preflight must address battery charging, EFB database revision and data currency, EFB configuration control, and SOP for EFB setup. In-flight procedures

must include standard application operating procedures, and EFB standard flight operating procedures for use.

4.4.2.2 Abnormal procedures must be established to address likely EFB function failures. Procedures for single and dual EFB failure must be established.

4.4.2.3 Class 1 or 2 EFB operating procedures and limitations must be established if the EFB being used has not demonstrated rapid decompression testing while *on* and operating. (See paragraph 14, subparagraph B.)

4.4.2.4 Checklists must be established or revised to include normal and abnormal EFB procedures to be used by pilots in flight. This may be accomplished by amending checklists when approved operator customized cockpit checklists are used or by creating an EFB checklist supplement when aircraft manufacturer cockpit checklists are used.

4.4.3. **Minimum Equipment List (MEL).**
When MEL relief is requested, the MEL must be amended in compliance with the aircraft's Master Minimum Equipment List (MMEL). An inoperative Class 1 EFB may be removed from the aircraft without MEL relief being utilized, provided redundancy is maintained, or paper backups for all Type B applications are available.

4.4.4. **Maintenance.** Regular maintenance procedures are required for Class 1 and 2 EFBs including measures to ensure the continued readability of the viewing screen. EFB battery maintenance needs to be addressed to ensure battery life, change intervals, and safety. Class 3 EFB maintenance must comply with the aircraft instructions for continued airworthiness (ICA).

4.4.5. **Risk Mitigation.** Procedures must be established for a transition to paperless authorization. Initial procedures establish an independent backup during the EFB validation period. Procedures must be established for continuous reporting of problems with EFBs. There must be procedures in place for the user/operator to review these reports periodically to mitigate potential unreliability issues and correct operating procedures where necessary. Procedures must be established to notify flightcrews of EFB problems or use issues. (For more information on Risk Mitigation see Volume 10, Chapter 1.)

NOTE: When certain Type B applications (e.g., approach charts, aeronautical charts, electronic checklists, and flight manuals) are utilized on Class 1 or 2 EFBs to replace aeronautical charts or data required by regulation, risk mitigation is required per FAA AC 120-76. Such mitigation methods may be satisfied by use of multiple EFB hardware and software

or backup paper aeronautical charts and data. Redundancy in the form of traditional paper aeronautical charts or data, a second EFB, or other procedural means may satisfy acceptable risk. When determining the need for redundancy, take into consideration that no single failure or common mode error can cause the loss of required aeronautical information or data. The need for redundancy should also consider independent power sources or battery backup for the EFB. (See FAA AC 120-76, paragraph 9, Risk Mitigation for EFB Systems).

4.4.6. **Training.**

The operator must develop EFB training for all personnel involved with EFB use, database servicing, and maintenance. EFB training must comply with training identified in FAA AC 120-76 and be CAAI-approved where applicable.

4.5. **AIRWORTHINESS REQUIREMENTS.**

This paragraph outlines the airworthiness and return to service requirements for installed components or provisions of Class 1 or 2 EFBs. These airworthiness requirements are applicable to all installed provisions capable of supporting EFB functions at flightcrew stations, regardless of any other stated intended function. The installer remains responsible to ensure all certification and airworthiness requirements are met for each installation. For provisional installations, each installer remains responsible for compliance with EFB airworthiness requirements and each operator is responsible for EFB operational use requirements of the installed provisions capability. All Class 3 EFB installations require certification under TC, amended TC, or STC, prior to installation.

4.5.1. **EFB Power Source.**

4.5.1.1 **Battery Primary Power Source.** This is defined utilizing an EFB battery only or aircraft power being used to recharge the EFB battery during flight operation, but the EFB battery remains the primary EFB power supply. Airworthiness criteria for Class 1 or Class 2 EFB aircraft power sources are accomplished in accordance with existing airworthiness requirements for PED outlets installation. Such outlets, if installed, must be labeled to enable use of the EFB by identifying the electrical characteristics (e.g., 28 volts direct current (VDC), 115 volts alternating current (VAC), 60 or 400 hertz (Hz), etc.) in order to address equipment sensitivity to voltage, current, or frequency parameters and to provide awareness to the flightcrew or maintenance personnel, reducing the likelihood of connecting incompatible devices to the power port (refer to the current edition of AC 20-173 for additional guidance).

NOTE: Special consideration must be given to the type of electrical power provided for the recharging of lithium ion batteries. Lithium ion batteries pose a safety hazard if overcharged or excessively discharged. Operators should have lithium ion battery charging procedures which are in total accordance with the battery manufacturer's charging instructions and prevent aggravation of lithium ion battery thermal hazards(refer to the current edition of AC 120-76 for guidance on lithium battery authorization)

4.5.1.2 **Aircraft Power Primary EFB Power Source (Class 2 EFB Only).** This is aircraft power used as the primary EFB power supply

and requires the power supply to be hardwired or connected with certified connectors to ensure reliability. This is an EFB that continuously depends on connection to aircraft power to perform its intended function (no sustaining battery power). The aircraft power for Class 2 EFB power supplies must be designed to remain available, at an acceptable level for required flight information, in the event of aircraft electrical malfunctions. Class 2 EFB power supplies require installation approval addressing applicable airworthiness regulations (refer to the current edition of AC 20-173 for additional information), and the power port must be appropriately labeled to enable use of the EFB by identifying the electrical characteristics (e.g., 28 VDC, 115 VAC, 60 or 400 Hz, etc.) in order to address equipment sensitivity to voltage, current, or frequency parameters and to provide awareness to the flightcrew or maintenance personnel to reduce the likelihood of connecting incompatible devices to the power port.

4.5.2. **EFB Data Connectivity.**

This read-only data is provided to an EFB from the aircraft's systems (e.g., flight management system, GPS, air data, fuel system, etc.) through a certified ARINC 429, RS-232, RS-485, or other compatible interfaces or certified router. EFB data connectivity does not include raw antenna reception data from an installed antenna going directly to the EFB. EFB data connectivity must include isolation to preclude the EFB from interfering with any aircraft system and all associated wiring must be protected from damage and secured. EFB data connectivity requires design approval. Such design approval must be accomplished under TC, amended TC, or STC by AIR and excludes the installation from eligibility for field approval.

NOTE: Data converters (e.g., ARINC 429 to RS-232, etc.) that are capable of supporting EFB functions at flightcrew stations must have design approval issued by the CAAI.

4.5.3. **EFB Mounting Devices.**

4.5.3.1 Yoke-Mounted EFBs must be certificated by a design approval by AIR under TC, amended TC, or STC. All the structural and dynamic, as well as wiring protection and security requirements affecting the flight controls, (including autopilot (AP), stall warning, stick pusher, crashworthiness, human factors, etc.), must be addressed prior to installation. Field approval or Designated Engineering Representative (DER) approval without a design approval from AIR by TC, amended TC, or STC, is not permitted for Yoke-Mounted EFBs.

4.5.3.2 Cockpit Mounted EFB is a Class 2 EFB mounted in the cockpit other than on the control yoke. The EFB mounting device requires

airworthiness approval by AIR. CAAI policy excludes this installation from eligibility for field approval.

4.5.4. **Installed Antennas.**

Installed antennas are those antennas permanently installed in the aircraft. Portable antennas attached to a portable EFB, but not attached to the aircraft, are not subject to these airworthiness requirements. Portable antennas and temporary antenna holders, like suction cups, are subject to EFB evaluation requirements only. Installation of antennas capable of supporting EFB functions at flightcrew stations must be accomplished using existing guidance for antenna airworthiness considerations.

4.5.4.1 Antennas combining reception for both aircraft navigation and EFB must be TSO approved for this intended function providing isolation to preclude the EFB from interfering with antenna reception for aircraft navigation.

4.5.4.2 TSO or STC approved antennas may be used to independently provide GPS and/or satellite weather for an EFB in accordance with existing installation airworthiness requirements.

4.5.4.3 Portable EFB-only antennas without a TSO may be used to provide a GPS or satellite weather signal for EFB-only use. Non-interference testing by the installer is required.

4.5.5. **Installed Satellite Receivers (e.g., WX Worx, XM Weather, WSI In Flight).**

If any component of a weather receiver is installed in an aircraft separate from a portable EFB on the flight deck, it is subject to avionics installation requirements and may not be considered a PED. If the result of the received weather data is capable of being displayed on an EFB, the individual components of the weather receiver system cannot be installed as STC provisions only because the installation cannot meet regulatory requirements for testing of non-interference without performing its intended function. The weather receiver must be non-interference tested with the intended EFB installed and operative even though the installation only applies to the weather receiver. The airworthiness for the weather receiver installation is independent of EFB/PED suitability responsibility of the user/operator. The user/operator is responsible for EFB non-interference as a PED and the installer is responsible for non-interference for the weather receiver as part of installation requirements. This installation requires design approval under TC, amended TC, or STC which excludes the installation from eligibility for field approval.

4.6. **AUTHORIZATION PROCESSES.**

4.6.1. **General.** The operator is responsible to ensure all operational requirements are met for an EFB. The operator must submit documentation demonstrating compliance with all operational requirements for EFB's to their PI. The CAAI evaluation process for an EFB follows the general process for approval and acceptance as described in 1.1.030 The General Process for Approval or Acceptance.

4.6.2. **Phase One, Initiation.**
Phase one of the process begins when the operator requests authorization to use the EFB from the CAAI. During this phase, the CAAI and the operator reach a common understanding of the role of the CAAI and what documents and actions the operator is responsible for during each phase of the authorization process.

4.6.3. **Phase Two, Required Application Information.**
Phase two begins when the operator submits a formal EFB plan to the PI for evaluation. The plan is reviewed for completeness and the PI facilitates coordination with other inspectors and CAAI offices, as necessary. During phase two, the PI may coordinate with the appropriate AEG for guidance on EFBs having functions not addressed in this guidance. Once the plan is accepted, the operator follows that plan to produce a complete EFB program. The operator must submit the following information in the application package:

- EFB hardware and application specification (Figures 1 and F 1.1.046F, Evaluation Report Information Template),
- EFB operator procedures/manual revisions,
- EFB cockpit procedures checklists,
- EFB training program,
- EFB evaluation report (F 1.1.036F),
- Rapid decompression test data (when required),
- Completed non-interference test results, and
- Airworthiness documents for Class 2 equipment (mounting device, aircraft data connection, aircraft power primary, remote antenna).

4.6.4. **Phase Three, PI Review.**
The PI must use the checklist found in F 1.1.046A, to conduct a review of the application submitted by an operator. All PI specialties should coordinate the review of an operator's EFB program. The PI should participate in the simulator evaluation or flight evaluation of an EFB when a user/operator is requesting initial EFB authorization. Additional simulator/flight evaluations are not required for adding a new EFB to an existing authorization unless there is a substantial change in EFB intended functions. When a new aircraft is added to a

certificate with existing EFB authorization, the suitability of the EFB for that aircraft must be addressed as part of aircraft conformity and configuration control process. Inspectors should examine the technical content and quality of the proposed EFB program and other supporting documents and procedures. The user/operator's program for EFB management is critical to EFB reliability and must be well documented for EFB users.

4.6.5. **Phase Four, Interim Authorization to Use an EFB.**

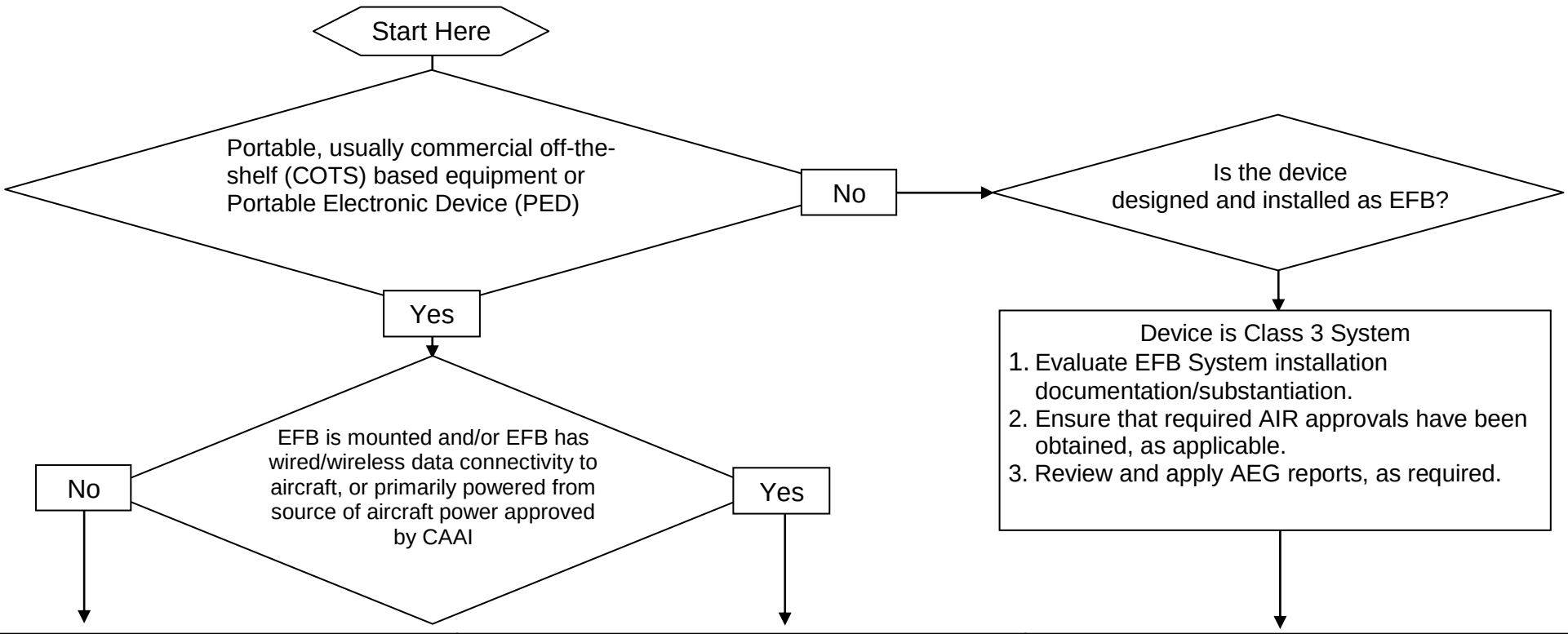
An interim EFB authorization is granted to allow the user/operator to proceed with EFB validation testing. During this validation phase, the operator must maintain a paper backup of all electronic information. The user/operator does not need a formal authorisation issued at this time because a paper backup of all required operating information is required to be available and accessible to the flightcrew during operation. The validation phase begins when the operator formally begins use of the EFB combined with paper backup for an established period of time. Use F 1.1.046F, EFB Line Evaluation Job Aid, for data collection during the validation phase. Validation testing should follow guidelines in FAA AC 120-76.

4.6.5.1 Unacceptable Validation Results. If the PI finds the proposed EFB reliability and/or function to be unacceptable by the conditions of this EFB guidance, the PI should contact the operator for corrective action. EFB deficiencies must be corrected and the EFB function revalidated prior to paperless authorization being issued.

4.6.5.2 Acceptable Validation Results. If the PI finds the proposed EFB reliability and/or function to be acceptable based on validation data then paperless authorization may be issued.

Figure 1 - Flow Chart for Determining EFB Hardware Class

Note: If you wish to print this diagram, A3 size paper must be used.



Class 1 EFB

Note: Ensure that EFB software does not require additional AEG or ACO evaluation.

a. Class 1 EFB Device description and authorization criteria:
(1) May be used on ground and in-flight; and,
(2) May connect to protected, non-essential aircraft power source for purpose of charging internally installed batteries within the Class 1 EFB Device.

b. AIR and AEG Involvement:
NONE, provided mounting fixture is not utilized, there is no connection to aircraft power, and EFB Device is not receiving data from another aircraft system or signal from an installed remote antenna.

c. Operator Requirements:
(1) Develops program for usage;
(2) Completes operational evaluation; and
(3) Demonstrates and documents non-interference compliance to AC 91-21-1 (current edition).

d. PI Involvement:
(1) Device and interface criteria & operator requirements are met;
(2) Data update procedures are in place and followed;
(3) The aircraft power source is qualified and connection is made to assure adequate egress;
(4) Applicable checklists, including human factors evaluation, are completed, as applicable;
(5) Training, checking, and currency programs are approved, as applicable;
(6) Authorisation is issued, as applicable, upon completion of authorization process; and
(7) Class 1 EFB configurations with only Type A software applications do not require entry into aircraft records.

Class 2 EFB

Note: Entry into aircraft records is required to add or remove installed elements.

e. Installation and Operational Approval:
(1) An applicant must obtain approval for the initial alteration for installation of a mounting fixture, power, and/or data connectivity on the basis of type certification (TC) or by issuance Supplemental Type Certification (STC). Follow-on installations must be accomplished using CAAI-approved data;
(2) The manufacturer, provider, or installer must assure testing is accomplished on the Class 2 EFB equipment to ensure interference-free operation. If a data transmitter is used to transmit data to the Class 2 EFB Device it must also be tested to requirements conducted and radiated emissions must be shown to not exceed maximum allowable levels specified in RTCA/DO-160E, section 21, category M; and
(3) An applicant must obtain approval by TC, STC, or by an CAAI DER for installation of antennas that provide sources for navigation, weather, etc.

f. AIR, AEG, and PI Involvement:
(1) AIR upon making satisfactory findings, issues approval of the type design data for the installation of the EFB for inclusion into the TC or it awards STC for alteration to the applicant for airworthiness approval of mounting bracket or fixture, crashworthiness, data connectivity, and power connections;
(2) AEG may evaluate new or novel EFBs and prepare an Operational Suitability Report (OSR); and
(3) PI conducts review and issues authorization for use by.

g. Operator Requirements:
(1) Develops program for usage;
(2) Completes operational evaluation;
(3) Ensures system performs its intended function;
(4) Documents non-interference per AC 91-21-1;
(5) Ensures non-interference with and isolation from aircraft systems during transmission and reception; and,
(6) Determines usage of hardware architectural features, persons, procedures, and equipment to eliminate, reduce, or control risks associated with a hardware failure.

Class 3 EFB

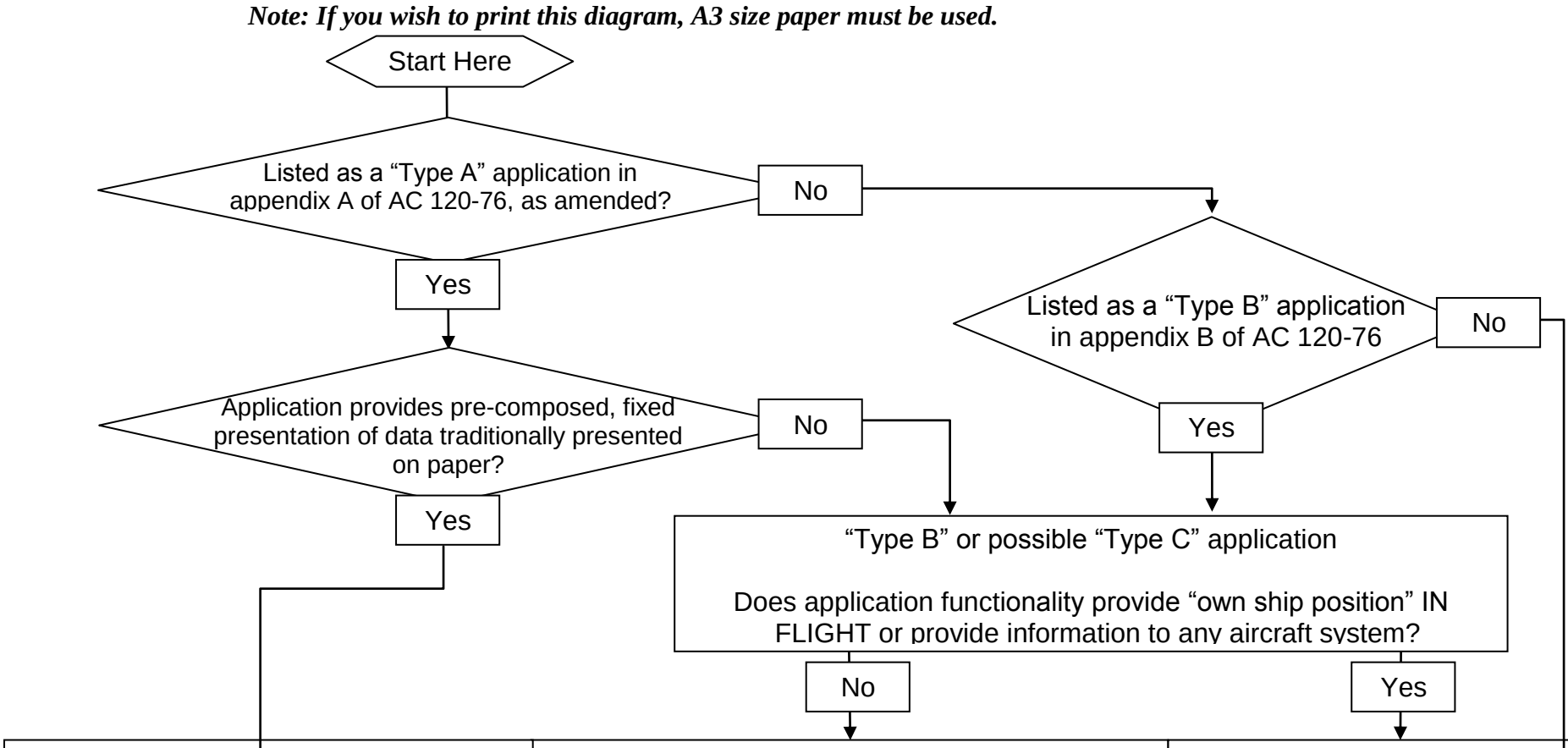
Note: PI and Operator conditions in d. and g. apply.

h. Class 3 System Description and Approval:
An installed processor unit that may contain a database and a permanently mounted or removable display unit that may contain a processor used for control and display of information to the flightcrew is Class 3. If such display is removable by the flightcrew the permanently installed mounting bracket or fixture must be AIR approved. If a removable display unit is used within the system, it must undergo testing comparable to the requirements of a permanently mounted one.
The following steps are qualifiers:
(1) An applicant must obtain approval for the initial alteration for installation of a Class 3 EFB system on the basis of TC or by issuance STC. Follow-on installations must be accomplished using data approved by the CAAI;
(2) The manufacturer, provider, or installer must assure testing is accomplished to ensure interference-free operation of the Class 3 EFB. Conducted and radiated emissions must be shown to not exceed maximum allowable levels specified in RTCA/DO-160E, section 21, category M; and
(3) The manufacturer may be required to obtain CAAI Parts Manufacturer Approval (PMA) for both the processor and the display if intended for installation into an aircraft in which the TC or STC does not cover variations in configurations or if the processor contains performance data specific to the make, model and series of aircraft only for which the original TC or STC applies.

i. AIR, AEG, and PI Involvement:
(1) AIR evaluates and approves the design, including satisfactory completion of tests to assure environmental suitability of the Class 3 EFB system hardware and operating system software;
(2) AIR upon making satisfactory findings, issues to the manufacturer of the Class 3 EFB System; Technical Standard Order Authorization (TSOA) or PMA based upon TC or STC;
(3) AIR upon making satisfactory findings, issues approval of the type design data for the installation of the EFB for inclusion into the TC or it awards STC for alteration to the applicant;
(4) AEG evaluates operations/maintenance suitability; and
(5) PI ensures that FSB report is complied with and issues authorization for use.

Figure 2 - Flowchart for Determining EFB Software Application Type

Note: If you wish to print this diagram, A3 size paper must be used.



Type A

j. Aircraft Certification Service (AIR) and Aircraft Evaluation Group (AEG) Involvement: NONE.

k. Operator Requirements:

(1) Determines usage, architectural features, people, procedures, and equipment to eliminate, reduce, or control risks associated with an identified failure in a system; and

(2) Provides evidence to the PI that:

(a) The EFB operating system and hosted application software meet the criteria for the appropriate intended functions and do not provide false or hazardously misleading information; and

(b) Software revision loading won't corrupt data integrity of original software.

l. PI Involvement:

Verifies that:

(1) Application criteria and operator requirements are met;

(2) Data updates follow maintenance manual and inspection program procedures;

(3) Applicable job aids, including human factors evaluation, are completed;

(4) Training, checking, and currency programs are approved;

(5) Operational evaluation report from operator is appropriately reviewed and

(6) Authorisation is issued upon completion of authorization process, as applicable.

Type B

m. Type "B" Applications:

(1) May be hosted by any device/system class; does not require AIR design approval or AEG evaluation; does not require compliance with RTCA/DO-178B; Operator and PI requirements of note **l.** and **n.** are met; may display pre-composed information such as navigation or approach charts; required flight information should be presented for each applicable phase of flight; pending human factors evaluation, panning, scrolling, zooming, rotating, or other active manipulation is permissible; electronic navigation charts should provide a level of information integrity equivalent to paper charts; ensure application functions (such as display of 'own-ship' position) do not require AIR approval;

(2) Flight Standards (AFS) initial operational authorization granted for hosted performance applications based on AIR recommendations and AEG determination of flightcrew training, checking and currency requirements; and

(3) Hosted interactive Performance/Weight and Balance (W&B) applications procedures should be developed per ANR.OPS requirements. These procedures should define the roles that the flightcrew and dispatch/flight following have in creating, reviewing and using performance calculations supported by EFBs.

(a) Authorization for use is issued, as applicable; and

(b) Weight and Balance Control Procedures, lists EFB as approved method for W&B calculation, as applicable.

n. Operator Requirements: Demonstrates EFB meets operational and certification requirements:

(1) Determines usage, architectural features, people, procedures, and equipment to eliminate, reduce, or control risks associated with an identified failure in a system;

(2) Performs 6 month operational validation per authority granted authorisation, as applicable;

(3) Uses both EFB device/system and conventional paper copies during evaluation period;

(4) Submits final evaluation report to PI, as appropriate, after evaluation;

(5) Operating system and hosted application software meet criteria for appropriate intended functions and do not provide false or hazardously misleading information; and

Type C

o. Type C Applications:

(1) Primary flight displays are examples of Type C applications;

(2) A means for obtaining AIR design approval is a Technical Standard Order Authorization (TSOA), which is a dual CAAI certification design and production approval with a streamlined approval process;

(3) An index of TSO standards is published in the current version of AC 20-110, Index of Aviation Technical Standards Orders; and

(4) The regulatory basis for TSOA is defined in 14 FAR part 21 subpart O.

p. AIR & AEG Involvement:

(1) AIR design approval required, except for user modifiable software, which may be utilized to host Type "A" and "B" applications. No user modifiable application may affect any Type "C" application software. RTCA DO-178B detail user modifiable software applications;

(2) Manipulation of dynamic performance or load data requires AIR review; and

(3) AEG determines operational suitability during certification process.

q. Operator requirements:

(1) Applies for a TSOA for certain Type C application software; and

(2) Follows airworthiness determination for installation and operational approvals.

5. Task Outcomes

5.1. **Phase Five, Authorization to Use an EFB.**

An operator is granted authorization to use an EFB through authorisation of relevant sections in the OM only after acceptable completion of validation testing. Any subsequent change to EFB hardware or intended functions must be validated at a level appropriate to the effect of the change on the EFB program