



**U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION**

Job Aid

Effective Date:
February 14, 2014

SUBJ: Type B Electronic Flight Bag (EFB) Software Application(s) Displaying Own-ship Position Limited to Airport Moving Map for Surface Operations: Aircraft Operator Checklist and FAA Principal Inspector (PI) Job Aid

Purpose and Intended Function: The depiction of an own-ship symbol limited to Airport Moving Map (AMM) for airport surface operations has a failure classification of 'minor' for hazardously misleading information and 'no effect' for loss of function. This may be considered an EFB Type B software application pending evaluation for operational suitability and subsequent issuance of operations specifications (OpSpecs), management specifications (MSpecs) or Letter of Authorization (LOA) A061 as applicable. This aircraft operator checklist and FAA PI Job Aid describes a means to evaluate the suitability and quality of a proposed system configuration intended to provide supplemental positional awareness utilizing an own-ship indication for the airport map on an EFB (see current edition of FAA Order 8900.1 Volume 4, Chapter 15, Section 1: *Electronic Flight Bag Operational Authorization Process*, and FAA Advisory Circular (AC) 120-76, current version: *Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags*, for additional information).

This checklist supports a system comprised of a Type B software application utilizing commercial-off-the-shelf (COTS) portable or EFB "built-in" GPS receivers or position information obtained from an installed GNSS sensor. TSO Authorization for the software application and portable GPS receivers is not required if the conditions of this checklist are met. The successful completion of this checklist demonstrates a level of safety that meets or exceeds requirements appropriate for the intended function, derived from RTCA DO-257, as amended

Note: Aircraft operators are required to comply with all applicable regulations. PIs are required to use the applicable policy and guidance (orders, notices and policy letters), and be familiar with related advisory circular information during the evaluation of an aircraft operator's program or system to determine if the operator meets or exceeds regulatory requirements, including the intent of the regulations. Guidance material may include language that refers to regulations or identifies safety requirements. Guidance material may also describe an acceptable means, but not necessarily the only means, to demonstrate procedures comply with applicable regulations and meet the intended level of safety.

Note: PIs should direct all unresolved questions to their geographic responsible regional specialists and seek additional assistance from the appropriate Flight Standards Service (AFS) Aircraft Evaluation Group (AEG) if necessary. If questions remain unresolved, the regional specialist should seek support from AFS-430 Flight Technology Requirements Branch, AIR-130 Avionic Systems Branch, or AFS-240 New Program Implementation and International Support Branch.

Scope: This aircraft operator checklist and FAA PI job aid is appropriate for a system configuration including the following elements:

Airport maps.

- These checklist requirements are applicable to dynamic or pre-composed airport maps or charts as the geographic basis for an own-ship overlay derived from the GPS source to support the intended function.

Software.

- This checklist aids in the evaluation of software function and map display supporting the intended function.

System Composition.

- Hardware: Hosted on a Class 1, 2, or 3 EFB hardware system as defined by AC 120-76, as amended.
- Software: Type B airport map application as defined by AC 120-76, as amended, and that meets the requirements of AC 120-76, as amended, and this job aid.
- Database: Raster, vector, or dynamically rendered airport maps that meet the requirements of AC 120-76, as amended, and this job aid.
- Own-Ship: Aircraft own-ship position display derived from an installed GNSS sensor, or from a COTS portable GPS receiver, or from a GPS that is built-in to an EFB, that meets the requirements outlined in this job aid.

Outside Scope.

- Airworthiness and certification requirements pertaining to hardware mounting beyond Class 1 "secured and viewable," and airplane system integration is beyond the scope of this Job Aid. Refer to AC 20-173.
- Certification of any installed GNSS sensor, if used as the position source for the software application, and design assurance of a one-way feed of position data from installed GNSS sensors is beyond the scope of this Job Aid.

Instructions: The checklist is designed to engage the operator and the inspector in an active dialog concerning the evaluation of the system configuration.

Operator.

- Each section contains questions and items that you must address during authorization of an EFB including the functionality described in this document. Answer each checklist item. Addition of comments is strongly recommended to describe or clarify how a checklist requirement is met.

Inspector.

- Review the Operator's completed checklist and indicate within the designated inspector areas whether the operator has satisfied the requirements.

Document Structure: This document includes seven sections:

- System Configuration
- Software Performance Specifications
- GPS Receiver Suitability
- Validation of Configuration Function
- Flight Crewmember Training and Operational Procedures
- Wireless Connectivity
- Final Review and Signature

Abbreviations:

AC	Advisory Circular
AMM	Airport Moving Map
AMMD	Airport Moving Map Display
COTS	Commercial Off The Shelf
DOD	Department of Defense
EFB	Electronic Flight Bag
EMD	Electronic Map Display
FCC	Federal Communications Commission

GNSS	Global Navigation Satellite System
GPS	Global Positioning System
ICAO	International Civil Aviation Organization
PED	Portable Electronic Device
RAC	Raster Aeronautical Charts
RTCA	RTCA, Inc. (formerly known as Radio Technical Commission for Aeronautics)
SAE	Society of Automotive Engineers
TCAS	Traffic Collision Avoidance System
T-PED	Transmitting Portable Electronic Device
TSO	Technical Standard Order
WGS	World Geodetic Survey

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1. SYSTEM CONFIGURATION DESCRIPTION

The system configuration is defined as the EFB hardware, Type B EFB software application for the display of own-ship position limited to AMM for surface operations, and/or the charting software application, and the GPS receiver source.

1.1. Hardware & Software

In this section, the operator documents the tested configuration. The configuration should meet the requirements outlined in SCOPE, page 1.

EFB Device Hardware Make/Model:	P/N:
Description:	

EFB Device Operating System (OS):	Version or P/N:
Description:	

Surface own-ship Software Application:	Version:
Description:	

EFB Chart Software/Airport Map Database (if not included above):	Version:
Description:	

1.2. GNSS/GPS Source

COTS or Built-In GPS Make/Model:	P/N:
Description:	

Or Certified GPS Source:	P/N:
Installation Interface Approval:	

Section 1 Inspector Acceptance:

1.	The configuration is within the intended scope of this job aid (see page 1) and AC 120-76B, Change 1, or later version.	<input type="checkbox"/> Yes <input type="checkbox"/> No
2.	The operator has a system or method of ensuring that only an authorized configuration is used and mitigating any equipment variations.	<input type="checkbox"/> Yes <input type="checkbox"/> No

2. SOFTWARE PERFORMANCE SPECIFICATIONS

2.1. RTCA DO-257A Equivalency Requirements

This section lists an applicable excerpt of requirements and recommendations from RTCA DO-257A, Minimum Operational Performance Standards for the Depiction of Navigation Information on Electronic Maps, required to achieve an acceptable level of operational performance from the system configuration. Some DO-257A references have been slightly revised in order to apply to EFB software applications supported by this Job Aid. Any of the requirements listed below that have not been met require further explanation.

DO-257A Reference	Requirement Description	Operator Assessment	Inspector Acceptance
2.1.2	The equipment shall perform its intended function(s) as defined by the manufacturer, and its proper use shall not create a hazard to the aircraft or its occupants.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.5	Controls should be designed to maximize usability, minimize flight crew workload, and reduce pilot errors.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.5.1 (1)	Operations that occur with high frequency or in the terminal area should be executable with a minimum number of control operations.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.5.1 (2)	Controls shall provide feedback when operated. <i>Note: Tactile and visual cues are acceptable forms of feedback. Aural cues may also be acceptable.</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.5.1 (3)	Controls shall be resistant to inadvertent activation.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.5.1 (4)	The use of controls should not cause inadvertent activation of adjacent controls. (Keys should not be spaced so that sequential use is awkward or error prone.)	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.5.1 (5)	Control operation should allow sequential use without unwanted multiple entries.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.5.1 (7)	Activation or use of a control should not require simultaneous use of two or more controls in flight (e.g., pushing two buttons at once).	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.5.1 (8)	If a control can be used for multiple functions, the current function shall be indicated either on the EMD or on the control.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat

2.1.5.1 (9)	<p>Controls should be designed for nighttime usability (e.g., illuminated).</p> <p><i>Note: Control illumination may be achieved by either illuminating the control itself or providing flight deck (external) illumination. This will need to be evaluated on an installation specific basis.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.5.1 (10)	<p>Labels shall be used to identify the functions of all controls used to manipulate information content and operating characteristics of the EMD.</p> <p><i>Note: This requirement applies to standard mechanical controls (e.g., buttons, knobs, etc.)</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.5.2 (1)	<p>Controls that are normally operated by the flight crew shall be readily accessible.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.5.2 (2)	<p>Controls should be organized in logical groups according to function and frequency of use.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.5.2 (3)	<p>Controls most often used together should be located together.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.5.2 (4)	<p>Controls used most frequently should be most accessible.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.5.2 (5)	<p>Dedicated controls should be used for frequently used functions.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.5.2 (6)	<p>Line select function keys should acceptably align with adjacent text. Note: Consideration should be given to providing a skew function to account for different pilot-to-Control Display Unit viewing angles.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.6 (1)	<p>No more than six colors should be used for color-coding on the map display. See SAE ARP4032 and RTCA DO-257A Appendix E for color guidelines.</p> <p><i>Note: Use of additional colors for other purposes should not detract from the discriminability of colors used for coding.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.6 (2)	<p>Color-coded information should be accompanied by another distinguishing characteristic such as shape, location, or text.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat

2.1.6 (3a)	<p>Red shall be used only for indicating a hazard that may require an immediate corrective action.</p> <p><i>Note: Requirements are intended to preclude the excessive use of amber & red on the AMMD. They are not meant to inhibit the use of red and amber for the coding of surface signs, lights, and markings.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.6 (3b)	<p>Amber shall be used only for indicating the possible need for future corrective action.</p> <p><i>Note: Requirements are intended to preclude the excessive use of amber & red on the AMMD. They are not meant to inhibit the use of red and amber for the coding of surface signs, lights, and markings.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.6 (4)	<p>Colors used with RACs should closely approximate the colors depicted on the paper chart.</p> <p><i>Note: 2.1.6 (1), (2) and (3), above, do not apply to the display of RAC data, but do apply to any additional information superimposed onto the RAC.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.9 (2)	<p>Where information on the shared display is inconsistent, the inconsistency shall be obvious or annunciated, and should not contribute to errors in information interpretation.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.9 (3)	<p>Symbols and colors used for one purpose in one information set should not be used for another purpose within another information set.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.1.10 (1)	<p>If the EMD can use multiple position sources, other than multiple GPSs, a means of identifying the active source(s) shall be provided.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.1 (2)	<p>The EMD should provide an indication if the map range is smaller (i.e., “zoomed in” closer) than the level supported by the accuracy and resolution of the data. See RTCA DO-257 Appendix F for discussion of this as it relates to RAC displays.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.1 (3)	<p>The EMD should have a consistent prioritization scheme for layering map data.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.1.1 (1)	<p>The EMD shall display distinctive symbols for different fix types (waypoints, airports, VORs, NDBs, intersections) and the aircraft (own-ship)</p> <p><i>Note: See RTCA DO-297, as amended, Table 2-1, for a list of symbols that make up the minimum required symbol set.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat

2.2.1.1 (2)	Use symbols similar to those shown on published charts or that are consistent with established industry standards. Guidelines for electronic display symbology are provided in SAE ARP5289. Refer also to RTCA DO-257 Appendix H.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.1.1 (3)	All symbols shall be depicted in an upright orientation except for those designed to reflect a particular compass orientation. <i>Note: This requirement does not apply to RAC data because it may not be able to meet this requirement due to the fundamental nature of that data. It does apply to vector data superimposed onto a Raster Chart.</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.1.1 (4)	Symbols indicating a particular compass orientation shall maintain that orientation at all times. An example of this is a runway symbol that maintains an accurate depiction of its direction as the map rotates.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.1.1 (5)	Symbols used for one purpose on published charts should not be used for another purpose on the EMD.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.1.1 (6)	Required symbols shall be discriminable at a viewing distance of 30 inches under a full range of normally expected flight deck illumination conditions.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.1.1 (7)	The own-ship symbol shall be unobstructed. <i>Note: Exceptions may be allowed for multi-function displays depicting higher priority information that are required by regulation that may temporarily obstruct the own-ship symbol.</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.1.1 (8)	If the heading is available, the aircraft/own-ship symbol shall be directional, oriented to heading.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.1.1 (9)	If the EMD supports more than one aircraft symbol directional orientation (e.g., heading and North-up), then the current aircraft symbol orientation shall be indicated.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.1.3 (1)	The EMD should have the capability for manual de-cluttering during operational use. This capability is not required, but operator should be aware if functionality is not available. [Not applicable for pre-composed maps.]	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.1.3 (2)	It should be possible for the pilot to accomplish this de-clutter function with a single action.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat

2.2.1.3 (3)	If additional map information has been selected for display, it should be possible to deselect all displayed additional information as a set.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.1.3 (5)	Additional data on the display (over and above the minimum required data) should be located in a consistent location and should not interfere with the usability of the minimum data (e.g., if a graphic wind indicator is on the display it may be in a designated corner of the display).	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.1.3 (6)	All overlaid data shall be the same map orientation and scale.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.2 (2)	Labels shall be used to identify fixes, other symbols, and other information, depicted on the EMD, where appropriate.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.2 (3)	The spatial relationships between labels and the objects that they reference should be clear, logical, and, where possible, consistent.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.2 (4)	Alphanumeric fonts should be simple and without extraneous details (e.g., sans serif) to facilitate readability.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.2 (6)	Label terminology and abbreviations used for describing control functions and identifying EMD controls should be consistent with RTCA DO-257 Appendix A.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.2 (7)	All labels shall be readable from a viewing distance of 30 inches and under the full range of normally expected flight deck illumination conditions. <i>Note: The size of numbers and letters required to achieve acceptable readability may depend on the display technology used.</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.4 (1)	The EMD shall have the capability of manually changing the map range.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.4 (3)	If the EMD is controlling the map range automatically, the mode (e.g., auto map range) should be indicated.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat

2.2.4 (4)	<p>If the EMD is controlling the map range automatically, then the capability shall exist to activate or deactivate the automatic map range.</p> <p><i>Note: An acceptable method of compliance is to have a discrete control action (e.g., button push) to activate the automatic range function.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.4 (5)	<p>If the automatic map range function is deactivated, the display should maintain the last range scale prior to deactivation until the flight crew manually selects another map range.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.4 (6)	<p>When the display is switched to a previously viewed page then the display should maintain the settings (e.g., range, pan) associated with that previously viewed page.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.4 (7)	<p>If a panning and/or range selection function is available, the equipment should provide the capability to return to an own-ship oriented display with a maximum of two discrete control actions (e.g., two button pushes).</p> <p><i>Note: The panning function is defined as moving the center reference of the display independent of the own-ship.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.4 (8)	<p>When using the panning and/or range selection function, an indicator of own-ship current position within the overall displayed image should be provided.</p> <p><i>Note: While panning across a map, moving from one area to another, the operator may lose track of what is being displayed, and be uncertain how to move in order to see some other area of interest. An indicator of current position may help operators to maintain overall orientation (Foley Van Dam 1982).</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.4 (9)	<p>The EMD shall have the capability to present map information in at least one of the following orientations: North-up or heading-up.</p> <p><i>Note:</i></p> <ol style="list-style-type: none"> 1. Desired North-up orientations (to facilitate cross checking with the paper charts and flight planning) are acceptable. 2. Use of default mode is encouraged. 3. This requirement does not apply to systems while displaying RAC data. 4. This requirement does not apply to pre-composed maps because it is undesirable to have text orientation other than "read right." 	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.4 (11)	<p>If the flight crew has selected a display orientation (e.g., heading-up), that display orientation should be maintained until an action that requires an orientation change occurs.</p> <p><i>Note: Actions can include crew selection of a different orientation or a mode change.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat

2.2.4 (12)	If the system is in North-up, the orientation of the map shall be referenced to true North.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.4 (13)	The default reference for all directional [information] on the EMD (e.g. heading, track, etc.) shall be magnetic, and "MAG" mode need not be annunciated.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.4 (14)	If the direction information is referenced to true North, this shall be indicated	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.4 (15)	Data fields should include the units of measurement or labels for the displayed data (Smith & Mosier, 1986). <i>Notes:</i> 1. RTCA DO-229C4 specifies that bearings be labeled with "0" to the right of the bearing value. 2. The label/ unit guideline need not apply if the numeric bearing number is anchored on a compass rose, and thus is not likely to be misunderstood.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.4 (17)	Current map orientation shall be clearly, continuously and unambiguously indicated (e.g., track-up vs. North-up). <i>Notes:</i> 1. Issue: systems exist that have four orientation modes available without any explicit indication of mode: actual track-up, North-up, heading-up, desired track-up. The orientation mode selected must be continuously indicated. Alternatively, the indication could be done using external annunciators or an external switch that indicates the orientation currently selected. 2. An acceptable means of compliance would be to have a "desired track-up" (or DTK1), "North-up" (or N 1), "heading-up" (or HDG 1) or "actual track-up" (or TRK 1) on the display. 3. A compass arc/rose or North indicator is an acceptable means of compliance for a system that provides only two options (North-up and one other option).	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.4 (18)	The EMD shall respond to operator controls within 500 msec. <i>Note: It is desirable to provide a temporary visual cue to indicate that the control operation has been accepted by the system (e.g., hour glass or message). It is recommended that the system respond within 250 msec.</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat

2.2.4 (19)	<p>The EMD shall update the displayed minimum required information set as defined in table 2-1, at least once per second.</p> <p><i>Notes: The following exceptions apply:</i></p> <ol style="list-style-type: none"> 1. While the EMD must be capable of operating at an update rate of once per second, it is acceptable to adjust the update rate either dynamically or at installation to match the update rate of the position source. While acceptable it is not necessary to update the display more often than once per second even if the data source is being updated at a higher rate. 2. It is acceptable for a longer delay, not exceeding five seconds, to occur at state transitions (e.g., orientation mode, range, and leg changes). 3. At larger map ranges this requirement may not be necessary since the movement of the minimum required information set may not be noticeable. 	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.4 (20)	<p>Maximum latency of aircraft position data at time of update shall be one second, measured from the time it is received by the EMD system.</p> <p>(e.g., maximum latency is one second for systems updating at 1 Hz).</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.4 (21)	<p>Movement of map information should be smooth throughout the range of aircraft maneuvers.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.4 (22)	<p>When the EMD receives a “data not valid” or “reduced performance” (e.g. dead reckoning mode) indication from the source, this condition shall be indicated on the EMB within 1 second.</p> <p><i>Note: For the purposes of this checklist, evaluate the behavior of the own-ship display during an unexpected interruption of data. The own-ship symbol shall not ‘freeze’, become erratic, or inaccurately depict location or present misleading information.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.4 (23)	<p>If aircraft positioning data are not received by the EMD for five seconds (i.e. data timeout), this condition shall be indicated to the flight crew.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.5 (1)	<p>The EMD shall provide a means to identify the database(s) version and valid operating period.</p> <p><i>Notes:</i></p> <ol style="list-style-type: none"> 1. An acceptable means of compliance is to require the pilot to acknowledge an out-of-date (or “expired”) database upon EMD start-up. Alternatively, a flight crew procedural check of data base validity would also be acceptable. 	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat

2.2.5 (2)	<p>The EMD shall indicate if any data is not yet effective or is out of date.</p> <p><i>Notes: Acceptable means of compliance include:</i></p> <ol style="list-style-type: none"> 1. disabling the display of out-of-date data; 2. using a distinct means of identifying out-of-date data on the display (e.g., unique color, shape, special label, etc.); or 3. indicating to the pilot during start-up which specific data is out-of-date (e.g., a message that says "off-route data not current " or "only on-route fixes and off-route airports are current, all other data is out of date "), and indicate in the operating manual that any out-of-date data displayed on the EMD must either a) be verified to be correct by the flight crew before use or b) not be used. Complex start-up messages with long lists of what is out of date are not acceptable. 	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.5 (3)	<p>There should be a required pilot action acknowledging an expired database.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.2.5 (6)	<p>WGS-84 position reference system or an equivalent earth reference model shall be used for all displayed data.</p> <p><i>Note: It is recognized that many datums exist other than ICAO Annex 15 WGS84 and that conversions exist between various datums. However, datums and conversions other than WGS-84 cannot be approved without determining acceptable datum equivalency to WGS-84. It is the responsibility of the approving authority to determine if an alternate datum is equivalent.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat

2.3.1	<p>The AMMD shall provide an indication if the accuracy implied by the display is better than the level supported by the total system accuracy.</p> <p><i>Notes:</i></p> <ol style="list-style-type: none"> <i>1. The total system accuracy includes consideration of all error sources, including the positioning accuracy, the data accuracy and resolution, display resolution and addressability, latency, etc.</i> <i>2. The accuracy implied by the display depends upon the system implementation. For example, the scale of the own-ship symbol relative to the map range may imply a level of accuracy. If a system provides the ability to display a circle around the own-ship symbol that indicates the system accuracy, then the circle would define the implied accuracy. The system may account for the fact that the inaccuracy is not constant: for example, the accuracy of survey data may vary. The objective is to ensure the user is aware of the performance limitations of the system. See also RTCA DO-257 section 3.2.3.</i> <i>3. Although new airport surveys are expected to provide more accurate airport data, currently the most significant error source is expected to be the data describing the airport environment. As described in RTCA DO-257 section 2.3.5, rather than trying to validate the accuracy of data before it is used, acceptable system performance is achieved through reporting of errors, and having a process to take corrective action or notify operators when there is an unresolved error. It is expected that pilots will report errors if they observe that the indicated position is inconsistent with the accuracy implied by the display. One intent of the indication required by this paragraph is to reduce the number of false data error reports caused because the implied accuracy is better than the actual and expected accuracy.</i> 	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.3.1.1.1 (1)	Capability shall exist to depict runways.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.3.1.1.1 (2)	<p>The depiction of runways shall be distinctive from all other symbology.</p> <p><i>Note: The use of color as the sole means of distinguishing runways may not be sufficient to meet this requirement.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.3.1.1.1 (3)	With the exception of instances where two or more runways intersect, each runway should be depicted as a contiguous area (i.e., an unbroken rectangle).	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.3.1.1.1 (4)	Runways should be depicted as filled areas, rather than outlined areas.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat

2.3.1.1.2 (1)	The capability should exist to depict taxiways.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.3.1.1.2 (2)	Taxiways should be depicted as filled areas, rather than outlined areas.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.3.1.1.3 (1)	Taxi route information shall be distinguishable from all other AMMD map attributes.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.3.1.1.3 (2)	The way taxi routes are depicted in the preview or edit mode shall be distinctive from the depiction of the active taxi route. <i>Note: An active taxi route is defined as the intended path that will be used during taxi.</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.3.1.1.3 (3)	The depiction of taxi routes should not obscure runway or taxiway identifiers. <i>Note: The intent of this recommendation is to ensure that taxi routes do not completely cover the identifiers.</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.3.1.2 (1)	The AMMD shall contain a symbol representing the location of the own-ship.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.3.1.2 (2)	If direction is not available, the symbol shall not imply directionality. <i>Note: If directionality becomes unusable due to low taxi speeds or when stopped, the own-ship would revert to a non-directional symbol (e.g., circle).</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.3.1.2 (3)	If directional data is available, the own-ship symbol should indicate directionality.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat

2.3.1.2 (4)	<p>If own-ship directionality information becomes unusable then this condition should be indicated on the AMMD.</p> <p><i>Notes:</i></p> <p>1. One method for indicating the loss of directionality information may consist of changing the own-ship depiction from a directional symbol to a non-directional symbol (e.g., circle).</p> <p>2. Equipment that does not have access to heading information may derive track based on changes in position over time (e.g., a Global Navigation Satellite System (GNSS) sensor used to derive track). However, this information will become unreliable when the taxi speed is low relative to turning velocity. Directionality information is generally considered unusable if it is not within 15 degrees of actual track.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.3.1.2 (5)	<p>If the own-ship symbol is directional, the front of the symbol that conveys directionality (e.g., apex of a chevron or nose of the aircraft if using an aircraft icon) should correspond to the aircraft location.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.3.1.2 (6)	<p>If the own-ship symbol is non-directional, the aircraft location should correspond to the center of the non-directional symbol.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.3.2 (1)	<p>The runway identifiers shall be available for depiction on the display, if available.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.3.2 (2)	<p>If taxiways are depicted then the taxiway identifiers should be available for depiction on the display, if available.</p> <p><i>Note: For requirement 1 and 2, the equipment is not required to continuously display all taxiway and runway identifiers. For example, some implementations may include a de-cluttering function to remove the identifiers.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.3.2 (3)	<p>If runway markings (e.g., runway centerline) are provided they should be depicted in their correct relative position.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.3.2 (4)	<p>Runway identifier should be distinguishable from the depiction of runway markings.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.3.2 (5)	<p>At reduced map ranges, at least one identifier should be displayed for any taxiway or runway depicted within the selected map range.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat

2.3.2 (6)	When surface map features are being depicted, the aerodrome designator (e.g., ICAO identifier) or name for the depicted aerodrome should be indicated on the display.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
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2.2 Additional Software Performance Specifications

	Requirement Description	Operator Compliance	Inspector Acceptance
1.	The own-ship symbol is not displayed above 80 kts ground speed and/or in flight.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.	Evaluate the behavior of the own-ship display when GPS connectivity is lost. The system should automatically remove the own-ship symbol until GPS connectivity is regained.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
3.	Assessment of Database Accuracy & Quality: Database accuracy should be 25 meters or better for all movement areas on the airport maps. A formal statement including production methods and quality control processes that assure database accuracy by the database manufacturer should suffice for determination of database accuracy contribution to the total target error budget.	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes:	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
4.	System Accuracy Assessment: The operator must demonstrate the system performs within a maximum total error budget of 40 meters. The 40 meter accuracy target is based on half the separation of taxiways at aerodrome code letter E as specified in ICAO Annex 14. The total error budget includes position source accuracy and database accuracy. Assessment of Total System Performance (includes position source): Attach documentation that demonstrates that the system is designed to support a maximum total error budget of 40 meters. Since GPS accuracy can be affected by antenna placement and airplane characteristics, measure actual results in a representative airplane to demonstrate the total error budget is achieved. Include a description of the methods used for error measurement, and actual results. (For accuracy assessment considerations, see Appendix A)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Attach supplier statement including required database accuracy & quality control process. <input type="checkbox"/> Attach total error budget assessment documentation and measured results.	<input type="checkbox"/> System configuration meets or exceeds 40 m maximum error requirement

Section 2 Inspector Acceptance:

1.	The operator has demonstrated that the system configuration meets or exceeds the specified performance requirements (at least 25 inbound and/or outbound taxi segments between parking location and runway).	<input type="checkbox"/> Yes <input type="checkbox"/> No
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3. COTS/PORTABLE GPS RECEIVER SUITABILITY

This section provides a list of factors for consideration in the selection and use of COTS GPS receivers as an input for the display of AMM surface own-ship position. Additional criteria may apply for an intended function en route or in other phases of flight, and is beyond the scope of this checklist.

	Requirement Description	Operator Compliance	Inspector Acceptance
1.	<p>GPS receiver receives an adequate number of channels (typically 12 channels or above).</p> <p>Note: Refer to GPS specifications provided by the supplier of the selected internal or external GPS.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.	<p>GPS receiver updates at a rate of 1 Hz or higher.</p> <p>Note: Refer to purchased GPS specifications.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
3.	<p>GPS receiver initial acquisition time for 20 meter or better accuracy is two minutes or less.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
4.	<p>GPS receiver has a suitable and reliable method of connectivity to the EFB. (see also Section 6, Wireless Connectivity).</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
5.	<p>GPS receiver accuracy reporting should be displayed within the charting application.</p> <p>If the GPS and/or location services of the EFB do not provide this information, the operator should capture additional data to adequately demonstrate the accuracy of the GPS source (e.g., larger sample size).</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
6.	<p>GPS receiver has an adequate battery life to perform the intended function in normal operation. If authorized, in flight charging may be permitted. (See current edition AC 120-76) NOTE: In the event a GPS receiver is not properly charged or exceeds battery limit, loss of this supplemental situation awareness software application is officially recognized as “No safety effect.” Training should include this case, directing pilots to continue taxiing using normal methods (i.e., reference to airport diagram and continued out-the-window focus).</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
7.	<p>GPS receiver/antenna must be positioned in a location within the aircraft to allow for good satellite reception.</p> <p>Note: The GPS receiver/antenna position in the cockpit must not obstruct or impede the pilot’s view during any phase of flight to include all ground operations involving taxi, and must be free from reflections that could interfere with the pilot's vision. When making this determination, the PI may consider the information in Title 14 of the Code of Federal Regulations (14 CFR) §23.773 and §25.773, Pilot compartment view. Keep in mind that these regulations apply to certificated applications and should only be used as guidance for this un-certificated application.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat

8.	<p>The GPS receiver/antenna location in the cockpit must be secure and not present a hazard. Considerations for device location include avoiding extreme hot or cold surfaces or vents. The GPS is not to block or hinder access or view of annunciations, levers, knobs, switches or any other equipment intended for use by the pilot.</p> <p>Note: The placement of the GPS receiver/antenna must not impede emergency egress through a cockpit window.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
9.	<p>The method used to secure the device is sufficient for ground movement, take-off and landing</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
10.	<p>Any cords used for charging or connectivity are not to be routed in such a way to distract or prevent emergency egress.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat

Section 3 Inspector Acceptance:

1.	<p>The operator has demonstrated the successful selection and use of COTS GPS receivers as an input for the display of AMM surface own-ship position.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
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4. VALIDATION OF CONFIGURATION FUNCTION

The operator shall conduct an evaluation to determine that the system configuration is operationally suitable and meets its intended function for the pilot. This evaluation should be performed on a representative sample of taxi segments appropriate for the operations conducted by the air carrier. The following items are areas of interest in the evaluation:

		Operator Compliance
1.	An evaluation clearly identifies the hardware, software and GPS configuration under test.	<input type="checkbox"/> Yes <input type="checkbox"/> No
2.	An evaluation of the own-ship display was conducted at a representative sample of airports appropriate for the operator. Sample airports should be representative of the types of airports normally accessed by the operator. Including the more complex airport types accessed by the operator is preferred. The operator should provide a list of airports and the data collected.	<input type="checkbox"/> Yes <input type="checkbox"/> No
3.	If possible, the evaluation of the own-ship display should be conducted in a variety of lighting and/or visibility conditions.	<input type="checkbox"/> Yes <input type="checkbox"/> No
5.	Evaluation results determined that the actual airplane location was not depicted in a location inconsistent with the real world. Depicted aircraft location does not present any misleading information to the crew. This should be accomplished using both survey and data driven means. See Appendix A.	<input type="checkbox"/> Yes <input type="checkbox"/> No
6.	Evaluation results determined that the removal of the own-ship position (required at GPS signal loss or degradation) occurred appropriately; the loss of own-ship or subsequent annunciation was not distracting and did not increase crew workload.	<input type="checkbox"/> Yes <input type="checkbox"/> No
7.	Evaluation results determined that own-ship symbol indicated the proper direction when the aircraft was moving and transitioned to a non-directional indication when heading information was unavailable or incalculable (e.g., when airplane was stopped)..	<input type="checkbox"/> Yes <input type="checkbox"/> No
8.	Evaluation results determined that depiction of the aircraft location on an airport surface diagram did not increase pilot workload.	<input type="checkbox"/> Yes <input type="checkbox"/> No
9.	Evaluation results determined that depiction of the aircraft location on an airport surface diagram did not have negative effects on the crew's situational awareness.	<input type="checkbox"/> Yes <input type="checkbox"/> No
10.	Evaluation results determined that there were no safety issues caused or made worse by the own-ship presentation.	<input type="checkbox"/> Yes <input type="checkbox"/> No

Section 4 Inspector Acceptance:

1.	The operator's evaluation was performed on a representative sample of taxi segments (include at least 25 inbound and/or outbound taxi segments between parking location and runway) appropriate for the operations conducted by the air carrier, and has determined that the system configuration is operationally suitable and meets its intended function for the pilot.	<input type="checkbox"/> Yes <input type="checkbox"/> No
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5. FLIGHT CREWMEMBER TRAINING AND OPERATIONAL PROCEDURES

		Operator Compliance
1.	In accordance with FAA AC 120-74, flight crewmember training materials and standard operating procedures reinforce safe taxi practices and the need to maintain an awareness of the aircraft's location on the field in relation to outside reference and the airport environment.	<input type="checkbox"/> Yes <input type="checkbox"/> No
2.	Flight crewmember training materials emphasize that the display should not become a distraction or increase 'heads down' time.	<input type="checkbox"/> Yes <input type="checkbox"/> No
3.	Preflight procedures adequately address any equipment set up or tasks to be performed prior to aircraft operation.	<input type="checkbox"/> Yes <input type="checkbox"/> No
4.	Flight crewmember training materials emphasize that this system configuration is not intended, or certified, as a primary reference for maneuvering in low visibility conditions.	<input type="checkbox"/> Yes <input type="checkbox"/> No

Section 5 Inspector Acceptance:

1.	Crewmember training and standard operating procedures adequately include any additional considerations necessary for the introduction of the display of AMM surface own-ship depiction.	<input type="checkbox"/> Yes <input type="checkbox"/> No
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6. WIRELESS CONNECTIVITY

6.1 General

		Operator Compliance	Inspector Acceptance
1.	The GPS receiver reliably pairs or maintains connectivity with the EFB.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
2.	It is readily apparent to the crew when wireless connectivity is present and operational.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
3.	There are reasonable mitigations in place to prevent inadvertent or malicious connectivity with unauthorized devices.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat
4.	A review of the system configuration has been performed to determine that the wireless functions will not inadvertently connect to any other aircraft communication, navigation or entertainment systems (unless otherwise specifically authorized by approved installation documentation).	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat

6.2 Electromagnetic Compatibility Demonstration

The following general guidance pertaining to electromagnetic compatibility demonstrations has been provided for the convenience of the operator and is only applicable to unmodified low output power and generally compatible frequency spectrums of Bluetooth and 802.11x wireless devices, compliant to current standards for emissions by the Federal Communications Commission (FCC). Any other wireless technology is beyond the scope of this document.

In order to operate a portable electronic device (PED), or transmitting PED (T-PED), the user/operator must comply with 14 CFR Part 91.21, 121.306, 125.204, 135.144. FAA Order 8900.1 contains procedures for the authorization of Electronic Flight Bags, and a description of a practical means to perform electromagnetic compatibility testing applicable to Portable Electronic devices. Data for radio frequency emissions documented in the applicable RTCA DO-160 Section 21 or FCC test report for the portable electronic device can be used to determine frequencies that should be checked during operation of the aircraft radio receivers in use by the subject aircraft. Demonstrate that the device output power, emissions characteristics and location within the aircraft is electromagnetically compatible with aircraft navigation, communication or other safety-related electrical and electronic systems by performing operational checks on the ground and then in flight. The frequency assessment and operational checks are aircraft/make/model/Series and EFB configuration specific.

For example, if a separate portable GPS receiver is used to provide position information to the EFB using wireless connectivity such as a portable GPS receiver with Bluetooth or 802.x connectivity, the operator should demonstrate that operation of the portable GPS receiver is electromagnetically compatible with the operation of other aircraft electrical and electronic systems by performing a frequency assessment and documented operational checks using an industry standard checklist.

For your convenience, a sample electromagnetic compatibility checklist may be downloaded from <http://fsims.faa.gov/PICResults.aspx?mode=Publication&doctype=Other>

Section 6 Inspector Acceptance:

1.	The operator has demonstrated the successful use of a wireless connectivity as part of an authorized system configuration.	<input type="checkbox"/> Yes <input type="checkbox"/> No
2.	The operator has successfully performed the required non-interference testing required for the use of wireless technology	<input type="checkbox"/> Yes <input type="checkbox"/> No

7. FINAL REVIEW AND SIGNATURE

Name of Operator: _____

Originator: _____

FAA Office: _____

Supervisor Initials: _____ (DATE) _____

Inspector Signature: _____ (DATE) _____

Accuracy Assessment of the EFB System

Why is an Accuracy Assessment needed?

FAA AC 120-76 indicates Type B software applications showing own-ship on the AMM for surface must be designed with a maximum accuracy error target of 40 meters. This requirement is based on half the separation of taxiways at aerodrome code letter E as specified in ICAO Annex 14. The 40 meter limit considers two components in the overall error “budget,” 1) database accuracy and 2) GPS location accuracy.

The system includes EFB hardware, charting software application, chart database, and the GPS receiver source. For implementations involving portable GPS position source, additional variables are introduced by the placement of the GPS antenna in the airplane, and the characteristics of the airplane itself (e.g. heated and/or shielded windshield effects). Due to the variety of elements that can affect system performance, a practical in-airplane evaluation is required to demonstrate system accuracy.

Compliance through Practical Evaluation:

The following guidelines may be helpful for performing the required in-airplane evaluation. The guidance below assumes a portable GPS, or GPS built into the EFB, is utilized. If an aircraft installed GPS data is used, disregard comments about GPS antenna placement/location.

- Determine the desired location of the GPS antenna, considering the tips in Section 3. Secure the GPS in that location. Document the location for subsequent use for deployment, training and procedures development.
- Execute a statistically relevant sample of taxi operations. During the taxi operations, digitally capture and record the GPS latitude/longitude track files. Instruct pilot(s) to diligently taxi with nose on centerline during taxi segments used in the evaluation.
- It is recommended to include taxi operations at airports that are representative of more complex airports typically accessed by the operator.
- Taxi segment samples should include data that is derived from runways and taxiways, and should include numerous turns.
- Note any unusual events, such as observing own-ship in a location on the map that is notably offset compared to the real world, own-ship changing to non-directional when airplane is moving, and times when own-ship disappears from the map display.
- Compare the recorded GPS track files against valid ground-truth source, and measure typical and “most severe” offsets compared to ground truth.
- Complete a statistically valid analysis to determine that own-ship accuracy falls within the “GPS location accuracy” component of the total error budget. The analysis must include at least 25 inbound and/or outbound taxi segments between parking location and runway.
- Operators should attempt to capture data from a representative sample of your typical airports of operations.
- Document the captured data and your completed analysis and review with your POI to determine if the results meet the relevant requirements of this Job Aid.