AERONAUTICAL CHARTING FORUM
Instrument Procedures Group
Meeting 14-02 – October 28, 2014

RECOMMENDATION DOCUMENT

FAA Control # 14-02-317

Subject: Use of GPS on Conventional (Ground-Based NAVAID) Instrument Approach Procedures (IAPs)

Background/Discussion:

FAA Advisory Circular AC 90-94 prescribed a means to use GPS on non-precision approach (NPA) procedures referred to as the "GPS Approach Overlay Program". Today, only the Phase III overlay approaches remain. These approaches contain "or GPS" in the procedure title and the use of GPS on these approaches is addressed by the Aeronautical Information Manual (AIM) in section 1-1-18 g. AC 90-94 was canceled by the FAA and replaced by AC 90-105. Since the AC's cancelation, there is no guidance furnished to pilots concerning the use of GPS to fly conventional, ground based NAVAID NPAs (e.g. VOR, VORTAC, VOR/DME, or NDB).

While the AIM states that the underlying NAVAID on IAPs titled "or GPS" need not be operational nor is the pilot required to actively monitor the NAVAID during the approach, the only guidance provided in the AIM concerning approaches **not titled** "or GPS" is furnished in paragraph 1-1-18e4:

4. As the production of stand-alone GPS approaches has progressed, many of the original overlay approaches have been replaced with stand-alone procedures specifically designed for use by GPS systems. A GPS approach overlay allows pilots to use GPS avionics under IFR for flying designated nonprecision instrument approach procedures, except LOC, LDA, and simplified directional facility (SDF) procedures. These procedures are identified by the name of the procedure and "or GPS" (for example, VOR/DME or GPS RWY15). Other previous types of overlays have either been converted to this format or replaced with stand-alone procedures. Only approaches contained in the current onboard navigation database are authorized. **The navigation database may contain information about non-overlay approach procedures that is intended to be used to enhance position orientation, generally by providing a map, while flying these approaches using conventional NAVAIDs**. This approach information should not be confused with a GPS overlay approach. (See the receiver operating manual, AFM, or AFM Supplement for details on how to identify these approaches in the navigation database.)

This AIM paragraph implies that GPS may be used to furnish a moving map that is beneficial for situational awareness; however, it states that the approach must be flown using the conventional NAVAIDs. This paragraph does not state what constitutes acceptable conventional NAVAIDs course guidance (e.g. CDI, bearing pointer, etc.) and whether it is acceptable to fly the approach using GPS while displaying acceptable course guidance.

In addition, paragraph 1-2-3a and Note #4 in AIM section 1-2-3, Use of Suitable Area Navigation (RNAV) Systems on Conventional Procedures and Routes states:

1. ***Use of a suitable RNAV system as a Substitute Means of Navigation*** when a Very-High Frequency (VHF) Omni-directional Range (VOR), Distance Measuring Equipment (DME), Tactical Air Navigation (TACAN), VOR/TACAN (VORTAC), VOR/DME, Non-directional Beacon (NDB), or compass locator facility including locator outer marker and locator middle marker ***is out-of-service*** (that is, the navigation aid (NAVAID) information is not available); ***an aircraft is not equipped with an Automatic Direction Finder (ADF) or DME; or the installed ADF or DME on an aircraft is not operational***. For example, if equipped with a suitable RNAV system, a pilot may hold over an out-of-service NDB

NOTE−
4. ***Pilots may not substitute for the NAVAID (for example, a VOR or NDB) providing lateral guidance for the final approach segment.*** This restriction does not refer to instrument approach procedures with "or GPS" in the title when using GPS or WAAS. These allowances do not apply to procedures that are identified as not authorized (NA) without exception by a NOTAM, as other conditions may still exist and result in a procedure not being available. For example, these allowances do not apply to a procedure associated with an expired or unsatisfactory flight inspection, or is based upon a recently decommissioned NAVAID.

Taken together, a conclusion can be drawn that GPS (or FMS systems incorporating an approach approved GPS sensor) may not be used as the primary navigation source to fly a VOR or an NDB approach and that lateral guidance must be furnished by the ground based NAVAID. Industry seeks clarification concerning what type of primary guidance must be displayed and followed when flying a conventional, ground-based NAVAID approach and any alternate displays (e.g. GPS) that are acceptable for use by FAA.

Recommendations:

An approach-capable GPS provides many advantages to instrument approach operations including decreased pilot workload. For many aircraft, it also provides vertical guidance to stabilize the final approach using a constant descent profile down to, but not below, the minimum descent altitude (MDA). NBAA strongly believes that these features should be available and usable when conducting conventional ground-based NAVAID approaches **that are not titled "or GPS".**

NBAA request that FAA Flight Standards publish in the AIM guidance necessary to satisfy the requirement to base primary course guidance on the ground-based NAVAID

while still permitting the use of approach certified GPS receiver guidance to fly an instrument approach based on a ground-based NAVAID. As a starting point for discussion, such requirements ***could*** include:

1. Requirement that the ground based NAVAID approach be retrievable from the navigation database without modification.

2. Requirement that the ground-based NAVAID be operational & that the aircraft be equipped with an approved & operational navigation receiver applicable to the approach (e.g. VHF navigation receiver, ADF receiver).

3. Statement that it is acceptable to use an approach-certified GPS navigation receiver to fly a conventional NAVAID approach in the final approach segment provided that the pilot displays a source of lateral guidance for the conventional NAVAID. State what is acceptable for conventional NAVAID lateral guidance. Possible options for lateral guidance displays might include:
    - Display of a CDI for VOR navigation, or
    - Display of a bearing pointer for VOR or NDB navigation

4. Which approach types are excluded from using an approach-certified GPS to fly the approach in the final approach segment (e.g. LOC, LOC BC, LDA, and SDF).

5. Actions to take should a discrepancy exist between the lateral guidance furnished by the ground based NAVAID receiver and the approach-certified GPS navigation guidance.

Should FAA determine that GPS cannot be used for final approach lateral guidance on approaches that are not labeled "or GPS", we request that FAA amend AIM paragraph 1-1-18e4 to clearly state that final approach guidance must be based on the display and use of the conventional NAVAID lateral guidance (e.g. CDI for VOR, bearing pointer for NDB).

Comments: The recommendation affects:

- Aeronautical Information Manual (AIM)

Submitted by: Richard J. Boll II
Organization: NBAA
Phone: 316-655-8856
FAX:
E-mail: Richard.boll@sbcglobal.net
Date: 9/24/2014

Initial Discussion – MEETING 14-02: New issue presented by Rich Boll, NBAA, (View); provided background on the GPS overlay program. The third phase (first two done) added the "…or GPS" on conventional procedures. With addition of new RNAV approaches, the "or GPS" is are being removed from the conventional procedure chart titles (i.e. if currently a VOR or GPS RWY 14 approach exists, addition of an RNAV 14

approach will cause the "or GPS" is being removed from the VOR 14 approach title). The VOR approach is still in the database, but if flying it using RNAV, what guidance is the pilot to use on the final approach? FAA does have guidance in the AIM, paragraph 1-2-3, and AC 90-108, with respect to substitution (i.e., using GPS in lieu of an inoperative NAVAID or aircraft equipment) and is not the issue here. Rich is inquiring into AIM/AIP guidance where RNAV can be used on conventional procedures. Particularly in the final approach segment, defining what monitoring requirements are, what conventional NAVAID course guidance is sufficient, any limitations/tolerances, and how to resolve contradictory information. Vince Massimini, MITRE, pointed out that AC 90-108 covers most of this already, up to final, and allows for lateral guidance except on final (pilot needs to switch to conventional for final). Rich pointed out this not clear in the AIM/AIP and there is some confusion/ disagreement in the field. Rich believes that this is not a certification issue, but an operations issue. John Blair, AFS-410, said that if on a VOR approach and using the benefits of RNAV, you need to have VOR guidance up somewhere. Group discussion ensued regarding different airline Op Specs and operations, the fact that how no one is flying raw data, use of approach overlays and differences for Part 91 & 135 operations. Rich said that all NBAA is looking for is more definitive AIM/AIP guidance on this issue, whatever it comes out to be. AFS-470 will take IOU to look it over for possible AIM/AIP enhancement of current guidance.

Status: AFS-470 will review and look at AIM/AIP guidance. **Item Open:** AFS-470

MEETING 15-01: Kel Christianson, AFS-470, stated that draft language for the AIM has been accomplished and is under review by management. John Collins inquired about the direction this is taking and Kel advised it is essentially "monitoring." The pilot will need the VOR or NDB working to monitor; i.e., use RNAV for guidance and the conventional systems operating for monitoring and if there are differences between the two, the conventional system takes precedence for course guidance or missed approach. Rich Boll, NBAA, said that would mean if an aircraft is not ADF equipped, then you cannot shoot an NDB approach. Kel supported this statement. A brief discussion followed on differences between alternate means of approach vs. substitute means. Rich discussed the SMO VOR-GPS-A approach being changed to a VOR-A only. He is concerned the RNAV approach may not be operational then. Tom Schneider, AFS-420, said policy is that VOR-GPS procedures will not be removed until an RNAV approach is in place (normally this happens concurrently).

Status: Kel will brief on progress at next ACF. **Item Open:** AFS-470

MEETING 15-02: Kel Christianson, AFS-470, said currently we have substitute and alternate navigation with RNAV systems on conventional procedures up to the FAF, but it is not authorized inside the FAF, and these two do not require the pilot to monitor a NAVAID. Draft explanatory AIM language including a note (View) was shown. Lev Prichard, APA, said airlines under OpsSpec approval can directly substitute with suitable RNAV inside the FAF, but no one else can. Kel said C300 allows this currently (part 121 and some other operators can get this), but in general, aircraft cannot proceed inside FAF without monitoring the ground based navigation system. Rich Boll, NBAA, asked if once this is in the AIM, does it cancel the OpsSpec? Kel said no, adding without the

provisions of OpsSpec C300, the underlying ground system must be operational and received in aircraft to ensure course alignment. Kel said this is a change, even though some pilots are incorrectly doing it now anyway. Larry Hills, FedEx, inquired if this language should be tightened up to refer to the NAS only, and Kel concurred. Jeff Kerr, AFS-470, explained the main point in OpsSpec C300 is that the airline is required to check flyability on the final approach segment. In the absence of C300 authorization, you must be able to monitor the underlying ground navigation system for course alignment. Lev commented about the confusion on this, and Kel added AC 90-108 explains the terms. Kel will make some minor word changes and keep the agenda item open until the AIM is published.

Status: Track status of AIM update. **Item Open:** AFS-470.

MEETING 16-01: Mason Curling (AFS-470) advised AIM language (para 1-2-3) locked in and will be published 5-26-2016. (View) Bob Lamond (NBAA) requests item remain open until published.

Status: Mason will track status of the AIM update. **Item Open:** AFS-470.